7th IUFRO Extension Working Party Symposium 2004, Orvieto and Rome - Italy, September 27 – October 1

“Communication Strategies for Multiple Partner Involvement in Forest Extension”

Program

Monday, September 27

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<tr>
<th>Morning</th>
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<tr>
<td>07:00</td>
<td>Travel to Orvieto from Rome</td>
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<tr>
<td>10:00</td>
<td>Arrival in Orvieto, Hotel Check – in</td>
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<tr>
<td>10:30 onwards</td>
<td>Registration, Palazzo dei Sette, Orvieto</td>
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<tr>
<td>11:00</td>
<td><strong>Opening session</strong></td>
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<tr>
<td></td>
<td>• HE Romualdo Bettini, Italian Ambassador to the UN in Rome</td>
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<td>• Dr. Stefano Mocio, Mayor of Orvieto</td>
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<td></td>
<td>• Dr. ssa Loriana Stella, Vice-President of Terni Province</td>
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<td></td>
<td>• Chief, Forest Policy and Institutions Service, (FONP),</td>
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<td></td>
<td>Forestry Department FAO Break</td>
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<td></td>
<td>Key note addresses:</td>
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<td></td>
<td>• Prof. Giuseppe Scarascia Mugnozza, Director Istituto di Biologia Agroambientale e Forestale (IBAF), Consiglio Nazionale delle Ricerche (CNR), Italy</td>
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<td></td>
<td>• Prof. James Johnson, Chair International Union of Forest Research Organisations, Forest Extension working party</td>
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<td></td>
<td>• Dr. Ester Zulberti, Chief Extension, Education and Communication Service (SDRE) &amp; Christine Holding Anyonge, Forestry Officer (Extension), Forestry Policy and Institutions Service, Forestry Department, FAO</td>
</tr>
<tr>
<td>13:00 – 14.00</td>
<td>Lunch</td>
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Afternoon

**Learning processes and collective action in forestry extension**

**Moderator: Jim Johnson**

<p>| 14.00            | Reed A. Scott (USA): Strategic Relationships: Collaboration and Partnerships for Success |
| 14:20            | Gonzalez-Miranda (Puerto Rico): Puerto Rico’s Extension Service Urban Forestry/Arboriculture |
| 14:40            | Hubbard, William (USA): Communities of Interest: Working Across Stakeholder/Agency Boundaries to Develop Effective Forestry Education programs in the Southern United States |
| 15:00            | Shanley, Patricia (CIFOR - Brazil): Transforming Forest Research and Extension for Rural and Urban Relevance in the Brazilian Amazon |
| 15:20            | Break                                                            |</p>
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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>15:50</td>
<td>Thompson, Jakob (FAO/SDRE-Cambodia)</td>
<td>Communication for Development and multi stakeholder involvement in forestry extension</td>
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<tr>
<td>16:10</td>
<td>Wolter-McCord, Faren (USA)</td>
<td>A Collaborative Ecosystem Stewardship Approach to Private Lands Conservation</td>
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<tr>
<td>16:30</td>
<td>Wu, Shuirong (China)</td>
<td>Extension Strategies in the Sloping Land Conversion Program in China: An Analysis of their Strengths and Limitations</td>
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<td>16:50</td>
<td>LeBrun-Ruff, Anne (Canada)</td>
<td>A new approach to Forest Extension in New Brunswick, Canada</td>
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<td>17:10</td>
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<td>Early evening</td>
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<tr>
<td></td>
<td></td>
<td>Balancing public good and private interest in small scale forestry - (Biodiversity, ecological and environment )</td>
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<td>Moderator: Fiorella Villani, CNR-IBAF</td>
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<tr>
<td>17:30</td>
<td>Primmer, Eeva Finland</td>
<td>Biodiversity Integration to Forest Services in Finland: Policy Implications</td>
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<tr>
<td>17:50</td>
<td>Kant, Promode (India)</td>
<td>Public Interest Litigation Helps Extend Scientific Harvesting To Forests Owned by Tribes in India: An Ecological, Equity and Legal Analysis</td>
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<tr>
<td>18:10</td>
<td>Smith, Ed (USA)</td>
<td>A Collaborative Approach to Wildfire Threat Reduction in Nevada</td>
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<tr>
<td>18:30</td>
<td>Nketiah, K.S. (Ghana)</td>
<td>Bridging Science and Society to Conserve Ghana’s Rain Forest</td>
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<td>18:50</td>
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<td>Close for the day</td>
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<td>20:00</td>
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<td>Group Dinner</td>
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**Tuesday, September 28**

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<tr>
<th>Time</th>
<th>Speaker/Location</th>
<th>Topic</th>
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<tbody>
<tr>
<td>08:30</td>
<td>Mizaraite, Diana (Lithuania)</td>
<td>Forestry Extension for Private Forest Owners in Lithuania</td>
</tr>
<tr>
<td>08:50</td>
<td>Raae, Karsten (Denmark)</td>
<td>It is all about sharing interest</td>
</tr>
<tr>
<td>09:10</td>
<td>Wild-Eck, Stephan (Switzerland)</td>
<td>The Growing Spectrum of Interests Among Private Forest Owners as a Challenge for Extension Services Insights from a Survey on Private Forest Owners in Switzerland</td>
</tr>
<tr>
<td>09:30</td>
<td>McGill, Dave (USA)</td>
<td>Information Transfer During the Timber Transaction Process in West Virginia, USA</td>
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<tr>
<td>09:50</td>
<td>Lengyel, Attila (CEPF/Hungary)</td>
<td>Extension Activities for Small-Scale Private Forest Owners in CEE Countries</td>
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<td>10:10</td>
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<td>Break</td>
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**Moderator: Karsten Raae**
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<thead>
<tr>
<th>Time</th>
<th>Speaker &amp; Affiliation</th>
<th>Presentation Title</th>
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<tbody>
<tr>
<td>10:40</td>
<td>Beck, Roland (Germany)</td>
<td>Enhancing the Acceptance and Adoption of “new” Harvesting Technology through Multiple Partner Involvement. A Case Study from Bavaria, Germany</td>
</tr>
<tr>
<td>11:00</td>
<td>Creighton Janean, Baumgartner, David (USA)</td>
<td>Extension Education for Family-Forest Owners in an Urbanizing Environment</td>
</tr>
<tr>
<td>11:20</td>
<td>Pagliarino, Elena (Italy)</td>
<td>Participation and Communication in Forestry Training: The Case Study of Chestnut Fruit Filière in Southern Italy</td>
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<tr>
<td>11:40</td>
<td>Hughes, Glenn (USA)</td>
<td>Research and Extension Effort Targeting Underserved Forest Landowners in the South Central United States</td>
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<tr>
<td>12:00</td>
<td>Tietje, William (USA)</td>
<td>The University of California Integrated Hardwood Range Management Program: Addressing Oak Woodland Conservation Through Research and Education</td>
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<tr>
<td>12:20–13:20</td>
<td>Lunch</td>
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**Afternoon**

Experiences in the application of techniques approaches, tools and methods extension communication  
**Moderator: Scott Reed**

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>13:20</td>
<td>Johnson, James E. (USA)</td>
<td>Communicating with Forest Owners: A Web-Based Distance Education Approach</td>
</tr>
<tr>
<td>13:40</td>
<td>Moore Susan E. (USA)</td>
<td>Knowledge Transfer and Attitude Adjustment through Experimental Learning: The North Carolina Sustainable Forestry Teachers’ Tour</td>
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<tr>
<td>14:00</td>
<td>Borgschulte, Michael (Germany)</td>
<td>Co-orientation as a Basis for Communication Strategies.</td>
</tr>
<tr>
<td>14:20</td>
<td>Oslejis, Juris (Latvia)</td>
<td>Transfer of Communication Skills from DFRI (Denmark) to LSFRI &quot;Silava&quot; (Latvia) and Involvement of New Partners from Baltic States into Nordic Forest Extension Network</td>
</tr>
<tr>
<td>14:40</td>
<td>Laessig, R. (Switzerland)</td>
<td>Waldwissen.net: A joint internet-based information and communication platform on forest knowledge in the alpine region</td>
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<td>15:00</td>
<td>Break</td>
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**Moderator: Kwabena Nketiah**

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<thead>
<tr>
<th>Time</th>
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<th>Presentation Title</th>
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<tbody>
<tr>
<td>15:20</td>
<td>Begus, Jurij, Breznikar, Andrej (Slovenia)</td>
<td>Analysis of different communication channels and its characteristics in forestry extension in Slovenia</td>
</tr>
<tr>
<td>15:40</td>
<td>Hou Yuanzhao (China)</td>
<td>Communication Strategies Adopted in the ITTO Demonstration Project of Sustainable Management of Tropical Forest in Hainan: an Evaluation of their Comparative Effectiveness</td>
</tr>
<tr>
<td>16:00</td>
<td>Strnad, Renee (USA)</td>
<td>Increasing Fire Education for Youth and Adults: The BLM-PLT Fire Education Initiative in North Carolina</td>
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<tr>
<td>16:40</td>
<td>Break</td>
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**Early**

Agroforestry : Extension and communication experiences (Italy)
evening

Moderator: Jurij Begus

17:00 Pisanelli, Andrea (Italy):
Farmers’ awareness of Silvoarable Agroforestry systems: Perception and Interest in Italy

17:20 Paris, Pierluigi (Italy):
Agroforestry systems as an alternative to pure forest plantations for timber production on arable lands in Italy

17:40 Cami, Sebastiano (Consortium Atena, Italy):
The farmers’ opportunities within the European Policy framework

18:00 Briefing on logistics of next day field excursion and close of the day

20:00 Dinner: own choice

Wednesday, September 29

All day Excursion (including dinner)

Morning Chestnut forest management for fruit and timber production

Afternoon Monte Rufeno Regional Park: public forest for multipurpose aims

Thursday, September 30

Morning

08:30 Feedback on field trip: Participant Rapporteur

Agroforestry: Extension and communication experiences (International)
Moderator: Mizaraite

08:50 Linyunga, Kenneth (ICRAF - Mozambique): Accelerating Agroforestry Adoption: A Case of Mozambique

09:10 Cannata F. et al.: Research Activity and Spreading about Agroforestry in China

09:30 Mannigel, Elke (Germany/Brazil):
Participatory Monitoring of Agroecological Practices Implemented in the Buffer Zone of private Reserve Mata do Sossego in the Scope of the Doces Matas Project in Minas Gerais Brazil

09:50 MacClinchy, Wendy (UNOPS- Afghanistan):
Greening Afghanistan: Restoring Severely Degraded Natural Resources through Livelihoods

10:10 Break

10:30 – 12:30 Themed Group Discussions / Rotational Brainstorming Session
Round 1, 2, 3

12:30 - 13:30 Lunch

Afternoon

13:30- 15:00 Themed Group Discussions / Rotational Brainstorming Session
Round 4 and final round: market place

15:00 End of session / Departure for Rome

16:09 Departure Train Orvieto to Rome

17:20 Arrival in Rome
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<tr>
<td>20:00</td>
<td>Group Dinner in Rome</td>
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<tr>
<td><strong>Friday, October 1st</strong></td>
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</table>
| **Morning:** | Iran Room, FAO Headquarters, Rome  
Chair: Director FON |
| 09:00 | Introductory remarks: Mr. Michael Martin, Director Forestry Policy and Information Division, FON, FAO |
| 09:15 | FAO and IUFRO collaboration: Oudara Souvanna vong, Senior Forestry Officier (Research) Forestry Department, FAO |
| 09:30 | Synthesis and perspectives of the meeting: Giuseppe Scarascia Mugnozza, Director IBAF, CNR, Italy |
| 10:10 | Overview of IUFRO meeting: Jim Johnson, Chair IUFRO Working Party |
| 10:30 | Break |
| 10:45 | Introduction to theme presentations: Roland Beck, Deputy Chair IUFRO Forestry Extension, and Christine Holding Anyonge FAO |
| 10:50 | Learning processes and collective action in forestry extension |
| 11:10 | Small forest landowners (non-industrial private owners) – information and organizational needs |
| 11:30 | Experiences in the application of techniques approaches, tools and methods of extension communication  
Agroforestry: Extension and communication experiences |
| 11:50 | Balancing public good and private interest in small-scale forestry |
| 12:10 | Official closure |
| 12:30 | Lunch |
| 14:00 | Farewell: Flag Room |
Co-orientation as a Basis for Communication Strategies

by

Michael Borgschulte
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Tel: +49 761 203-3790, Fax +49 761 203-3763, E-mail michael.borgschulte@fobawi.uni-freiburg.de,
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Abstract

Social, technical and environmental issues have prompted environmental groups, citizens and political leaders to start making changes. Some central issues in this process are conservation, improvement of biodiversity as well as environmental education and sustainable management. Since various stakeholders may have different views on these complex issues, it is important that those working with communication strategies for multiple partner involvement are able to understand the underlying complexity of stakeholder relationships.

This paper introduces the “co-orientation” model as a unifying framework for identifying the states of relationships between stakeholders in a communication process. For a communication strategy to be effective it should be based on an accurate assessment of the communicating parties’ knowledge about each other’s perceptions of the issue under consideration.

Sustainability is a complex concept. Consequently, it is common for stakeholders to have differing definitions of it and also to have inaccurate perceptions about others’ definitions. The co-orientation model provides guidance for improving communications and stakeholder relationships by identifying different co-orientation states of the communicating parties. The implications for the development of effective communication strategies are discussed in this paper.

Keywords

Co-orientation, Communication Relationships, Communication Strategies, Sustainable Development
1. Introduction

Communicating Complex Issues

In their attempts to meet increasingly demanding environmental performance expectations from a critical group of external stakeholders, organizations are faced with many challenging tasks. Some of these tasks may be characterized as “technical” in that they require the application of new technologies to address particular problem areas. In many cases, such environmental improvements are incremental efficiency improvements and come about as a part of the organization’s plan of process improvements using the latest available technology. Communicating these types of environmental initiatives is relatively unproblematic. The organization has the technical knowledge and it informs the stakeholders about the costs and benefits. The results can be objectively assessed by outside parties.

Those cases in which there are no generally agreed upon standards for measurement, or where there is considerable discussion about the fundamental issues involved, represent another class of environmental challenges. From the organization’s perspective, communications that relate to this type of environmental issue is considerably more difficult. Consequently, the type of communications chosen by the firm under such conditions is different than that used in the case of efficiency improvements.

Co-orientation to Sustainable Forest Management in the Chain-of-Custody

In 1999 the Norwegian forest industry was involved in a long-term program (Borgschulte et al. 2000) that falls under the description of the second case. At issue was the development of sustainable forest management practices. One initiative to reach this goal was certification in the chain-of-custody. Forest certification is a system for identifying well-managed forestland with the goal of sustainability (Upton et al. 1995). Certification may not have a direct impact on achieving sustainable management, but it can have a valuable indirect effect (Castañeda et al. 2001). To carry an “ecolabel” a product must have documentation that shows it comes from a certified forest. This information trail from the forest owner through the various processes and the distribution stages is called the chain-of-custody.

The confounding factor in this communication problem is that the concept of “sustainable development” can be interpreted in a number of different ways, depending upon the stakeholder group. Additionally, since one cannot assume that one stakeholder’s definition will be accepted by others, there should be a mutual learning component (Grunig et al. 1984) built into the communication strategy. This requires that the forest industry see the communication process as an ongoing, dynamic process.

According to Plato (Bohm 1990) the skills necessary for achieving a desirable and ethically preferable style of communication have their roots in dialogue. Dialogue is defined by Senge et al. (1994) as a sustained collective inquiry into the processes, assumptions and certainties that comprise everyday experiences. It has been proposed that communication that seeks mutual understanding is two-way (Grunig et al. 1984). The key element in Grunig and Hunt’s (1984) symmetrical two-way communication model is feedback activity. They emphasize that feedback is in the form of dialogue. It carries with it the potential that the stakeholder groups will influence the organization as much as the organization influences the stakeholder groups. An effective communication requires the communicating parties to have an accurate picture of each other’s perceptions of the issues under consideration.

In the next section, the co-orientation model is presented as such a framework. The third section links co-orientation states and communication activities and emphasizes the importance of learning in an effective communication strategy. The last section describes the results gained in the long-term Norwegian program and specifies recommendations towards an effective communication strategy regarding sustainable development.
2. Co-orientational Framework

The Co-orientation Model

Newcomb (1953) originally developed the co-orientation model as a tool for relational analysis of dyadic pairs. This simple, yet insightful, model consists of two communicators, A and B, and their “co-orientation” toward some “object of communication”, X (Figure 1). The object of communication can be an actual physical object, an event, an activity, an attitude, or a behavior. Each communicator, A and B, has a simultaneous co-orientation towards her or his communication partner and towards the object of communication.

![Figure 1: Newcomb’s A-B-X co-orientation model (1953)](image)

Newcomb (1953) identified four basic components of this relation system:
- A’s attitude toward X; and A’s attraction to B;
- B’s attitude toward X; and B’s attraction to A.

McLeod and Chaffee’s (1973) co-orientation model (Figure 2) builds on Newcomb’s paradigm. The co-orientation model assumes that each actor in the co-orientation pair has two set of cognitions: a “self-perception” of a particular object or attributes of the object, and an “other-perception” of what the other person thinks about the object or its attributes. Comparison of these four sets of cognitions yield five relationships, indicated by arrows in Figure 2. According to McLeod and Chaffee (1973) these five measures identified by the co-orientation model generates three basic kinds of communication states: Congruency, Agreement and Accuracy.

![Figure 2: Co-orientation model (McLeod & Chaffee 1973)](image)
Communication Relationships in the Co-orientation Model

Congruency is not a true interpersonal variable from the objective social system point of view since it is an indicator of the degree of similarity between person’s own cognitions and her/his perception of the other person’s cognitions. The point is that the effect of communication may be either to increase or decrease congruency, depending on its initial level and the actual state of the system. Congruency tends to be more important in the early stages of interpersonal processes and consequently has been useful as an independent variable in developing communication theory (e.g., Pearce et al. 1972).

The degree of similarity, or cognitive overlap, between the co-orientations of the “organization’s definition” and the “stakeholders’ definition” is called “agreement”. To the extent that the organization and the stakeholder group have the same summary evaluations of objects there is agreement. McLeod et al. (1972) argued that agreement is not a satisfactory criterion for communication. It can be argued that personal values, the products of many kinds of individual experiences and constraints, are unlikely to be changed sufficiently by communication alone to produce complete agreement.

Accuracy is the extent to which one participant’s estimate of the other’s cognitions matches what the other participant really does think, seems an ideal criterion for communication. A key assumption underlying the co-orientation model is that a person’s behavior is not based simply upon a private cognitive construction of the person’s own world, but also a function of the perception of the co-orientation held by others around the person and of the orientation to them. This assumption serves as an important basis of this study because the forest industries are likely to design their services based not only on their own cognitions, but also on their perceptions of their end consumers’ cognition.

Co-orientation states in the Co-orientation Model

By including many individual simultaneously oriented to issues of mutual concern and interest, the interpersonal co-orientation model can be extended to large social groupings. The co-orientational concept of public opinion in communities and society casts public opinion as the product of both “individual perceptions on an issue” and “their perceptions of what significant others think about the same issue”.

Social scientists recognized the need to take into account perceptions of agreement in addition to actual agreement. Scheff (1967), for example, argued that perceptions of agreement can be independent of actual agreement and that perceptions of agreement more likely affect public behavior than does actual agreement. Those involved in issues of public debate often do not know the state of actual agreement, and are operating instead on their perceptions of agreement. A number of combinations of co-orientation states between communicating parties are possible (Table 1) and each can be expected to have different implications for an effective communication strategy.

<table>
<thead>
<tr>
<th>Co-orientation state</th>
<th>Scheff (1967)</th>
<th>Dozier et al. (1992)</th>
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<tbody>
<tr>
<td>Monolithic consensus or true consensus</td>
<td>Communicators can have similar understandings of the same communication rules and accurately perceive that this is the case. (Monolithic consensus)</td>
<td>The parties know they share an agreement on their evaluation of an issue. (True consensus)</td>
</tr>
<tr>
<td>Pluralistic ignorance or false conflict</td>
<td>They can have similar understandings but perceive that they do not. (Pluralistic ignorance)</td>
<td>The parties believe that they disagree on an issue when in fact, they agree. (False conflict)</td>
</tr>
<tr>
<td>Dissensus</td>
<td>Communicators can have dissimilar understandings of what the communication rules are and accurately perceive that this is the case.</td>
<td>The parties hold conflicting views and are aware of their differences.</td>
</tr>
<tr>
<td>False consensus</td>
<td>They can have dissimilar understandings of the rules but believe that they do not.</td>
<td>The organization believes that the stakeholders agree with them on a particular issue, or the stakeholder group mistakenly believes that the organization holds the same view that they do.</td>
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Consensus is a complex social phenomenon that can be described using the co-orientational model. In this way, the state of true consensus (Figure 3a) represents a high level of actual agreement recognized as such by those involved. Dissensus (Figure 3a) exists when a high level of actual disagreement are accurately perceived as such.

Public opinion based on inaccurate perceptions of agreement is more troublesome in communication relationships. After extended interaction, two or more persons may simply agree or disagree. At least they know where each other stand on the issue. The same cannot be said about situations based on inaccurate perceptions of each other’s views. False consensus (Figure 4a) exists when there is actual disagreement but the majority of those who are involved think they agree. False conflict (Figure 4a) represents the state of public opinion in which the majority perceives little agreement but, in fact, there is widespread agreement.

When those involved do not accurately recognize the state of actual agreement, they act on the basis of their inaccurate perceptions. However, instead of trying to increase the accuracy of cross perceptions in communication relationships, most communication efforts attempt to influence levels of agreement. But according to Scheff (1967), actual agreement can exist independent of perceptions of agreement. In the context of public relation, the nature of the relationship between the organization and its public can be threatened by different definitions and inaccurate perceptions, not a disagreement over the issue itself (Cutlip et al. 1994). None of these situations call for communication designed to change the level of agreement-disagreement on the issue. Communication that helps to create shared definitions and increased accuracy improves the organization-public relationship and makes each side’s dealing with the other more appropriate.
3. Towards Sustainability Communication through Co-orientation

Co-orientation State and Communication Activities
The co-orientation model was developed originally by Newcomb 1953 and further developed by McLeod and Chaffee in 1973. It was later adapted for public relations by Broom (1977) and Grunig et al. (1984). This extension made it possible to reconceptualize the traditional approach to public relations by focusing on two-way relationship variables:
- Communication (dialogue or mutual exposure);
- Understanding (shared cognitions);
- Agreement (shared attitudes); and
- Complementary behavior.

In addition, the accuracy variable in the co-orientation model made it possible to identify gaps between, for example, the organization’s perception of the stakeholders’ evaluation and the stakeholders’ self-evaluation. The discrepancies between stakeholders on the accuracy variable indicate potential misunderstandings regarding the issue that cause difficulties in the communication relationship.

The co-orientational approach helps identifying the three co-orientation-states, dissensus, false consensus and false conflict, that call for more sophisticated communication strategies. A dissensus on sustainable development will need more than only provision of information. Moving from the state of dissensus to the state of true consensus requires an exchange of information from both sides. In this case, one-way communication may help as a minimum to provide information. Increased congruency needs an improved level of learning between the forest industry and their stakeholders by maintaining a high level of accuracy through two-way communication.

In the case of “false consensus” and “false conflict”, however, communication strategies were developed on the basis of inaccurate perceptions of the other’s views. Being in the state of “false consensus” or “false conflict” requires increased accuracy the one communicating party toward the other’s view of the issue under consideration. Accuracy can be achievable through communication activities that support reflection on the other’s point of view. In a two-way communication model practitioners both seek information from and give information to communication partners.

Learning is an Imperative
A key aspect of the co-orientation model is that information is exchanged and the major result of communication is that a greater knowledge of another’s cognitions is achieved. Communication should lead to changes in cognitions by both the organization and the public toward the issue, thus increasing accuracy. As mentioned earlier, a number of combinations of co-orientation states and communication relationships between the communicating parties are possible and each can be expected to have different implications for an appropriate communication strategy. Only in the co-orientation state corresponding to “true consensus” do we claim that there is an optimal communication strategy. This state is characterized by high agreement, congruency and accuracy. The communicating parties are of like mind in that they have a common understanding of the issue and know that they do. Communication in this situation will be of different nature then in the other co-orientation states.

In reality, the relationship between the communication parties, as they are the organizations and their relevant stakeholders, are dynamic and characterized by learning. The key element in Grunig et al.’s (1984) symmetrical two-way communication model is the feedback activity. They caution that feedback is in the form of dialogue. Dialogue can be defined as “a sustained collective inquiry in to processes, assumptions and certainties that comprise everyday experiences (Isaacs 1993, p. 25)”. Dialogue presents a unique opportunity for the forest industries to learn. It also carries the possibility of the stakeholder being able to influence the organization as much as the organization can influence the stakeholder. Birkin et al. (1997) identify four levels of stakeholder involvement in the organizational decision-making process: no communication, one-way communication (information on request), two-way communication (proactive information) and dialogue. An effective communication strategy seeks to find a balance between inquiry and advocacy. According to Harrison et al. (1994), stakeholder management includes communicating, negotiating and contracting, managing relationships and motivating them to response to the organization in ways that benefits it.
4. Conclusion and Recommendations

Sustainability communications should improve the relationship between the organization and its public by not only changing what people know and how they feel about sustainable development issues and each other, but by increasing the accuracy of their perceptions of each other’s views. Sustainability communications requires a systematic and long-term approach in which all the communication activities are directed toward achieving an increased understanding about the issue between the organization and its relevant stakeholders.

Results of the evaluation of the Norwegian long-term program in 1999 have shown that a sample of forest owners in Norway and end-users in Germany were in the following co-orientation states with respect to the sustainable development issue (Borgschulte 2002):

- The two communicating parties, according to the co-orientation model, were in the actual state of dissensus regarding the social responsibility dimension. This means both saw the issue of social responsibility differently and they also knew that they did.
- Regarding the environmental dimension, the forest owner group was in the state of a false consensus. Therefore, this respondent group perceived agreement even though the communicating parties saw the issue differently.
- In the case of the organizational dimension, the two communicating parties were in the state of false conflict. There was actual agreement on the organizational dimension; however, both parties perceived no agreement.

There is little literature available on how to integrate communications with strategy development and implementation work. The co-orientation model presents a powerful tool to indicate the actual state of relationship, but it is limited to a snapshot and is not a process or strategy. Much work has been done on the topic “what to communicate”, but there is still a lack of research on how to implement communication on sustainable development.

Therefore, an effective communication strategy depends on developing internal and external strategies to improve the short-term accuracy of each side’s views of the other perceptions as well as to increase the long-term level of agreement. A successful strategy has to improve the transparency and credibility of the communication parties and thus leads to improved stakeholders’ understanding of sustainable development in the society. Creating shared definitions and increased accuracy by effective communication strategies improve the organization-public relationship and makes each side’s dealing with the other more appropriate. This can activate the willingness for critical dialogue. Building on feedback activities – the communication parties extend their learning activities to enable the integration of all stakeholder groups in the communication activity. The communication parties have to learn that an effective communication strategy includes communicating, negotiating and contracting, managing relationships and motivating the stakeholder to response to the issue under consideration in ways that benefits it.

References


ANALYSIS OF DIFFERENT COMMUNICATION CHANNELS AND THEIR CHARACTERISTICS IN FORESTRY EXTENSION IN SLOVENIA

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ABSTRACT

Forestry extension in Slovenia uses different communication channels to reach forest owners as a main target group. The most important communication channels, used at Slovenia Forest Service extension activities, are individual contacts with forest owners, field courses and workshops, demonstrations, printed materials and articles in newspapers. Forms of extension are determined with educational or extension objectives, but they also depend on forest owners’ characteristics and on forester’s communication capacity. Analysis of these two depending factors and their influence on extension models is given in the article. Forestry service foresters as main performers of extension activities have to be trained in order to find the appropriate communication strategy for those activities. Administrative tasks and legal procedures, which are prescribed in Forest act, are also a part of forestry service foresters’ work. They influence on contacts with forest owners and can represent a great danger to efficient extension work. Evaluation of realized extension programmes and cooperative (together with forest owners) building of new ones is the right strategy for improvement of Slovenian extension efforts.

Key words: forestry extension, communication channels, forest owners

1. Introduction

Use of different communication channels is the most important tool in forestry extension. Term “communication channel” has a variety of usages in extension practice and can be used to describe wider or narrower part of extension work. Sometimes “communication channel” can represent an extension method or an extension approach. Since this paper deals with communication characteristics of forestry extension, communication channels will be understood at this point as a tool or form to pass information from source to recipient with the intention of getting feedback from the recipient (OMOSA 1998).

Communication is the core of any extension programme, because without good communication information cannot reach people, who may benefit from it. In this paper we want to analyse today’s extension practise in forestry of Slovenia from the communication point of view. Our attempt was to find basic factors, which influence the prevailing communication channels, the barriers in those channels and how the effectiveness of extension efforts can be improved.

The present analysis is limited to Slovenia Forest Service as the paramount organization in extension activities in Slovenia and to forest owners as a target group. This will help us to describe the present situation accurately and to find, on the basis of field experience, precise directions for future improvement of forestry extension.

2. Basic characteristics of forestry extension in Slovenia

The present state of forestry extension activities in Slovenia is a result of different factors the most important among them being the general state of forests and forestry, historical influences, legislative grounds in organizational characteristics of Slovene Forestry.

Slovenia is one of most forested countries in Europe and has a very rich forestry tradition. First forest management plans were made at the end of 18 century (GOLOB 1997). The vulnerability of forests were the reason why the principles of close to nature and sustainable forestry were introduced into forestry praxis more than 100 years ago with acts like the use of “control method”, selection forestry and preservation of virgin forests. Clear cutting as a form of management was prohibited after the Second World War.
Forest owners experienced quite a pressure in the socialist period after World War II. About 20% of private forests were nationalised. Forest owners were forced to become co-operatives of forest management enterprises and they were obliged to sell timber to the state. Forest management plans prescribed all harvesting and silvicultural activities in forests and forest owners had to carry out those activities. They were not able to make their own decisions about the management of their forests. All these pressures resulted in strained relationship between forester and forest owner (GOLOB 1997).

Forest act in 1993 completely changed official relation towards private property rights. They are now fully respected. Nevertheless, the Forest act restricts the use of private forest property to the extent that "the rights of ownership to forest shall be exercised in such a manner as ensures their ecological, social, and productive functions. The owner of a forest must therefore (a) manage the forest in accordance with regulations, management plans and administrative acts issued on the basis of this act; (b) allow free access to and movement in the forest to others; and, (c) allow bee-keeping, hunting and the recreational gathering of fruits, herbal plants, mushrooms and wild animals in accordance with regulations."

Forest management plans are made by Slovenian Forest Service (SFS) for all forests irrespective of ownership. All forests must be managed respecting the limitations and guidelines of these plans. Owners of forests, however, have the right to, and are encouraged to, participate in preparation of forest management and wildlife management plans. Their needs, proposals and requests will be respected as far as possible, consistent with ecosystem limitations and legal restrictions.

An important feature of the Forest Act is the provision that forest owners can only utilize their forests after obtaining an administrative order, issued by the Slovenian Forest Service (SFS), on the basis of a silvicultural plan, and after prior consultation and joint selection (e.g. the forester together with the landowner) of trees for possible felling.

Special emphasis in the Forest act is set to multi-functional management of forests and to the use of close to nature principles of forest management, in order to ensure that all functions of forests (economical, social and ecological) are fulfilled harmoniously. The preservation of natural biodiversity is among the most important goals of forest management.

With the Forest Act from 1993 public forestry service was set with the establishment of Slovenia Forest Service (SFS). The general purpose of SFS is care for all forests in Slovenia. Forestry extension tasks were specially devoted to SFS among main tasks, which are: monitoring the state and development of forests, making forest management and silvicultural plans, deciding on administrative matters as a public authority, overseeing operational activities in the forest that are co-financed from the budget and, last but not least, educating and advising forest owners.

Beside the SFS, forestry extension activities are a legal obligation also of the Slovenian Agriculture and Forestry Chamber. Extension service, which is a part of that Chamber, has a long tradition and a lot of experience in agricultural extension, but its role in forestry extension is still very limited.

Forestry extension can be found also in activities of other governmental and non-governmental organizations such as Ministries and their agencies, Secondary Forestry School, Slovenia Forest Institute and Association of Forestry Societies. But in comparison with SFS extension work they play only a minor role.

3. Communication channel as the main extension tool

Communication channels are the means by which information is transmitted from source to recipient. Channels of communication are ways of presenting messages so that they can be seen, heard, touched, smelled, tasted and experienced (definition by VILLAGE FORESTRY TRAINING MANUAL 2001) In our case we are focusing on a SFS forester as the relevant source of information about forestry issues in Slovenia and a forest owner as the recipient.

Main purposes of sharing information in the extension process are benefits that both sides gain in such dialogue. The importance of two-way dialogue cannot be over-emphasized. On one side it is expected that given information will help forest owners to solve their problems with adequate forestry knowledge and skills. On the other hand it is extremely important, that views and opinions of forest owners are relayed back to decision makers, who frame the design, role and tasks of forest extension service. Without a reverse flow of information, foresters involved in extension will never know, why promising extension programmes failed to meet their goals.
Available information has to be reshaped in communication process in a form the target audience can understand, examine critically and incorporate into their regular practice. They have to benefit from applying these new ideas. When designing the communication process we have to be oriented towards these benefits as the final aim of information transfer.

Barriers, which limit the flow of information through communication channel, often occur in communication process. They can be a result of suspiciousness, past bad experience, lack of pre-knowledge on receiver side of communication channel or a result of poor forester communication capacity.

4. Methods

Analysis of different communication channels used in forestry extension for forest owners in Slovenia was carried out on the basis of
- Series of workshops with district foresters about efficiency of their contacts with forest owners;
- Some data from situation analysis for the purpose of FAO supported Technical Cooperation Programme about participatory forestry capacity building in year 2000;
- Systematic field observations, supervision and evaluation of SFS extension activities in past five years;
- And on statistical records about yearly extension events in SFS, gathered in Annual Reports of SFS.

5. Results and discussion

5.1 What determines the use of different communication channels at SFS forestry extension for forest owners in Slovenia?

Use of different communication channels in SFS forestry extension practice for forest owners in Slovenia depend on three main factors:
- On forestry extension goals, defined on the basis of forest owner needs;
- On the structure of administrative tasks that SFS have to fulfil on the basis of forest legislation;
- On human resources involved in the extension process;
- And on characteristics of forestry extension target groups.

The general frame for extension activities is defined in the Forest Development Programme of Slovenia (FDP). Long-term goals, which pertain to the type of extension programmes to be developed, are (GOLOB 1996):
• The preservation and sustainability of forests with regard for biological diversity and all ecological, social, and production functions, including the promotion of ecologically sound and humane technologies for extracting timber with an emphasis on worker safety;
• The conservation of the natural environment and the ecological balance of the landscape;
• The preservation of the habitation and cultivation of the countryside and the improvement of the quality of life in rural areas, including: a) respect for the principle that the forest is a part of the farm and that the farm must be treated integrally; b) respect for the reliance of the farmer on wood and other goods and sources of revenue from the forest, c) promotion of comprehensive development of the countryside and supplementary activities on farms, and d) ongoing education and training of forest proprietors (especially farmers) for safe and high-quality forest work.

In addition of these long-term goals for forest management in Slovenia, guidelines by which they should be carried out were adopted. These are:
• Programmes for developing skills and educating forest owners have to be fully developed; More attention must be paid to advising forest owners who do forest work themselves;
• The implementation of work in forests has to be adapted to the ecological sensitivity of forest ecosystems, to the ecological and social functions of forests, to health conditions of forests, to the biological rhythm of forests, to forest wildlife, and to the abilities and qualifications to different types of forest owners.

In the spirit of those general directions, education programmes for forest owners should be devised according to their needs, their current knowledge, their readiness and level of equipment for forest work, and other factors, which influence the contents of an education programme.

District foresters involved in extension activities have a variety of administrative tasks, based on current forestry legislation. They are required to enforce forestry regulation and issue administrative orders on which basis forest owners can only utilise their forests.
The importance of these duties from an extension perspective lies in the fact that every owner must contact the forester before beginning work, what gives to forester an opportunity to pass a great deal of information to the forest owner. For extension purposes already established contacts are very commonly used, which reduces costs and working time consumption. Foresters can also easily find areas of forestry activities, where demand for information is high and some extension activities are required. But on the other hand this connection of administrative and extension tasks can be a barrier towards more positive and co-operative attitude of forest owners. They are often afraid of some negative legal consequences of their actions.

The third factor of influence, which we mentioned in the beginning, is human resources, which are needed for implementation of SFS extension programme. SFS staff involved in extension activities can be found along the entire hierarchical tree of the SFS organisation. The SFS has central headquarters, 14 regional units, 93 local units and 408 districts. The central unit coordinates the functioning of the SFS in entire Slovenia. The central unit is comprised of five professional forestry departments. Every department is responsible for coordinating forestry extension with regional units in its field of specialisation and the Department for Development of Rural areas and for Relations with Forest Owners and Public deals with extension methodological and strategic planning. Regional units of the SFS represent a link between the central unit and local units as the lowest organisational level.

The employees of local units have direct contact with forest owners as well as other forest users and directly deal with extension activities. Most involved are district foresters. Their formal education has to be higher education (secondary forestry school + 2 years of University studies). Their average responsibility is 2500 ha of forests and 1000 forest owners. Forestry engineers who have broad ecological and forest management related knowledge guide them. The higher levels of organisation of the SFS act to support the extension work of District Foresters.

Formal forestry education of SFS staff involved in extension activities is high, but we are facing a lack of communicational skills in a more and more entangled environment of extension programmes. In the past five years a lot of efforts were put into education of SFS foresters on the field of communication, participatory techniques, conflict management and theory of extension. Capacity building started at the end of the nineties with communicational workshops for district foresters, which included all SFS field foresters (over 400). The next step was FAO Technical Cooperation Programme on Capacity Building for Support to Private Forest Owners and Public Participation in year 2000, which set grounds for continuous education in the past four years of SFS staff on that field with internal core group of trainers (11 persons). This group of trainers carried out several educational programmes, partly also as a TCP follow-up activity. The target groups were district foresters, forest management planning consultants, heads of local units and silviculturists from the local level of SFS. We were able to include a great deal of SFS staff, who dealt with extension activities and work with people in general. The main educational topics were better communication with forest owners, effective performing of a public debate, effective meeting with forest owners, participatory methods in foresters’ work, conflict management, education of adults and about motivating people.

Last but not least, we come to the forest as a main target group of extension activities. Their number today in Slovenia exceeds 310 000. The average size of forest estate is 2.6 ha. Almost 90% of forest owners have forest property smaller than 5 hectares. They can be divided according to the size and structure of their forest property on small- and larger-estate owners. Both can be farmers, semi-farmers and non-farmers. They can also be skilled enough to carry out forest work by themselves or they have to hire someone to work for them in their forest. All these groups require different extension approaches and the use of different communication channels because of their diverse needs, knowledge, attachment to forest, dependence on income from forest production and personal (character) characteristics.

Many psychological analyses describe differences between people from different parts of Slovenia. Some theories say, that huge diversity of landscapes and natural ecosystems in Slovenia also influence on peoples’ characters and their openness an willingness for communication. People from alpine narrow valleys are more closed than those from flatlands of Pannonian lowland. A skilled extensionist will incorporate all these specialities into communicational design of his extension activities.

At this point we have to mention also a barrier in communication with forest owners in many cases, which is a consequence of bad experience with respect to private property rights and forestry authorities in the former socialist regime. Most forest owners are older, so that this historical memory is still alive. The difference in attitude can be seen when communicating with younger generations of forest owners.
5.2 What are the most commonly used communication channels?

The realized communication channels for extension purposes in Slovenia are a result of the above-mentioned factors. Importance of different communication channels will be presented on the basis of data from Situation Analysis, carried out for FAO technical cooperation programme in Slovenia, entitled: Capacity Building for Support to Private Forest Owners and Public Participation. Results are presented in tables No. 1 and No. 2. Data collection was carried out with questionnaires.

Table No. 1: Opinion of forest owners (n=51), about importance of different communication channels for transfer of different forestry topics (% of answers which describe a single communication channel as important for a certain topic (scores 1-4 out of 10))

<table>
<thead>
<tr>
<th>Extension topics</th>
<th>Individ. contacts</th>
<th>Training courses</th>
<th>Meetings</th>
<th>Leaflets, publicat.</th>
<th>Newspapers</th>
<th>Excursions</th>
<th>Notices</th>
<th>Radio media</th>
<th>TV media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silviculture</td>
<td>78</td>
<td>57</td>
<td>26</td>
<td>26</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Harvesting</td>
<td>57</td>
<td>53</td>
<td>22</td>
<td>12</td>
<td>12</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wood market</td>
<td>35</td>
<td>29</td>
<td>24</td>
<td>20</td>
<td>18</td>
<td>10</td>
<td>10</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Forest protection</td>
<td>67</td>
<td>35</td>
<td>27</td>
<td>26</td>
<td>20</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>8</td>
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<tr>
<td>professional skills</td>
<td>53</td>
<td>35</td>
<td>24</td>
<td>22</td>
<td>16</td>
<td>14</td>
<td>10</td>
<td>8</td>
<td>6</td>
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<tr>
<td>forest equipment</td>
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<td>24</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>12</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>subsidising</td>
<td>63</td>
<td>22</td>
<td>20</td>
<td>14</td>
<td>12</td>
<td>8</td>
<td>8</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>nature protection</td>
<td>41</td>
<td>30</td>
<td>20</td>
<td>18</td>
<td>14</td>
<td>12</td>
<td>12</td>
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<tr>
<td>compensations</td>
<td>53</td>
<td>18</td>
<td>14</td>
<td>12</td>
<td>10</td>
<td>10</td>
<td>8</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>organizational skills</td>
<td>41</td>
<td>27</td>
<td>16</td>
<td>10</td>
<td>10</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Average value</td>
<td>53</td>
<td>34</td>
<td>21</td>
<td>17</td>
<td>13</td>
<td>10</td>
<td>8</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

Table No. 2: Opinion of extension foresters (n=70), about importance of different communication channels for transfer of different forestry topics to forest owners (% of answers which describe a single communication channel as important for a certain topic (scores 1-4 out of 10))

<table>
<thead>
<tr>
<th>Extension topics</th>
<th>Individ. contacts</th>
<th>Training courses</th>
<th>Meetings</th>
<th>Leaflets, publicat.</th>
<th>Newspapers</th>
<th>Excursions</th>
<th>Notices</th>
<th>Radio media</th>
<th>TV media</th>
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</thead>
<tbody>
<tr>
<td>Silviculture</td>
<td>96</td>
<td>83</td>
<td>42</td>
<td>56</td>
<td>27</td>
<td>23</td>
<td>8</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>Harvesting</td>
<td>92</td>
<td>86</td>
<td>35</td>
<td>69</td>
<td>25</td>
<td>17</td>
<td>7</td>
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<td>10</td>
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<tr>
<td>Wood market</td>
<td>78</td>
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<td>42</td>
<td>1</td>
<td>23</td>
<td>28</td>
<td>14</td>
</tr>
<tr>
<td>Forest protection</td>
<td>87</td>
<td>52</td>
<td>37</td>
<td>64</td>
<td>37</td>
<td>6</td>
<td>24</td>
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<tr>
<td>professional skills</td>
<td>80</td>
<td>76</td>
<td>30</td>
<td>65</td>
<td>32</td>
<td>10</td>
<td>4</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>forest equipment</td>
<td>75</td>
<td>80</td>
<td>34</td>
<td>62</td>
<td>23</td>
<td>15</td>
<td>11</td>
<td>10</td>
<td>14</td>
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<tr>
<td>subsidising</td>
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<td>45</td>
<td>38</td>
<td>47</td>
<td>42</td>
<td>3</td>
<td>13</td>
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<tr>
<td>nature protection</td>
<td>76</td>
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<td>56</td>
<td>47</td>
<td>13</td>
<td>6</td>
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<tr>
<td>compensations</td>
<td>65</td>
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<td>18</td>
<td>23</td>
<td>38</td>
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<td>7</td>
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<td>10</td>
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<tr>
<td>organizational skills</td>
<td>63</td>
<td>46</td>
<td>24</td>
<td>28</td>
<td>24</td>
<td>8</td>
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<td>Average value</td>
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<td>48</td>
<td>34</td>
<td>10</td>
<td>11</td>
<td>22</td>
<td>13</td>
</tr>
</tbody>
</table>
Individual contacts predominate for all topics, according to the opinion of both groups – forest owners and foresters. Training courses and meetings are also important communication channels and in some cases also leaflets. Foresters overestimate, in comparison with forest owners, the importance of newspaper articles and leaflets, especially in connections with harvesting and nature protection issues.

5.3 Some characteristics of the most important communication channels

5.3.1 Individual contacts

Individual contacts between district foresters and forest owners are the most important way of communicating for extension purposes in Slovenia. They are believed to be among the most effective ways to facilitate learning process and to transfer information to forest owners. They have a variety of forms: home visits, meetings in forest owners’ forests, telephone calls, informal contacts in public, etc…

Dialogue district foresters - forest owner is, as mentioned previously, prescribed legally prior to almost all measures in the forest. The effect of foresters’ work in private owned forests is valued in the amount of timber marked for felling, in the amount of realized silvicultural work and protection measures, in the amount of subsidy payments for forestry work meeting appropriate criteria, etc. To achieve these goals district foresters have to equip forest owners with proper knowledge and skills to motivate them for actions and to carry out forest work properly, safely and effectively.

In year 2003 SFS district foresters issued almost 65.000 administrative orders to forest owners. Considering administrative orders, issued to state Fund and average number of contacts in a process of issuing administrative orders, we can estimate the number of individual district foresters - forest owner contacts with possible extension content to the number of 100.000.

Types of information transferred at individual contacts are very diverse and include silvicultural, ecological, technical, economical and marketing aspects of forest work.

The quality and effectiveness of the dialogue district foresters - forest owner depend on motivation and communication skills on both sides. Individual contacts have to be pre – prepared: the main communication goal has to be set, all the necessary information have to be gathered, characteristics of the forest owner have to be considered and upon that strategy information transfer has to be set and all possible barriers in communication have to be foreseen. Individual contacts are extension programmes in small. They have almost similar structure as national extension programmes.

Good preparation and self-confident behaviour of the forester build forest owner’s confidence and influence on his motivation. The motivation profile of forest owner, what is important for him, is an essential data for successful transfer of information. This motivation profile can be assessed with right questions. Open questions are also important for encouragement of two-way communication in which very important suggestions for the district forester and his future acts may occur.

Analysis of barriers that district foresters feel at their individual contacts with forest owners pointed out low motivation of forest owners, statements like: “FO have not done what they promise”, “FO are unable to communicate”, “FO have different interests than foresters”, weak feedback from FO and to much bureaucracy at foresters work. All those problems, found mostly on the forest owner’s site, can be really solved with proper shift of forester’s behaviour in communication process.

A combination of regulatory duties and extension activities can also have a negative influence on district foresters - forest owner communication. We want to diminish that influence with active participatory decision-making process at the planning stage of forest management. Cooperation of forest owners in all important decisions about their forest reduces their suspiciousness and rises their motivation. Legal and ecological frames of forest production are not so narrow that foresters can not find a place for forest owner’s needs and wishes in between (in most cases).

To support successful communication at individual contacts SFS takes care for long term involvement of district foresters in the same area, which rises their acquaintance with local conditions and history of forests and offers district foresters possibilities to develop personal connections with forest owners. On the other hand, it has been observed that for the development of district foresters - forest owner relations it is better that the district forester...
is not a member of the local community. In many cases conflicts between members can have a negative influence on the forester’s professional work.

The fact that access to information is free of charge and that district foresters are easily accessible also has a positive impact on individual contacts. District foresters are all equipped with service mobile phones. They respond on forest owner requests in 7 -14 days.

5.3.2 Training courses

In 2003 SFS organised, alone or in cooperation with outer organisations, 159 courses with 3037 participants. Themes of these courses were safe work in forests (prevailing), bucking, maintenance of chainsaw, tending, forest protection, maintenance of forest roads, etc…

Training courses can be a very efficient way of information transfer in extension practice if certain approaches are used and important facts are respected.

A large number of forest owners in Slovenia do not allow a possibility for all to participate on training courses, so target groups must be carefully selected according to their motivation for change, to their previous knowledge and to effect new information will have on their every day forestry practice and on forest. Rationalisation demands, that SFS organise courses where forest owners are highly motivated for changes, with serious lack of knowledge and many problems in forests.

Topics selected for training courses must exactly address the interests of a group that will attend. It is very important to include participants in defining educational objectives, because it clarifies aims and rises motivation of participants.

All activities before a training course must ensure the participation of forest owners at the course, awake their curiosity and motivation. They have to be aware, what they can expect from the course and what will their contribution be, in the sense of time, efforts and money. Training courses are generally free, but in some cases small payment is required – it has very good effect on forest owner’s attitude toward training course.

Didactical design of a training course is crucial for its success. SFS is facing lack of that knowledge. In some cases training courses are designed and realised in cooperation with other educational organisations such as Secondary Forestry School.

An important part of a training course is practical work in connection with general truth known well to all extensionists (“tell me … and I will forget, show me … and I will remember and then forget, engage me … and I will remember”). We are trying hard to bring practical work to all SFS courses, but we are aware that it complicates the organisation, rises costs and often causes safety problems.

Evaluation of a training course and feedback from participants is important not only for correction of future educations but also for participants’ opinion about the course. Knowledge that their opinion is important in some context also positively influence on the relation towards that context. And with positive attitude towards new knowledge is a half way towards the general aim, which is not only knowledge but action.

5.3.3 Meetings with forest owners

Meetings with forest owners are a common practice of the SFS in all cases when we want
- To introduce and discuss new practices, which are not present in certain environment:
- To create a favorable attitude toward main problems in forestry
- To gain support for solving those problems.

Last year meetings with forest owners were organized to mobilize people against bark beetle, to discuss forest management plans, to discuss about possibilities of biomass usage, to assess situation on a field of forest technology, etc….

Meetings have to be prepared and managed by experienced facilitators. SFS is building its core group of facilitators in all regional units with permanent education. SFS experiences from meetings are systematically collected and built into everyday practice.
The first hard task for organizers of a meeting is how to get people to the meeting. The best assurances for a full room are properly presented benefits of the meeting and repeated invitations in certain time periods prior to the meeting.

A plan of the meeting is a necessity and has to be prepared according to the meeting objective and to the characteristics of participants. It offers a possibility for proper time management with respect to participants’ time.

A strong emphasis has to be made on objectives of the meeting in the beginning (without rising unrealistic expectations), on programme of the meeting and on the role of participants.

Forest owners have more trust if local people facilitate a meeting. Local language should be used and local customs respected.

We have to be preparing for different conflicts during the meeting and for difficult people. Proper strategy to avoid conflicts should be provided.

All-important decisions have to be summarized, recorded and at the end presented to the participants. Numerous participatory methods can really ease a facilitator’s work at the meetings and raise efficiency of the group work. They also offer possibility to express their opinion to people who normally don’t speak on such occasions.

5.3.4 Leaflets and publications

Leaflets and publications belong to non-verbal and mass communication channels. They are used to reach a large number of people quickly and often at a low cost.

Leaflets are used in SFS extension activities to represent concise and single items such as tending of young stands, felling of trees, behaviour in forests, etc.

We use leaflets for follow-up activities after courses and meetings in order to help participants stay in touch with topics, discussed at that event. They are also available at fairs and demonstrations.

Leaflets require accurate and competent basic information, proper presentation of that information and attractive design. SFS usually prepares text; professional designers accomplish design tasks.

Publications are short booklets with professional, forestry content. In past few years SFS published by itself and in cooperation with others different booklets: Safety and health at forest work, Care for forests, Tending of young forests, Safe work with chainsaw, Safe work with tractor, etc …

5.3.5 Articles in newspapers

SFS extension efforts are supported with articles in newspapers. Articles are prepared by different foresters on the field, who have high professional knowledge, practical experience and who are familiar with the attitude of forest owners toward the problem, they are dealing with. A combination of these capacities is the best guarantee for a short, professionally correct, simple and readable article.

Contents of articles are usually connected with actual problems of forest management. Since SFS has an agreement with several magazines and newspapers regarding publishing articles for forestry education purposes, it can very quickly respond to all new needs for accurate forestry information.

5.3.6 Comparison of different communication channels

Comparison of different communication channels (table No. 3) has been done with respect to costs per contact, possibility of two-way communication, adaptability to individual characteristics of forest owners and complexity of needed communicational skills.

All channels have their positive and negative sides. Their suitability for relevant information and target group depends on available resources for extension work (human, material, funds), on expected results and on time limits. Differentiation of communication channels according to the content of information transfer has already been presented in tables 1 and 2.
Table No. 3: Comparison of different characteristics of communication channels

<table>
<thead>
<tr>
<th></th>
<th>Costs per forest owner</th>
<th>Possibility of two-way communication</th>
<th>Adaptability to personal characteristics</th>
<th>Relative complexity of required communicational skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual contacts</td>
<td>high</td>
<td>high</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>Training courses</td>
<td>high</td>
<td>medium</td>
<td>medium</td>
<td>medium</td>
</tr>
<tr>
<td>Meetings</td>
<td>medium</td>
<td>high</td>
<td>medium</td>
<td>high</td>
</tr>
<tr>
<td>Leaflets, publications</td>
<td>low</td>
<td>low</td>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>Newspaper articles</td>
<td>low</td>
<td>low</td>
<td>low</td>
<td>low</td>
</tr>
</tbody>
</table>

Individual contacts can be very efficient if we have properly trained staff, especially if we consider, that they are already there because of SFS administrative tasks, which have to be done anyway. That also diminishes their costs for extension purposes. On training courses, with publications and newspaper articles a great amount of information can be transferred to a large group of people but feedback and their adaptability is rather small.

6. Conclusion

As a conclusion we want to assess briefly the possibilities of future development and improvement of effectiveness of different communication channels in SFS extension practice. A variety of influence factors, mentioned in this paper already determine some characteristics of used communication channels. From the SFS standpoint - legal grounds, present state of forests, forest property structure, economical situation and personal characteristics of forest owners have to be taken as facts. Our possibility to change and to improve our extension efforts has to be found in organisational and professional areas.

A quick analysis of current extension practise shows that strengthening of SFS extension activities surely include these three areas:

- Improving of feedback information assessment and its incorporation into planning phase of extension activities,
- Continuous improvement of communicational skills and integrity of SFS staff,
- Capacity building for participatory management of relations with forest owners as well as other stakeholders in Slovenian forestry.

Communicational potential, ability to promptly solve problems in relation with forest owners and effective educational approach are goals of integral human resources development in extension practice. Main shifts that we want to make and that we expect from our foresters are towards

- Goals instead of problems;
- Achievements instead of mistakes
- Opportunities instead of limitations and
- Partnership instead of only collaboration.

When we are able to completely set ourselves to above mentioned priorities, we will know that we are close to not only excellent extension but also to the best forest management practice.

7. Literature


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THE-changing face of family-forest owners in an urbanizing environment
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Abstract

Forest management in Washington State has long been a point of controversy between conservationists and landowners. Conflict has often centered on the externalities created when forests are managed for resource extraction, such as timber. In response to increasing regulations, many industrial forest owners are selling their commercial tree farms at an increasing rate (Bennett, personal communication), replacing thousands of acres of contiguous forest with residential development lots ranging from 5 to 20 acres. In addition, higher wages are creating more opportunities for urban expansion into rural and natural areas, which places conflicting pressures on private landowners to sell their forestland into commercial development. Urban residents seeking amenity-based lifestyles away from the crime and crowding of the cities and suburbs often purchase these parcels. There is rising concern among natural resource educators that this new group of landowners may not identify themselves as part of the traditional forest owner community, and therefore is not within the purview of the current educational and assistance programs. This oversight may have repercussions for the long-term health of the region’s forests.

Key words: Family-forests, urbanization, community, Washington State.

Introduction

Private family-owned forests comprise 20% of the commercial forestland in Washington State. Recent harvest restrictions on federal forestlands intended to protect endangered species have resulted in lower wood exports out of the Pacific Northwest. Since 1987 timber harvests in Washington have declined 95% on federal lands and 57% on state lands. Family-owned forests have been picking up the slack in supplying timber to the state (Baumgartner et al. 2003). Nearly 2.8 Mm$^3$ were harvested off family-owned forests in 1998, accounting for 29.3% of the timber harvest in the state on a volume basis (Larsen 2000). However, the increasing interest in Washington’s private lands goes far beyond their role in providing raw material for the state’s solid wood and pulp paper products sectors (Blatner et al. 1991; Thorud 2000). Private forest lands in Washington State provide a variety of public resources that many enjoy, such as wildlife, timber, non-timber products, recreational opportunities, and clean water (Fox 2000).

Traditionally, nature was valued by society for it’s economic potential. Soon after the United States was settled, the word “nature” was replaced with “natural resources” reflecting a decidedly utilitarian perspective (Scott 1998). As the human population grew and pushed the limits of it’s environment, there was a growing awareness of how resources were being used, and how resource use was affecting the environment. The extirpation of the American buffalo and the passenger pigeon was a wake-up call to our “unlimited resource” mentality. Perspectives shifted from nature as a “commodity” to nature as an “ethic.” A significant portion of society started to view landscapes through a moral lens by which traditional land use practices were judged to be either good or bad. The conflicts between public lands managers and the general public intensified. The management mistakes of the past were brought to the forefront, and society demanded better science and more public involvement in how public lands were managed (Scott 1998). Often, the environmental conflicts between interested parties are extremely contentious, and tend to become more complex as advances in science and technology move rapidly forward (McCool and Guthrie 2000). Traditional science-based models of resource management were efficient enough, as long as there was consensus regarding the use of natural resources. But as society moves away from a primarily commodity driven application of natural resource management, towards one focused more on non-extractive uses (i.e. clean water, air, wildlife, and recreation opportunities), consensus becomes more difficult (McCool and Guthrie 2000).
History of Forest Regulation in Washington

Forest management in Washington State has long been a point of controversy between conservationists and landowners (Irwin 1992). Conflict has often centered on the externalities created when forests are managed for resource extraction, such as timber. Such externalities include water pollution, soil erosion, habitat destruction, and threats to endangered species. The public continues to demand that these costs be taken into consideration (Brunson 1993). There exists a perception by many that public resources are being exploited in a non-sustainable way. In 1974, the Washington State legislature passed the Forest Practice Act 1, with the intent of improving environmental conditions by regulating forest practices such as road building, harvesting methods, and the use of chemicals. In response to the public’s demand for a healthier environment, the state legislature declared “that the forest land resources are among the most valuable of all resources in the state; that a viable forest products industry is of prime importance to the state’s economy; that it is in the public interest for public and private commercial forest lands to be managed consistent with sound policies of natural resource protection; that coincident with maintenance of a viable forest products industry, it is important to afford protection to forest soils, fisheries, wildlife, water quantity and quality, air quality, recreation, and scenic beauty” (RCW 76.09.010). In 1975, Washington State developed the first set of Forest Practice Rules 2. They have been amended over 13 times. The most recent significant modifications occurred in May 1999 with the passage of the Forest and Fish legislation 3—a regulatory response to the federal listing of the Upper Columbia River spring run Chinook salmon as endangered.

The “New” Forest Landowner

Washington State’s Forest Practice Rules are some of the most stringent in the United States, especially with the recent addition of the Forest and Fish legislation. These regulations specifically target critical fish habitat along 60,000 miles of streams on 10 million acres of non-federal forestlands in Washington State, and stipulate wider riparian buffers and restricted timber harvest to established outer zones of the riparian area. The majority of these streams occur on private forestland. In response to increasing regulations, many industrial forest owners are selling their commercial tree farms at an increasing rate (Bennett, personal communication), replacing thousands of acres of contiguous forest with residential development lots ranging from 5 to 20 acres. Urban residents seeking amenity-based lifestyles away from the crime and crowding of the cities and suburbs often purchase these parcels. In addition, higher wages are creating more opportunities for urban expansion into rural and natural areas, which places conflicting pressures on private landowners to sell their forestland into residential development (Sims 2000). Although many non-industrial forest landowners in Washington State indicate that the eventual selling of their forestland for development is not a major reason for land ownership (Creighton et al. 2002) it is expected that development pressures may intensify as real wages and housing prices increase (Sims 2000).

Rural communities are growing; resulting in an increase in new forest landowners with smaller-sized forest parcels, and changing the face private forest landowners in Washington (Creighton 2004). Recent studies suggest that these new landowners are different than traditional family tree farmers. The newer, more urbanized landowners are less interested in harvesting timber, they have fewer familial ties to their land, and are employed in a business outside of forestry—unlike the more traditional landowner who has a higher interest in timber management, own larger acreages, and have longer ownership tenure (WA-DNR 2002). There is rising concern among natural resource educators that this new group of landowners may not identify themselves as part of the traditional forest owner community, and therefore is not within the purview of the current educational and assistance programs. This oversight may have repercussions for the long-term health of the region’s forests. Little is known about how these new landowners define themselves with respect to the traditional moniker of “tree farmer”. There is speculation that urban and small-scale forest owners have a more preservationist perspective of their land than a utilitarian one. Natural resource managers and educators across the U.S. believe that these fundamental differences among landowners may hinder any attempts at wide-scale forest conservation, and that the lack of any shared experience will polarize the greater landowner community. The concern is that the new landowner may be either unprepared, or unwilling, to effectively debate and formulate policies addressing sustainable renewable natural resources, especially if economic considerations are not at the forefront.

1 Forest Practices Act RCW. 76.13
2 Forest Practices Rules WAC. 222
3 Forest and Fish Report ESHP 2091
Washington forest landowner community

The definition of community has long been a point of debate in sociology (Luloff and Krannich 2002). Wilkinson (1991) maintains that specific conditions must exist before the designation of community can be applied. These conditions include local community autonomy, i.e. the capacity for all individuals to meet their survival needs within the same locale, the existence of an integrated network of interactions from which social well-being is generated and maintained, and the “self-improvement of a shared life”, towards which members collectively work. Others contend that community is primarily a social system originating from a community that has complete local autonomy, yet over time this “local autonomy gives way to increased dependence on external organizations and authorities” (Warren 1978). Despite these differences Wilkinson and Warren include a shared, delineated territory or geographical location as an essential characteristic of community, without which a social organization cannot be considered a true community, although it may have community-like characteristics. Schmalenbach (1961) on the other hand, argues that community transcends face-to-face interaction, and exists whether we are aware of it or not. Once the natural bond between people is recognized we experience an emotional communion—or bund—that provides a platform for social interaction.

One feature of community that is common to most perspectives is that of community action or agency. Wilkinson maintains that this particular community field “gives substance to the ecological, cultural, organizational, and social psychological aspects” of a community, and that interaction is the “core property of the community, one without which community, as defined from virtually any sociological perspective, could not exist” (Wilkinson 1991, pg 3). Historically, humans built communities around natural resources, such as water (Barham 2001) or timber (Russell and Harris 2001). These communities were rural and isolated; thus giving rise to an autonomy from which community agency could develop (Russell and Harris 2001). However, as populations grew and communities continued to develop and expand, the autonomous nature of communities changed as economic opportunities arose outside of their initial boundaries (Warren 1978; Freudenberg and Gramling 1998). This increasing reliance on outside markets, and visa versa, moved many rural communities into an increasingly complex network of national and international relationships. It became difficult for many of these communities to sustain their autonomous nature and sense of agency.

In Washington State it is becoming more difficult to delineate a rural community from an urban one especially in the rapidly developing western part of the state. Washington is the first state in the nation to have an urban area, the Puget Sound area of western Washington, targeted for an endangered species listing (Sims 2000). This brought natural resource conservation, traditionally a rural issue in Washington State, into the backyard of the urban community. Soon, clashes over cultural traditions and long-term environmental quality became bundled up in the issue of private forestland management. As more land-use restrictions were put in place, more forest owners parcelled and sold their lands, and rural residential development exploded (Bennett, personal communication). Urban communities began seeking out the amenities of rural lands as a means of improving their quality of life (Phillips 2000). As people moved from the cities out into the rural areas, suddenly the new residents were voicing concern over how the forests in which they now lived were being managed. The traditional rural forest landowners were suddenly faced with a frightening prospect: the potential loss of their properties and, in some cases, their livelihoods. As one forest landowner said, “Over protection is killing us!” (WA-DNR 2002).

Family forest landowners in Washington State may not fit into the traditional community paradigm of Wilkinson and Warren, yet their collective actions can have a profound ecological impact on the rest of society, especially as landscapes become increasingly parcelled. From an ecological perspective, fragmentation increases the spread of noxious weeds, which threatens agricultural areas; wildlfe-human conflicts increase as habitat becomes limiting and animals are forced to move into the urban areas; issues of water quality and availability become more urgent as supply declines yet demand stays high. But there are social and economic ramifications as well as biological: loss of economic viability in natural resource-extraction industries, loss of jobs, reduction in the overall quality of life as resources become more scarce, etc. Private forest landowners may not have shared experiences, but they do have a shared life. They collectively control resources necessary for the rest of society to experience social well-being—clean water and air, forest products, regional economic viability, and healthy wildlife populations. Perhaps the community characteristic of the “self-improvement of a shared life” to which Wilkinson refers, should, for the family-forest landowner, transcend geographical location.
The Rhetoric of the Forest Landowner

In Environmental Sociology: A Social Constructionist Perspective, John Hannigan remarks that social construction theory recognizes the influence of social, political, and cultural processes on society’s definitions of environmental risks and problems. When opposing groups reach “mutually irreconcilable sets of conditions about problems and solutions,” each side makes contradictory claims, and environmental problems ensue (Hannigan 1999). These opposing claims contain rhetoric that helps define their respective positions to a greater public. To illustrate this, we use the preliminary findings of an ongoing qualitative study of Washington State landowners in a rapidly urbanizing environment, and the results of a 2002 mail survey of Washington State family forest owners attitudes regarding environmental regulations. The narratives reported are from person to person interviews conducted from March through August in 2004, and from open-ended comments assembled from the 2002 survey.

The first set of narratives represent traditional Washington forest landowners, defined previously. The rhetoric used by this group of interviewees demonizes both government and environmental organizations:

“Is the govt. going to take AWAY what is mine? The h*!# with the greenies!”

“We need less government control of private property not more. Keep the environmental (preservation) industry away from regulating private land.”

“My major concern is the excessive restrictions and requirements that reduce or eliminate the incentive to be a tree farmer. With all the rules and restrictions it is very difficult to convince my children and grandchildren that they should continue the operation of the tree farm.”

“I’ve kind of decided that the whole environmental thing…it’s not about species, it’s not about the environment, it’s no different than socialism or communism. It’s about people control.”

“The last ten years of activity by the environmental “communist” has caused me to lose interest in the tree farm. I will be encouraging my daughter not to waste her time on such a long term view that is shattered by people too clever by half.”

The newer forest landowners use a decidedly different rhetoric:

“Forest management needs to pay more attention to ecological values, water and fish and less on wood production”

“The land will always be there, but the owners will change. We own the right to do something with the land for a time. But ownership doesn’t mean that we can abuse it.”

“There are fish-bearing streams on the property. I want to keep these areas untouched. I tend to think that we need them [riparian regulations] and they [DNR] need to maintain them.”

“We are willing to put in as much sweat equity into our woods as needed. We want good habitat and aesthetic values, such as hiking trails, etc. “

“Our forest land is our home and home to many forms of wildlife … that deserve protection. I have a forestry plan but don’t intend to harvest. We have no roads into our forest yet…We support any laws that preserve wildlife habitat and continued forest land use.”

“Just for the record, I would rather have the environmentalists have the upper hand because nobody else is going to protect these forests, nobody else is going to worry about indicator species, nobody else is going to go out and fight for those things.”

Each group seems to have constructed the realities of their forests on very different ideologies. Similar negative experiences with government regulation shaped the anti-government narratives, and this was clearly illustrated in the claims made by this group. The second group of narratives, though more eco-centric in scope, made claims similar
to those of the first group, although the shared experiences were diametrically opposed. The first group took issue most strongly with government regulations, often charging the environmental community with equal blame. The second group indicated support for the regulations and the environmental community, and even expressed concern that the regulations might not be tough enough. Both groups identified the environmental community as being the driver of the regulations. Do these differences in rhetoric put the eco-centered landowner at a disadvantage with regards to available assistance and education opportunities? Are they less likely to participate because of preconceived notions of traditional timber focused programming? Resource managers hold many myths regarding private forest landowners that color the way agencies develop their landowner programs. Many forestry consultants, both state and private, characterize forest landowners as being timber oriented, anti-environmentalists, and anti-government (Jones et al. 1995). Although the narratives presented in this essay suggest that there are some landowners who feel this way, it is clear that not all landowners have had the same negative experiences.

Washington State is experiencing dramatic reductions in the amount of forestland resources available. A major objective for natural resource professionals is to encourage family-forest landowners to keep their lands in forest. Currently, there are a variety of programs available for family-forest owners seeking information and educational opportunities to help them better manage their forests. However, recent studies in Washington State indicate that only a certain segment of the entire landowner community is taking advantage of these programs (Baumgartner et al. 2003). Larger landowners with longer ownership tenures were more likely to use the available education and assistance programs. This same group was also more likely to participate in the active management of their forests, with an understanding of the land’s multi-use potential (Baumgartner et al. 2003). The differences illustrated through the landowner narratives may be indicative of an overall culture clash of ideologies that carries over into program use, and non-use. Some extension educators expressed concern that the current programs are perceived as being too timber focused, and that no alternative management programs exist for small urban landowners—such as managing exclusively for songbirds, or recreation, or mushrooms:

> “Not all people think of their forests as tree farms, but we [educators] assume that everyone who comes to [these forestry education classes] has a tree farm.”
> - WSU Extension forester

However, there are some examples of a movement towards a sharing of values by participants in forestry education courses, who originally held disparate viewpoints on forestry:

> “You’ve got two ends of the [environmental] spectrum: green and brown. Usually what happens in a forestry course is the people on the far ends of the spectrum come to the middle.”
> - DNR Stewardship forester

> “When someone is really interested in ecosystems, productive forests, water quality—there’s definitely a shift towards more active management [as opposed to away from it].”
> - WSU Extension forester

**CONCLUSION**

In his discussion on the environmental self and a sense of place, James Cantrill (1998) suggests “that people assign value to the places in which they live, work and play, and that these values facilitate the emotional and symbolic identification they have for a particular area”. The sense of place is a construct of the place-based theory, which builds its foundation on the human tendency towards territoriality—that all organisms naturally move towards those things that are perceived as good or safe, and away from things assumed bad or dangerous (Hannon 1994). This theory assumes that some form of territoriality is present in all human cultures, especially with respect to a community’s relationship with ecological, social, and cultural aspects of the environment. Therefore, a sense of place and the associated values are closely linked to identity. Social psychologist Terrell Northrup remarked: “Identity is defined as an abiding sense of the self and of the relationship of the self to the world. It is a system of beliefs or a way of construing the world that makes life predictable rather than random” and that “intense conflict begins when individuals become threatened” (in Susskind and Field, 155). Over time, these conflicts become steeped in personal beliefs and deeply held values. Needless to say, these kinds of conflicts are extremely difficult to remedy. The closer a group of divergent viewpoints can come to having a shared vision, the better the chances for consensus.
Whether the majority of new “green” landowners consider themselves a part of a larger group that includes traditional tree farmers, is unknown. The preliminary data presented here suggests that forestry education may serve as an equalizer of sorts; providing the opportunity for forest landowners with fundamentally different objectives and viewpoints on forestry the ability to develop a shared vision, as detailed by Susskind and Field (1996), or a sense of community agency described by Wilkinson. This agency may translate into the emotional communion that Schmalenbach (1961) said is the precursor to a platform of interaction, which is community. Regardless of the emotional communion that may arise from a shared experience, such as a forestry education course, the controversy surrounding increasing regulations in Washington State may be a fundamental “deal breaker” for the future of family forests. If the majority of the new forest owners show no opposition to land-use restrictions, will the regulatory climate become so harsh that it will drive out other members of the community? People with a strong sense of place are more likely to be involved in environmental advocacy and activism, and express strong reactions to environmental policies (Hannon 1994, Cantrill 1998). These responses are generally based on self-interests, often reflected in the “not in my backyard” attitude, as we saw with the traditional forest owner group. We suggest that this is a characteristic shared by both of the landowner groups, and needs to be considered when designing education programs. Most landowners feel strongly connected to their forests and place high value on the privacy they receive from living in a rural setting (Creighton et al. 2002), although they may not always appreciate the significance of their forest within the larger landscape, no matter how small the parcel:

“Landowners are certainly aware of the increasing fragmentation and development, but they don’t buy land with the hopes of reducing the fragmentation; they own land for purely selfish reasons.”

- WSU Extension forester

While Washington State forestry educators recognize the uniqueness of each family forest landowner, it is equally important to provide landowners the opportunity to appreciate their membership within this larger forest-owning community. This may have positive impacts towards maintaining forestry resources throughout the state.

“Now we may be attracting a different subset of the population that go into these [forest management] classes but the one thing I’ve noticed is that they come in as 25 or 30 individuals and they leave feeling like part of a group.”

- WSU Extension forester

LITERATURE CITED


Communities of Interest: Working across stakeholder/agency boundaries to develop effective Extension forestry programs in the Southern United States.


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Abstract

Cooperative Extension Service Directors and USDA Forest Service Administrators in the Southern United States created a multi-agency position in 1979 to foster improved communication and collaboration among state Extension, USDA Forest Service (State and Private Forestry) and state forestry agency personnel. An official Memorandum of Understanding was created that outlines goals and objectives of the position (titled the Southern Regional Extension Forester). Tasks of the position include working closely with USDA Forest Service personnel and foresters from more than 40 agencies and organizations to identify, prioritize and develop programs in regionally significant areas. To be effective, the position must establish strong communication links with these members of the southern forestry community. Among the keys to success include working with USDA FS and others to find common grounds and needs on important regional issues. The Regional Extension Forester works with information and education specialists in these agencies to develop technology transfer and educational programs that span beyond state and political boundaries. Issues that we are currently working on in the Southern region include forest sustainability, markets for forest products, landowner education and a number of other critical issues. Successful regional programs include the Master Tree Farmer program, a multi-stakeholder event that has reached over 15,000 participants and several interactive websites designed to reach service providers and others who work closely with private landowners. This presentation will focus on the strategies that have been employed by Extension and the USDA Forest Service to enhance communication with multi-stakeholders in the southern forestry community. In addition, barriers to effective communication and collaboration will also be discussed in this presentation.

Keywords

Forestry extension, multistakeholder collaboration, forestry communication strategies, knowledge management.
Introduction

The Cooperative Forestry Assistance Act of 1979 fostered the creation of a federal multiagency Memorandum of Understanding (MOU) on forestry in the United States. Among the major collaborators of the MOU were the USDA Forest Service, the National Association of State Foresters, the USDA Extension Service (now the USDA Cooperative States Research, Education and Extension Service or USDA CSREES), the USDA Soil Conservation Service (now the USDA Natural Resource Conservation Service). The MOU outlined lead fiscal, technical assistance, and information and education responsibilities of each of the partners. The MOU served as a catalyst to create a multi-agency, multi-state position in Extension with a title of Southern Regional Extension Forester (SREF). This position would serve to support state-level Extension specialists and coordinate regional activities that result in more efficient and effective forestry and natural resource programs in the South. Since 1979 the South has had two persons in this position, Jim Neal (1979-1991) and Bill Hubbard (1993-present).

Creation of a Regional Extension Network

Cooperative Extension Service Directors and USDA Forest Service Administrators in the Southern United States support the position, which is housed at a Land-Grant University (The University of Georgia). An official Memorandum of Understanding was created that outlines goals and objectives of the position. Tasks of the position include working closely with USDA Forest Service personnel and foresters from more than 50 “primary” and countless “secondary” agencies and organizations to identify, prioritize and develop programs in regionally significant areas. Primary agencies include the 1862 (historically white Land-Grant) and 1890 (historically black Land-Grant) Universities in the South (approximately 30), the USDA Forest Service State and Private, and Research branches, the state forestry agencies (13 agencies) and the state forestry associations (13 state associations and one regional association). Secondary organizations include related public and private agencies interested in forestry and natural resource education. To be effective, the position must establish strong communication links with each of these members of the southern forestry community. Among the keys to success include working with USDA FS and others to find common grounds and needs on important regional issues.

The Regional Extension Forester works with information and education specialists in these agencies to develop technology transfer and educational programs that span beyond state, agency, topical and political boundaries. The primary points of contact for the SREF are state-level Extension Specialists of which there are approximately 140 in 13 states covering a wide range of disciplinary responsibilities (Table 1). Issues that we are currently working on in the Southern region include forest sustainability, urban-wildland interface, new markets for forest products, landowner education and a number of other critical issues. Successful regional programs include the Master Tree Farmer program, a multi-stakeholder event that has reached over 8,000 participants, several interactive websites designed to reach service providers and others who work closely with private landowners, and regional education and training endeavors which capitalize on the expertise of national, regional, state and local professionals. This presentation will focus on the strategies that have been employed by Extension and the USDA Forest Service to enhance communication with multistakeholders in the southern forestry community. In addition, barriers to effective communication and collaboration will also be discussed in this presentation.

Why this Model has been Successful

The model created in the Southern region is a unique one. State Extension specialists, state forestry agency professionals and other federal partners work closely with the Regional Forester to identify regional issues, collaborator opportunities, and funding sources. The model is partially successful because there is accountability built in to the position responsible for multistate and regional programs on an annual basis. Regular communication is critical across agency and organization boundaries in order to be effective. Several examples are worth citing:

The Southwide Master Tree Farmer Program – In 1999, a forestry Extension Specialist at Clemson University, Clemson, South Carolina, USA approached the SREF about the possibility of increasing the
geographic scope of a short course he had been conducting in South Carolina to surrounding states including Florida, Georgia and North Carolina. After discussion with the forester, it was agreed that a regional approach where all 13 states in the South be invited to participate could be managed just as efficiently and effectively. An introductory meeting was held with representatives from various communities of interest: landowners, associations, forest industry, conservation groups, public and private stakeholders and others. The exploratory meeting turned into a planning meeting and 12 of the 13 states in the South agreed to participate. In addition, the states of Missouri and Maryland have participated as well. Lessons learned from this experience include the intense desire by everyone involved to develop a high quality, regional product that could be used locally and the need to develop a strong communications network. The program developed would be a satellite-based course and could be downloaded anywhere in the South (or world for that matter!). Downlink sites for example were chosen and included, community colleges, libraries, Extension Service offices, and even taverns. Basically, anywhere with a satellite dish receiver was eligible to participate. The first year of the program, in 2000, 67 sites broadcast the course on seven consecutive Tuesday evenings for 3 hours each evening. While Extension took the lead in every state, many other public and private service providers as well as several active landowners served to act as hosts, local organizers and even speakers at local events. In all, the Master Tree Farmer reached close to 1,500 participants that year live and countless others by videotape that year. In 2001 the course was repeated with over 130 live or tape-delayed sites and over 2,500 participants. Course participants asked for a more advanced course and in 2002, the Advanced Master Tree Farmer course reached 1,500 "live" participants and countless others via tape-delay in the South.

Following this success, the Master Wildlifer course was developed and reached close to 5,000 in the year 2003. Following this the original Master Tree Farmer course was redone with several enhancements and was well received again in 2004 with another 1,500 participants engaging in the distance education course. To date, the three courses have reached over 15,000 landowners either live or via tape-delay. All 63 hours of the course are also streamed online at www.sref.info along with course and reference materials. The course was recently honored with the highest award given by the United States Department of Agriculture (Secretary’s Group Honor Award for Excellence). The course websites can be reached at www.mastertreefarmer.net and www.masterwildlifer.net).

Regional Knowledge Management Projects – The advent of the internet has been a great boon for information and educational service providers such as those doing Extension work around the globe. We are now able to provide our clients with the information they need at lightning speeds. Everything from fact sheets, to conference announcements to short courses can now be accessed online at any time of the day or night. Communication strategies are necessary to ensure that these websites are developed, marketed and used in a manner that is beneficial to the clients. The Southern Regional Extension Forestry office has aggressively pursued multi-agency collaboration in the development of several regional and national knowledge management internet sites. These include several innovative websites:

The Forest Encyclopedia Network (FEN) located at www.forestencyclopedia.net is a unique website collaboration involving state, federal and private interests. The objective of the website is to make scientific information available to the user community. The SREF and his staff manage the computer-based infrastructure of the website while the USDA Forest Service serves to develop the content. The project involves online editing and document creation in a peer-reviewed setting. The project is endorsed by the Society of American Foresters and others.

Urban Forestry South Expo (UFSe) located at plone.urbanforestrysouth.org is an indepth content management system (CMS) website designed for various users within the urban and community forestry arena in the South. The website is a one-stop shop with information on new science and technology, directories of professionals, links to current publications, events, projects and a whole host of other resources. It is also a national portal for the USDA Forest Service’s online urban forestry database. The site is a multiagency collaboration involving the USDA Forest Service, Extension and the University System and the state forestry agencies. A marketing plan involving communication aspects will be developed in the fall of 2004.
The Southern Regional Extension Forestry office operates several other knowledge management sites including:

- The National Reforestation, Nursery and Genetics (RNGR) website (www.rngr.net).
- The National Wildfire Programs Database (http://wildfireprograms.net/).
- The Forestryindex (www.forestryindex.net).
- The National Forestry BMP’s website (http://www.forestrybmp.com/).
- And several others.

A Case Study: Forest Biomass Training and Education Project – Southern United States

The United States is undergoing dramatic change in its Southern region. Traditional markets such as pulp and paper and lumber have been impacted by global conditions. The forestry community; landowners and foresters alike have been investigating new uses for small diameter resources in light of an oversupply of pulpwood and pre-commercial sized trees. One area holding promise is the use of wood for fuel, energy and other resources. While energy prices are not at the point now of forcing a more critical look at wood for fuel, there remains interest by utility companies and others to increase the use of wood in their generation facilities. Because of this interest and the need to develop alternate energy sources and use for the timber resource, the United States Department of Agriculture and the United States Department of Energy released a call for proposals in 2003. The Southern Regional Extension Forestry office worked with a newly formed collaborative partnership, the Southern Forest Research Partnership (SFRP) and other partners to develop a multimillion dollar proposal to train forestry, community development and other professionals on biomass production, harvesting, transporting, storage and processing. These two partnerships, SFRP and SREF were successful in receiving these funds because of their collaborative nature and ability to develop communities of interest above and beyond the agency line. Figure 1 shows a schematic of the communities of interest involved in the upcoming regional biomass training. The training will involve the creation of an online encyclopedia volume (under the Forest Encyclopedia Network), development of cross-agency training curriculum materials and various other traditional and nontraditional products which will be dependent on the results of a user needs assessment survey.

This case study is an example of how two regional organizations with no individual agency or entity alliance were successful in obtaining grant funds in an area of immediate importance to many stakeholders in the Southern Region. Among the attributes that makes this case study a success is the fact that each of these two organizations had personnel assigned to regional, multiagency communication roles. Because of the background of the these positions, each principal investigator knew the regional players and processes that would be necessary to complete a successful training program in forest biomass issues and opportunities.

Overcoming Barriers to Multiagency Stakeholder Involvement

It is sometimes hard to imagine why public service providers in the region such as the USDA Forest Service, Natural Resource Conservation Service, state forestry agencies, Extension and the Land-Grant University System do not work more closely together. Shocking as it sounds, many sister agencies are not even on the same page when it comes to priority areas such as land conservation, technical assistance and information and education programs. While successful programs can be found throughout the region and nationally, these have traditionally been more the exception than the rule. Agency barriers must be broken. Barriers include administrative, fiscal, communication, power, traditional, cultural and geographic. To overcome these barriers takes a real effort and the desire to work together. State and federal programs especially have the responsibility to the taxpayer to work together. The federal Congress of the United States of American now mandates that federally authorized and appropriated funds be leveraged across state, disciplinary and academic bounds. The Agricultural Research, Extension, and Education Reform Act of 1998 (AREERA) requires that 25% of federal dollars in many agricultural and Extension categories received by state Land-Grant universities must be shown to be used in multi-state and multi-disciplinary programs. In addition, ample evidence must be shown that these funds are used to coordinate research technology...
transfer efforts with Extension and outreach functions of the University. The 1862 and 1890 Universities in the South for example must be able to overcome their differences and work together. A fresh look is needed for all these key collaborators and communication will be the key. Leadership within these institutions will have to take an increased interest in overcoming these barriers if anything is to be done. The creation of partnerships such as the Southern Regional Extension Forestry office and the Southern Forest Research Partnerships are a step in the right direction. These positions do not pay allegiance to any one particular organization. Their success is based on the amount of multi-stakeholder collaboration going on at any given time by the member organizations.

Summary and Conclusions

Communication strategies of multipartner collaboration in forestry Extension involve technology, accountability, human resources skills and a host of other attributes. Use of the internet, satellite technologies, communities of interest concepts/practices and collaborative planning techniques can all be used to improve the efficiency and effectiveness of forestry programming. In the Southern United States, the creation of multi-state, multiagency partnerships such as the SREF office and the SFRP are one effective means of involving more collaborators. As a result, much more is being accomplished than any would be possible if any one individual agency or organization were undertaking these efforts on their own. For more information on Southern Regional Extension Forestry programs and projects please visit our website at www.sref.info.

Communities of interest: biomass training

Figure 1. Example of communities of interest: Biomass Training Grant, USDA – DOE grant.
<table>
<thead>
<tr>
<th>State</th>
<th>Forestry</th>
<th>Continuing Education</th>
<th>Urban Forestry</th>
<th>Environmental Education</th>
<th>Wood Products</th>
<th>Wildlife</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>4.6</td>
<td>0</td>
<td>0.9</td>
<td>0</td>
<td>1</td>
<td>1.5</td>
<td>8</td>
</tr>
<tr>
<td>AR</td>
<td>4.4</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>3.3</td>
<td>14.7</td>
</tr>
<tr>
<td>FL</td>
<td>3.9</td>
<td>0.5</td>
<td>0</td>
<td>0.7</td>
<td>0</td>
<td>2</td>
<td>7.1</td>
</tr>
<tr>
<td>GA</td>
<td>5.25</td>
<td>0.5</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0.75</td>
<td>9.5</td>
</tr>
<tr>
<td>KY</td>
<td>4.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>7.5</td>
</tr>
<tr>
<td>LA</td>
<td>6.4</td>
<td>0.5</td>
<td>0</td>
<td>0</td>
<td>0.4</td>
<td>1</td>
<td>8.3</td>
</tr>
<tr>
<td>MS</td>
<td>18.4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>23.4</td>
</tr>
<tr>
<td>NC</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>1.75</td>
<td>11.75</td>
</tr>
<tr>
<td>OK</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0.25</td>
<td>1</td>
<td>4.25</td>
</tr>
<tr>
<td>SC</td>
<td>11.67</td>
<td>1</td>
<td>0.79</td>
<td>1</td>
<td>0</td>
<td>1.82</td>
<td>16.28</td>
</tr>
<tr>
<td>TN</td>
<td>4.33</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>7.33</td>
</tr>
<tr>
<td>TX</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3.5</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td>11.06</td>
<td>1</td>
<td>0</td>
<td>2.35</td>
<td>1.5</td>
<td>15.91</td>
<td></td>
</tr>
<tr>
<td>Total FTE's</td>
<td>83.51</td>
<td>6.5</td>
<td>3.69</td>
<td>11.7</td>
<td>10</td>
<td>25.12</td>
<td>140.5</td>
</tr>
<tr>
<td>Average</td>
<td>6.42</td>
<td>0.50</td>
<td>0.28</td>
<td>0.90</td>
<td>0.77</td>
<td>1.93</td>
<td>10.81</td>
</tr>
</tbody>
</table>

Table 1. Full Time Equivalent Natural Resource Extension and Outreach Specialists (Fisheries and Aquaculture not included due to inadequate data sources). Current as of March 2003. Data obtained from surveys to state Extension leaders in 2003.
Research and Extension Effort Targeting Underserved Forest Landowners in the South Central United States.

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Abstract

A combined research and extension effort targeted underserved forest landowners in the south-central United States. An “underserved landowner” was defined as one who had not utilized the various federal, state, or local resources available. This paper examines selected results of a mail survey completed by 1,689 landowners, and describes small forest landowner workshops conducted in Arkansas, Louisiana, Mississippi, and Tennessee. Selected mail survey data are reviewed. The most frequently cited reason for owning forestland was “As an estate to pass on to my children or heirs.” However, almost 40% of landowners did not have a written will or trust. A majority of landowners are not taking advantage of the numerous programs and activities available to them. A total of 1,302 people attended the 16 workshops, for an average attendance of 81.4 people per workshop. Participants owned 107,153 acres of forestland and estimated the value of the information received at $6.8 million. Of various publicity methods, letters to individual landowners were the most effective way to inform landowners of the upcoming workshop.

Keywords: Underserved forest landowners, mail survey, landowner workshops

Introduction

Forestland is a major land use in the southern United States and offers both environmental and economic opportunities to landowners. These opportunities are the result of an extensive forestland base of more than 200 million acres, forest ownership dominated by more than 1.5 million non-industrial private forest (NIPF) landowners, highly productive forests, and diverse timber markets (Powell et al. 1994, Hubbard 1999, Jones et al. 2001).

Unfortunately, many NIPF landowners are not realizing the full benefit of their forestland. Landowners with small- to mid-sized tracts of land generally lack forestry knowledge and training, thus making their lands less productive and more often neglected than other ownership categories. This situation is particularly acute among minorities, females, and other landowners not generally served by current federal, state, and local programs. Landowners are frequently unfamiliar with the maze of federal and state agencies and programs available to them, and thus make limited use of these resources. Additionally, landowners are either unaware of, or perceive that they cannot afford to pay for, private consulting services. For the purpose of this project, we have identified these owners as “underserved forest landowners.”

This paper describes a combined research and extension project conducted to enhance the management of farm and forestland owned by underserved landowners in four states in the south-central United States (Arkansas, Louisiana, Mississippi, and Tennessee). A key element of the research component involved mail surveys to gain new or updated information on landowner perceptions and attitudes related to forestry, as well as socio-demographic information. The extension component consisted of a series of workshops to address many of the needs that underserved forest landowners have.

Methods

Research Component

The research focused on a mail survey of landowners to obtain new or updated information about them, their attitudes, and perceptions related to forestry. To accomplish this, a questionnaire was developed, pilot tested,
and mailed to 6000 randomly selected landowners (1,500 per state). Multiple mailings were used in the questionnaire implementation (Dillman 1978, Salant and Dillman 1994). A reminder postcard was sent to non-respondents during the week after receipt of the initial mailing. One follow-up mailing of a cover letter and questionnaire instrument was sent to those who had not responded after the third week. A business reply return envelope addressed to Mississippi State University was included in all questionnaire mailings. All data was statistically analyzed using the Statistical Package for Social Scientists (SPSS).

Extension Component

The key extension component of this effort was a series of landowner workshops conducted in participating states. Each workshop required a diverse local planning committee to plan, promote, and conduct the workshop. Committee members included landowners, local forestry association members, Extension personnel, state and federal personnel, ministers, local government officials, and other key community people. We publicized each workshop extensively. We obtained from tax rolls a list of landowners owning 10 or more acres of forestland and sent each landowner a letter explaining the workshop agenda and inviting them to attend. Some tax roll information was unavailable, and in such cases we relied on more traditional means of advertising.

An important point about the landowner workshops is that all landowners were invited to attend, not just those deemed underserved. This is because most forest landowners are underserved. That is, most have not recently used the services of the many federal, state, and local efforts designed for their benefit. Also, those deemed to be “served” can also benefit from the information provided at workshops, as new materials are continually being developed for these presentations.

Workshop Format

Each workshop lasted approximately three hours, and was conducted on a Saturday morning or a weeknight. The format was subject to change given local needs, but generally consisted of the following:

1. Welcome/Introductions
2. Landowner Perspective (local landowner)
3. Ownership Issues (local attorney)
4. Marketing and Environmental Issues (forester)
5. Economics of Forestry (forester), and

The “Landowners Perspective” was a personal account by a local private landowner of their experiences in managing their forestland. These accounts frequently included both “good” and “bad” experiences of the landowner, but the important point was to illustrate that properly managing forestland significantly benefits individuals and families. Next, an attorney discussed “Ownership Issues.” The primary issues included the importance of: 1) a written will, 2) obtaining clear title to the land, and 3) a written contract when selling or marketing timber. Attorneys frequently used real-life examples to illustrate complex issues facing current and future generations if landowners do not obtain appropriate legal help. We specifically avoided discussing estate planning because this complex topic could be the subject of its own workshop. While estate planning is important, it did not fit into the time frame for the workshop.

A forester discussed “Marketing and Environmental Issues.” These topics, though apparently dissimilar, actually work well together. A landowner in the process of marketing his/her timber should also seek to protect the environment from logging damage. The forester communicated why “marketing” the timber is better than just “selling” it to the first interested buyer. The forester also addressed the importance of management in meeting the objectives of the landowner and improving monetary returns from this significant investment. Finally, the forester addressed the importance of environmental issues, including Best Management Practices (BMPs) in reducing erosion and protecting stream water quality. Where applicable, endangered species were discussed, along with management modifications required to meet the needs of those species.

Another forester then discussed the “Economics of Forestry.” This addressed the basic question, “Can I make money growing trees?” It was pointed out that the South is the primary timber-producing region in the U.S., and produces more forest products than any other country or region in the world (Wear and Greis 2003). Projections call for an increasing share of the market demand to shift to the South, particularly the south-central U.S. While we are currently in a market slump (Baldwin and Harris 2003), the overall supply and demand situation bodes well for NIPF landowners in the south-central U.S. (Wear and Greis 2003). Foresters frequently conducted a hypothetical economic analysis showing projected growth and economic returns from forest
investments. This situation varied considerably among geographic areas, as pine forests have a different set of constraints and projections than hardwood forests.

The “Question-and-Answer” session was an opportunity for participants to ask questions of presenters and other foresters at the workshop. Through this process we were able to clarify points or address specific concerns of landowners.

An evaluation was included in the handout materials. We collected evaluations at the end of the workshop session and summarized the results. These summaries provided useful information about the benefits of the workshop, as well as information on how participants learned of the workshop.

Results

Research Component

A total of 1,689 completed questionnaires were returned. After accounting for the undeliverable surveys, deceased landowners, and landowners who did not own forestland, the combined adjusted rate of return was 30.7% (range 28.9% to 33.9%).

For this project, underserved forest landowners were defined as those who have not obtained assistance from forestry professionals or attended forestry-related educational programs that were available to them. On this account, a series of questions were asked to determine the underserved status of landowners. Eighty-nine percent of landowners do not belong to a forestry-related organization. Sixty-two percent of landowners had not previously used a professional forester. Also, 60% of respondents reported they had not previously received information on forestry. Correspondingly, 86% had never attended a forestry-related educational program. These data demonstrate that a majority of landowners are not taking advantage of the numerous programs and activities available to them.

Overall, 91% of respondents felt owning forestland was a good investment, and 85% believed forest management was a good investment on their land. Seventy-five percent were not familiar with government cost-share programs and 83% were not aware of government tax incentives for forest landowners. Only 18% of landowners had previously used either government cost-share or tax incentives.

Landowners gave multiple reasons for owning forestland. The most frequently cited reason was “as an asset for my children or heirs.” Ironically, 59.5% of landowners had a written will or trust, indicating that a large number of landowners have not made sufficient provisions for passing their forestland to the next generation.

Extension Component

Table 1 gives data from the 16 workshops. These results indicated that landowners derived great value from the workshops. Landowners felt the information they received would help them earn more money by managing their timber. They estimated the value of the workshops at $427,156 per workshop, which translates into an economic benefit of $5,249 per participant. While it is difficult to assess the accuracy of landowner estimates, they are in the best position to know what has, or has not, been done on their land. Also, these figures could actually be conservative, as fewer than half of participants put an economic value on the evaluation. Most participants indicated that they will benefit economically from the workshop, but the impact was either not listed or unknown.

Table 1. Evaluation summary for 16 underserved forest landowner workshops held during 2003 in Arkansas, Louisiana, Mississippi, and Tennessee.

<table>
<thead>
<tr>
<th>State</th>
<th>Attendance</th>
<th>Average Attendance</th>
<th>Acres Owned</th>
<th>Value to Landowner ($)</th>
<th>Value per Participant ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td>433</td>
<td>108.3</td>
<td>41,907</td>
<td>2,054,000</td>
<td>4,744</td>
</tr>
<tr>
<td>Louisiana</td>
<td>346</td>
<td>86.5</td>
<td>18,814</td>
<td>2,498,000</td>
<td>7,220</td>
</tr>
<tr>
<td>Mississippi</td>
<td>346</td>
<td>86.5</td>
<td>31,228</td>
<td>2,054,500</td>
<td>5,938</td>
</tr>
<tr>
<td>Tennessee</td>
<td>177</td>
<td>44.3</td>
<td>15,204</td>
<td>228,000</td>
<td>1,288</td>
</tr>
<tr>
<td>Overall</td>
<td>1,302</td>
<td>81.4</td>
<td>107,153</td>
<td>6,834,500</td>
<td>5,249</td>
</tr>
</tbody>
</table>
Attendance was considerably above that normally associated with “traditional” Extension forestry workshops. Attendance averaged 81.4 people, and local workshop planners were frequently surprised because traditional forestry education programs usually average less than 50 attendees. Most importantly, conversations with county Extension agents, USDA representatives, and others responsible for working with landowners indicated that most participants were “new” to them, thus indicating that we were reaching the targeted audience.

We were interested in how participants learned of the workshop. This will help us plan, promote, and conduct more successful Extension programs in the future. In the evaluation we included a question asking, “How did you learn about this workshop?” Landowners were requested to check all that applied. The options listed in the evaluation included a letter, brochure/flyer, newspapers, radio, church, personal contacts, and other. Figure 1 shows the percentage of responses to this question. The landowner letter (direct mail) was the primary way participants learned about the workshop. This has important implications for Extension programs, as publicity relying on traditional techniques (i.e., news releases, radio, TV) was not as effective, particularly with the underserved audience.

Direct mail was the most effective way to reach forest landowners. However, we will continue to utilize all techniques to publicize our programs. The cost of mailing landowner letters is a concern, particularly with declining extension budgets. Workshop attendance as a percentage of landowner letters mailed averaged 6.6%, or 16 letters per workshop participant. Considering the high costs involved in planning and conducting a workshop for underserved landowners, and the difficulty in reaching this non-traditional audience, this appears to be a wise investment. Tax roll data can also serve as a database for landowners when conducting future programs.

We were also interested in any change in behavior as a result of the workshop. Specifically, we were interested in whether or not the workshop would encourage landowners to use professional foresters. Research shows that landowners benefit both economically and otherwise when they use a professional forester (Munn and Franklin 1995). Therefore, the evaluation asked two questions in succession. First, “Have you used a professional forester in the past?” Second, “Do you plan to use a professional forester in the future?” Overall, 45% of landowners used a forester in the past, while 90% plan to use a professional forester in the future. This demonstrates a fundamental shift in how participants view foresters. Rather than viewing foresters as a cost, landowners apparently perceive foresters as a benefit or an investment.

Conclusions

This combined research and extension project generated new or updated information on forest landowners in the south-central United States. In addition, four workshops targeting the needs of underserved forest landowners were conducted in participating states. The landowner survey indicated that most forest landowners were underserved; that is, they had not used federal, state, or local resources available to them. The survey also
revealed that although the most frequently cited reason for owning forestland was as “an asset for my children or heirs,” almost 40% of landowners do not have a written will or trust to ensure an efficient transfer of assets to the next generation.

Workshops attracted larger numbers of participants than more traditional Extension forestry programs. Most participants were “new” to Extension and USDA personnel, indicating we were reaching the underserved landowner. Evaluations indicated that landowners valued the information received, and anticipated greater monetary returns because of the workshop information.

Workshops were publicized extensively, but results revealed that the primary way that landowners learned of the workshop was through a letter sent to the landowner. Landowner databases were developed from tax roll information, and letters were mailed to landowners with 10 or more acres of forestland.

Ninety percent of workshop participants plan to use a professional forester in the future, whereas 45% used a forester in the past. This demonstrated that the workshop successfully conveyed the importance of obtaining professional forestry advice. There is no reason why similar workshops cannot succeed in other areas, particularly those with ownership dominated by NIPF landowners.

Literature Cited


Abstract

During 2002 and 2004 a web-based shortcourse entitled Woodland Options was offered to forest owners in Virginia and surrounding states. A total of 173 participants enrolled for the courses, 158 of them current forest owners. The remaining participants were professional natural resource managers, and non-forest owners. Overall, the participants rated the courses highly, with 98% indicating the courses met their expectations, and 97% willing to recommend the courses to others. The courses also met the objective of providing useful information and guiding the participants toward seeking professional natural resource assistance. Overall, 92% of the respondents indicated the information in the course will help them to better manage their forests, and 78% indicated they have already or will in the future seek out professional natural resource assistance. For the 44% of respondents who indicated that earning income from the forest is important, 37% said that the course information will help them earn more from their forest, on average $20,625 per owner.

Key Words: Forestry extension, World Wide Web, Distance education, Forest owners

Introduction

Virginia is a state rich in forest resources. With nearly 6.3 million ha of forest land, the state has a forest products industry that contributes $25.4 billion annually to the state’s economy (Becker 2001). And 77% of this forest is owned by nonindustrial landowners, approximately 160,000 landowners own over 4 ha (Birch 1997). Since 1925 the Virginia Cooperative Extension Service has been providing educational services to the state’s forest owners. However, following the implementation of the Sustainable Forestry Initiative in 1996, the Virginia Forest Landowner Education Program(VFLEP), was created (Johnson and Jenkins 1998). This coordinated and branded program brought forth a series of shortcourses, regular correspondence through newsletters and web sites, events calendars, and publications for the forest owners of the state. To date 80 shortcourses have been held around the state, reaching 1,738 forest owners who collectively own nearly 138,000 ha. However, in 2002 a new web-based educational program entitled Woodland Options was instituted, patterned after a traditional, 12 hour, face-to-face shortcourse (Monaghan 1997). The course was repeated in 2004.

This paper will describe, in general, the web-based Woodland Options course, as well as the post-course reactions of the participants.
Overview of the Woodland Options Web-Based Course

The Woodland Options web-based shortcourse runs for 10 weeks (participants have access to course materials for 7 months). The shortcourse is designed to acquaint forest owners with their resources, assess their own family capability to conduct work in the forest, develop their own objectives and expectations for the forest, and eventually lead to the development of a management plan that would guide their actions into the future (Jenkins and Johnson 2003). The modules in the course are outlined in Table 1. Each module is introduced singularly, so that all participants receive the same module at the same time. Participants are not allowed to skip ahead, and are encouraged to complete all tasks on time so that they are ready for the next module when it becomes available. Unique features include chat rooms by region, and a discussion forum, that at times is quite active. Participants can interact with each other in a threaded discussion, with the course instructor, and with the mentors. Mentors include volunteer, seasoned forest owners who have had previous experience and training, and professional foresters working in the area. With each module is a field activity, which is best accomplished during the course, though not all owners are physically able to visit their forest during the course period. Examples of field activities include a courthouse deed search, orienteering exercise, boundary line identification, tree identification, and stand delineation. Downloadable field sheets are available.

Preview of Course Participants

Over the two years of the course 173 participants registered. Of those, 158 (91%) were forest owners (Table 2), and seven (4%) were professional natural resource managers. Thirty-nine percent of the participants were residential forest owners, while 61% were absentee owners. On average, the absentee owners lived 311 km from their forest. About 22% of the forest owners have a prepared forest management plan and 41% have received some form of professional natural resource assistance in the past (Table 2). Twenty-one percent of the participants who own forest land intend to harvest timber in the future, while 27% do not (Table 2). The remainder are undecided. On average, each forest owner participant owned 42.5 ha of forest land and the total forest land owned by all participants was 6,721 ha. Twenty-three percent of the forest owner participants owned their forest less than one year, while 30% owned their forest for over 20 years (Table 2).

In comparison to other forest owners in the southern U.S., the participants in this course were more engaged in the management of their forest. For example, southwide, only 5% of forest owners typically have a forest management plan (Birch, 1997), while 22% of our participants did. But southwide, 45% of forest owners have had some timber harvesting experience, while only 28% of our forest owner participants had.

Post-Course Survey Results

Immediately following the course, all participants were asked to complete a post-course survey. Of the 173 participants in the two courses, 59 (34%) of the participants responded. Technology issues did not appear to be a major problem, as 85% of respondents indicated the on-line registration process was easy, only 2% experienced connection problems, and 98% indicated that the course material was easy to download (Table 3). Only 9% of respondents indicated they had connections slower than a 56K modem, and 30% had connections including cable modems or faster (Table 3). Respondents looked upon the course quite favorably, as 95% indicated the course organization was good, 100% indicated the on-line instructions were clear (Table 3), 98% indicated the course met their expectations, and 97% would recommend the course to others (Table 4). Seventy-one percent of the respondents interacted in the group forums, or chat rooms, and 67% found them to be useful. Ninety-two percent of the respondents indicated that the course information would be useful in helping them to manage their forest land, and 78% indicated they either have in the past, or would in the future, seek out professional natural resource assistance. The greatest form of assistance indicated was forest management (70%), followed by wildlife management (49%) and assistance with timber sales (46%). About 44% of the respondents indicated that they were interested in earning income from their forest, and 37% indicated the course information would assist them in earning more money from their forest, on average $20,625 per owner.
In order to further examine the post-course survey responses, the respondents were grouped into three sets based on gender, existence of a forest management plan, and resident/absentee owner. The results are displayed in Table 5. Across all three sets, the bulk of participants were taking their first on-line course, and the reactions to the course were favorable. Most participants were prone to obtain professional natural resource assistance, with males greater than females (90% vs. 71%) and those with management plans (100%) vs. those without management plans (70%). Typically, more males desired to earn income from the forest than females (48% vs. 36%), and clearly those with management plans more so than those without management plans (72% vs. 33%). For the most part, there were few differences between resident and absentee landowners. While there have been inferences in the literature that absentee landowners may seek out professional assistance more readily than resident landowners (Shaffer and Meade 1997), this was marginally verified by our study population, in which 31% of the resident landowners vs. 45% of the absentee landowners had previously sought out professional assistance.

Other primary differences between the study sets included the previous use of professional forestry assistance by males (46%) vs. females (15%), and those with management plans (91%) vs. those without management plans (26%). Also notable were prior timber harvests, with 33% of males vs. 9% of females, and 47% of those with management plans vs. 22% of those without management plans having conducted a previous harvest. Additionally, 25% of males intend to harvest timber in the future, while only 6% of females do, and 32% of those with management plans intend to harvest vs. 18% of those without management plans (Table 5). The area owned by males, 53.6 ha, was greater than females, 32.4 ha. Likewise, those forest owners with management plans owned 82.7 ha and those without management plans owned 37.6 ha. On average resident landowners owned 35.8 ha, while absentee landowners owned 54.2 ha.

**Conclusion**

Online education offers yet another way to reach disparate audiences with the latest forestry and natural resource information. While forest owners mostly prefer the high-touch environment of regular shortcourses, field days, and tours, they recognize that distance education is the only option for some (Johnson et al. 2004). As connectivity speeds increase and become more affordable, and internet access increases, more and more people will become used to distance education. The results from the two offerings of the *Woodland Options* web-based course indicate to us that this is a viable delivery system for those landowners with the technology savvy and interest in web-based education.

**Literature Cited**


<table>
<thead>
<tr>
<th>Module</th>
<th>Description (advanced assignment in italics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Overview</td>
<td>Course overview; assignment of working group and mentor team; pre-course evaluation; <em>how to collect materials and equipment for the advanced assignments.</em></td>
</tr>
<tr>
<td>1: Vision, Goals, and Family Resources</td>
<td>The planning process; understanding the limits of management; vision and basic goals for property; <em>family resource inventory</em>; dendrology 1.</td>
</tr>
<tr>
<td>2: Stewardship and Sustainability</td>
<td>Sustainable forestry concepts; forest and land use history in the Southeast U.S.; impacts of landowner decisions; <em>identifying natural and human disturbance on your property</em>; dendrology 2.</td>
</tr>
<tr>
<td>3: Property Deeds and Boundary Lines</td>
<td>Locating a legal property description; your property in the landscape; orienteering; <em>obtaining a legal property description, boundary line identification and maintenance</em>; dendrology 3.</td>
</tr>
<tr>
<td>4: Maps, Photos, and Soil Surveys</td>
<td>Locating and interpreting topographic maps, aerial photographs, and soil surveys; <em>creating a basic property map</em>; dendrology 4.</td>
</tr>
<tr>
<td>5: Forest Ecology and Management</td>
<td>Forest resource assessment; understanding forest soils and site; silvicultural practices; <em>forest stand delineation</em>; dendrology 5.</td>
</tr>
<tr>
<td>6: Assistance, Planning, and Options</td>
<td>Sources of professional assistance; components of the forest management plan; assembling your plan; <em>contacting a professional forester</em>; dendrology 6.</td>
</tr>
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</table>

Table 1. *Woodland Options* web-based course content
Table 2. Profile of *Woodland Options* web-based course participants.

<table>
<thead>
<tr>
<th>Question</th>
<th>Number of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own Forest Land</td>
<td>158</td>
<td>91</td>
</tr>
<tr>
<td>Professional Natural Resource Manager</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Primary Residence on Forest</td>
<td>61</td>
<td>39</td>
</tr>
<tr>
<td>Have a Forest Management Plan</td>
<td>34</td>
<td>22</td>
</tr>
<tr>
<td>Member of American Tree Farm System</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Member of Forest Stewardship Program</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Received Professional Forestry Assistance</td>
<td>64</td>
<td>41</td>
</tr>
<tr>
<td>Harvested Timber</td>
<td>44</td>
<td>28</td>
</tr>
<tr>
<td>Plan to Harvest Timber in Future</td>
<td>33</td>
<td>21</td>
</tr>
<tr>
<td>Do Not Plan to Harvest Timber</td>
<td>43</td>
<td>27</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Area (ha) Mean</th>
<th>Area (ha) Total</th>
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</thead>
<tbody>
<tr>
<td>Total Area Owned</td>
<td>47.6</td>
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<td>Forest Land Area Owned</td>
<td>42.5</td>
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<table>
<thead>
<tr>
<th>Length of Land Tenure (Years)</th>
<th>Number of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less Than One</td>
<td>36</td>
<td>23</td>
</tr>
<tr>
<td>Two to Nine</td>
<td>54</td>
<td>34</td>
</tr>
<tr>
<td>Ten to Twenty</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>Over Twenty</td>
<td>47</td>
<td>30</td>
</tr>
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Table 3. Post-course survey results for technology use and course organization.

<table>
<thead>
<tr>
<th>Question</th>
<th>Number of Respondents</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td><strong>Ease of Registration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easy</td>
<td>50</td>
<td>85</td>
</tr>
<tr>
<td>Not easy</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Not intuitive</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Access Speed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.4K</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>28.8K</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>56K</td>
<td>34</td>
<td>58</td>
</tr>
<tr>
<td>Cable</td>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>DSL</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>LAN</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Experienced Connection Problems</strong></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Course Material Easy to Download</td>
<td>58</td>
<td>98</td>
</tr>
<tr>
<td>Syllabus Clear and Accurate</td>
<td>58</td>
<td>98</td>
</tr>
<tr>
<td>Linked On-Line Format</td>
<td>57</td>
<td>97</td>
</tr>
<tr>
<td>First On-Line Course</td>
<td>46</td>
<td>78</td>
</tr>
<tr>
<td>Navigation Became Easier Over Time</td>
<td>53</td>
<td>90</td>
</tr>
<tr>
<td><strong>Course Organization</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>56</td>
<td>95</td>
</tr>
<tr>
<td>Fair</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Instructions were Clear</strong></td>
<td>59</td>
<td>100</td>
</tr>
<tr>
<td>Interacted via Group Forums</td>
<td>42</td>
<td>71</td>
</tr>
<tr>
<td>Group Forums Useful</td>
<td>28</td>
<td>67</td>
</tr>
<tr>
<td>Felt Isolated</td>
<td>21</td>
<td>36</td>
</tr>
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</table>
Table 4. Post-course survey results for course content and impact.

<table>
<thead>
<tr>
<th>Question</th>
<th>Number of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sufficiency of Course Content</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too Advanced</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>About Right</td>
<td>57</td>
<td>97</td>
</tr>
<tr>
<td>Too Basic</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Course Content Helpful in Management</td>
<td>54</td>
<td>92</td>
</tr>
<tr>
<td>Have or Will Seek Professional Assistance</td>
<td>46</td>
<td>78</td>
</tr>
<tr>
<td>Type of Assistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Management</td>
<td>41</td>
<td>70</td>
</tr>
<tr>
<td>Wildlife Management</td>
<td>29</td>
<td>49</td>
</tr>
<tr>
<td>Recreation</td>
<td>12</td>
<td>20</td>
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<tr>
<td>Reforestation</td>
<td>25</td>
<td>42</td>
</tr>
<tr>
<td>Taxes</td>
<td>17</td>
<td>29</td>
</tr>
<tr>
<td>Cost-share</td>
<td>17</td>
<td>29</td>
</tr>
<tr>
<td>Timber Sale</td>
<td>27</td>
<td>46</td>
</tr>
<tr>
<td>Income from the Forest is Important</td>
<td>26</td>
<td>44</td>
</tr>
<tr>
<td>Course will Assist in Earning More Money</td>
<td>22</td>
<td>37</td>
</tr>
<tr>
<td>Course Met Expectations</td>
<td>58</td>
<td>98</td>
</tr>
<tr>
<td>Recommend Course to Others</td>
<td>57</td>
<td>97</td>
</tr>
</tbody>
</table>
Table 5. Post-course survey results for selected sets of respondents.

<table>
<thead>
<tr>
<th>Question</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>Prior use of professional assistance</td>
<td>46</td>
</tr>
<tr>
<td>Prior timber harvest</td>
<td>33</td>
</tr>
<tr>
<td>Intend to harvest in future</td>
<td>25</td>
</tr>
<tr>
<td>First on-line course</td>
<td>77</td>
</tr>
<tr>
<td>Enjoyed on-line format</td>
<td>96</td>
</tr>
<tr>
<td>Course content helpful in management</td>
<td>93</td>
</tr>
<tr>
<td>Will seek professional assistance</td>
<td>90</td>
</tr>
<tr>
<td>Income from forest is important</td>
<td>48</td>
</tr>
<tr>
<td>Course will assist in earning more money</td>
<td>39</td>
</tr>
<tr>
<td>Recommend course to others</td>
<td>96</td>
</tr>
</tbody>
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Public Interest Litigation Helps Extend Scientific Harvesting to Forests Owned by Tribes in India: An Economic, Equity and Legal Analysis

by

Promode Kant

Abstract

The seven north-eastern provinces of India, one of the richest biodiversity zones in the world and comprising 25.70% of the forest cover of India, are inhabited by 209 major and minor tribes who own, or control in varying degrees, 71.42% of the total forest area of 16.38 million ha in the region. The Constitution of India accords a very high degree of protection to the cultural and land rights of the tribal people of India. Till 1998 the forests under the control of the various tribes were being worked by the members of the land owning tribes without the benefit of scientific tools. The strict tribal conservation ethics, which guided tree harvesting till a few decades back, slowly gave way to market forces and between 1991 to 1999 the seven north-eastern provinces of India lost a total of 201200 hectare of forest cover completely besides severely reduced tree cover density in most places elsewhere. Executive efforts to stop the downslide failed completely on account of the unintended use of the constitutional provisions protecting tribal land rights. Acting on public interest litigation (PIL), the Supreme Court of India initiated a long process involving the tribal communities, student unions, tribal district councils, wood based industry, state governments, the central government and the civil society with the objective of bringing all forests, irrespective of ownership, under forest working plans. The Court also used its all encompassing powers to ensure coordinated actions by all organs of the state for controlling unregulated market forces injurious to the sustainable management of forests.

This paper discusses the path breaking procedure adopted by the Supreme Court of India which changed the nature of litigation to that of extension, and analyses their constitutional, legal and ecological basis, with particular reference to the equity issues involved. The limitations of the public interest litigation in enforcing changes in the behavior of marginal people deemed harmful are also analyzed.

Key Words: community forests, sustainable harvesting, PIL

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Introduction

The northeastern part of India is endowed with rich forest wealth and is one of the eighteen ecological “hot spots” of the world. The total forest cover of the region in 2001 stood at 166173 sq km (Table 1) that is about two third of the geographic area as against the national average of just about 20%. However, the region has experienced continuous sharp decline in the forest cover for over two decades. Beginning in the nineteen eighties the losses reached 635 sq km between forest cover assessment during 1991-1993 and peaked at 783 sq km between 1993-1995 before registering decline to 316 sq km during the years 1995-1997 (FSI, 1999). Within the north eastern region the highest total cumulative loss of 927 sq km during the eight years between 1991 and 1997 was in Assam, the most populous state of the region, followed by 267 sq km in Manipur, 218 sq km in Meghalaya, 155 sq km in Arunachal Pradesh, 100 sq km in Nagaland and 78 sq km in Mizoram (FSI, 1999).

When seen in the context of the forest cover changes in the entire country the situation in the northeastern region appears even grimmer. Between 1991 and 1993 forest cover assessments the overall forest cover of India increased by a significant 925 sq km but that in the North East decreased by 635 sq km. And again between 1993 and 1995 assessments the forest cover of the region decreased by 783 sq km while that of the rest of India increased by 276 sq km (FSI, 1999). And this was in spite of the fact that the population pressure in the region is far lower than in the rest of the country with an average of 0.89 ha of land availability per capita in the region against a mere 0.30 ha for the India as a whole. And further the conditions of rainfall, temperature and humidity as well as the soil is also conducive to a very high productivity and compares with the best in the country and the world.

Excessive Harvesting in Forests Owned by Tribes

The Government of India, deeply concerned with the trend, examined the issue in details and came to the conclusion that the alarming situation obtaining in the north eastern region was primarily caused by a harvesting system almost entirely governed by the needs of the wood based industry rather than sustainable availability of the timber from the forests. The unclassed forests, falling under the control of the tribal communities and individuals, which constitute 45% of the total forest cover and 56% of the recorded forest area, had never been
covered by forest working plans and, therefore, harvesting in this vast area had been purely need based and the intensity of harvesting had merely been governed by the presence or absence of a network of roads to transport the logged timber. Even in the government owned reserved forests also slowly the same trend of needs of the industry becoming the deciding factor for harvesting took over the earlier practice of sound management of forests and it became acceptable to simply extend the previous working plans indefinitely on an adhoc basis annually instead of revising earlier plans in accordance with the ecological evaluation of the current status of forests.

**Weakening Authority of the Tribal Institutions**

Till the 1960s the tribal communities had remained largely isolated and the communities and their leaders were able to enforce the traditional tribal conservation values quite strictly. But with the development of roads, spread of modern education, quick change over to the market economy from the earlier barter system and, above all, changes in their religious and cultural practices owing to large scale conversion of tribes to organized religion the tribal conservation ethics, rooted in their traditional cultural values, have been weakened greatly over the years. Today, with honorable exceptions, these traditional conservation practices can be seen only in the remnants of the sacred groves and in the rest of the places the timber traders have been able to persuade the tribal forest owners to fell the forests without any consideration of their own future incomes let alone the ecological security of their lands and that of other neighboring tribal communities.

**A Major Political Attempt to Stop the Downslide**

There have been many attempts in the past to induce scientific harvesting practices among the tribal communities but the lure of money offered by the timber traders and the mill owners has always proven much more attractive. The central government initiated a number of steps to arrest the decline in the forest cover and density the most prominent of which was to bring the situation to the attention of the highest political levels in these states by holding discussions with the forest ministers of the state governments of the region at Itanagar in Arunachal Pradesh on 19.5.94 during which the underlying reasons of the problem were identified as unsustainable levels of harvesting primarily to feed the mushrooming wood based industries (MoEF, 1997) and the seven state governments agreed to

1. Update the existing working plans of the government forests most of which had not been revised since the 1980s and were being continued adhoc merely to regularize harvesting;
2. Extend working plans to forests coming under the control of tribal communities and tribal administration at district level;
3. No permission for setting up new wood based industries;
4. Sale of timber to the industries at market rates as the subsidies in sale prices was devastating the forests by leading to excessive harvesting;
5. Promoting plantations to relieve pressure from natural forest ecosystems;
6. Interstate co-operation in controlling smuggling of timber across the states.

But in spite of this resolution at the highest political level the situation was only worsened, as the state governments could not gather the necessary political will to undertake the tasks. In subsequent years no attempts were made to bring scientific forestry to the tribal community forests and the number of wood based industries kept on increasing with scant regard to the fast depleting resources. In Arunachal Pradesh alone 304 saw mills and 102 veneer mills were licensed after the adoption of these resolutions (HPC 1997). And the situation was not much different in other states.

**Constitutional Provisions**

India's constitution places the forest and environmental protection as a fundamental duty of its citizens. It also has separate provisions to protect the tribal traditional rights like the article 244 (VI Schedule) which has created Tribal District Councils that have both legislative and executive powers in limited areas dealing with the tribal
land holdings, their culture and ethnic identity and traditional laws. These district Councils have the power to make laws for the management of any forests other than the reserved forests, regulation of shifting cultivation and the occupation, allotment or use or setting apart of any land other than the reserved forests.

Another forceful provision of the Constitution lies in the Articles 371 A and G that accord special autonomy to various states like Nagaland and Mizoram preventing the central Parliament from making laws in relation to the following subjects without the concurrence of the state legislatures of these tribal states:

1. The tribal religious or social practices;
2. Their customary laws and procedures;
3. Administration of civil and criminal justice involving decisions according to customary laws;
4. Ownership and transfer of land (and also its resources in the case of Nagaland).

**Public Interest Litigation as a Last Resort**

When it was clear that the concerned state governments were unable to tackle this extremely serious problem on account of lack of political will and the constitutional provisions prevented the central government from interfering strongly a public interest litigation was filed by a group of interested citizens in the Supreme Court of India in order to correct the malaise and the Court clubbed all public interest petitions related to the forests of India under one writ petition number 202/95 which came to be known as the Godhavarman case. The Supreme Court of India decided to treat the case as a non-adversarial litigation with the concept of no guilt for all acts of commission and omissions in the past except when specific provisions of an existing law were violated and sought to create a wide consensus among all participants including the central and state governments, tribal district councils, the wood based industries and the members of public. For almost two years beginning 1996 this became the most prominent case that came up for hearing at least once a fortnight before a Bench presided by the Chief Justice of India.

**High Powered Committee for the Northeastern region**

Since the matter involved intermeshing political, legal, economic, ecological and other technical issues the Supreme Court constituted a High Powered Committee (HPC) under the chairmanship of a former Governor of one of the state of the region and consisting of a highly respected retired forestry professional having long experience of working in the region and a senior representative of the central government to examine the matter in all its aspects in an independent manner. The HPC in its first detailed report submitted in 1997 to the Supreme Court brought to light the scale of devastation of the forests in the region. It noted that the total number of the saw mills in the region was 1228, veneer mills 291 and 77 plywood factories and said that the total quantum of timber used by the industry in 1995 was about 98839000 cubic feet per annum which was several times more than the permissible level of harvesting. The HPC calculated that the total earnings from this timber should have fetched about Rs 19770 millions to the state governments and other community and private owners of the forests in 1995-96 but the total income from this source of all the states in that year amounted to a mere Rs 792.5 millions only. It was apparent that the forest wealth of the region was being systematically squandered away (HPC, 1997).

Separately the Supreme Court also set up independent committees in all the states to decide what constituted forests in these states. These committees consisted of senior serving and retired members of Indian Forest Service most of whom belonged to the tribes of the region. All the reports submitted by the various committees were heard in the Court in great details and after prolonged hearings the Court gave a detailed order on 15.1.1998 (Anon., 2003), which directed that

1. No new wood based industries to be allowed for the next five years;
2. Ecologically sensitive areas to be identified by the state governments with the help of professional institutions like the Wildlife Institute etc and to be kept out of bounds for harvesting;
(3) Harvesting in all forest areas to be done only in accordance with working plans duly approved by a central government authority located in the north eastern region;

(4) Harvesting in the forests belonging to the tribal communities and individuals also to be done only on scientific basis but could be carried out in accordance with approved working schemes dealing with harvesting and regeneration alone and covering limited time horizons of five years or less;

(5) Central government to take appropriate measures for helping prepare working plan and schemes in the tribal areas;

(6) Transport of timber to destinations outside the region was to be undertaken by railways only to ensure greater control;

(7) Requisitioning the services of border security force and the customs for ensuring that no illegal timber enters from the neighboring Myanmar to compensate for the reduced timber supply from forests within these states;

(8) Appropriate changes in local and state laws to be brought in to facilitate the above on a permanent basis.

The Court also created, by separate orders, specific Forest Protection Authorities under the Environment Protection Act 1986 for the states of Arunachal Pradesh and Nagaland to look into the specific problems of these two states which were comparatively heavily dependent on the forestry sector. These Authorities, constituted under the chairmanship of the Chief Secretaries of the respective states and having a senior representative of the central government as its member-secretary, were delegated with specific powers to resolve local issues under the basic principles of forest management approved by the Supreme Court.

A Special Investigation Team (SIT) was also set up to investigate into serious complaints of violations of the Court orders. This body also was required to involve the local officials in its works to ensure participation at all levels. Recognizing that one order may not cause the necessary and required changes in the governance in the tribal areas in relation to forestry matters the Court decided to seek periodical reports from the central and state governments which were also heard in the open Court almost once a month for the first year and with decreasing frequency in the subsequent years. The situation with regard to harvesting in community and private forests was constantly watched and timber suspected to be originating from forests not covered by approved working plans was not allowed to be sold or transported until cleared by the Special Investigation Team (SIT) constituted for investigating into all serious instances of wrongdoing.

Results

This public interest litigation is seen in India as one of the most effective usage of this instrument in bringing desirable changes in a society’s conduct under the changing environment. While it is too early to discern real changes in forest cover and density on its account the initial signs are encouraging. For the region as a whole there is an increase in the forest cover by 2376 sq km between the 1999 and 2001 assessments even though declines continue in many of the states under examination. Also, there has been some progress in the extension of working plans to the forest owned by the tribal communities and individuals and as on today about 510 sq km in Nagaland, 6717 sq km in Assam, 5639 sq km in Arunachal Pradesh and 140 sq km in Mizoram of the forests of these categories have been brought under the cover of working schemes. The number of wood based industries in these states has also come down to 374 from the high of 1596 in 1997.

Analysis of the Outcome

An overview of the action taken by the Supreme Court of India would make it appear a simple case of legal action to enforce forest conservation laws. But if we analyze the case in details it would be clear to us that it was essentially a case of extension of modern scientific ideas into the management of forests owned by tribes through apparently coercive but actually consensus building moves by the Court, which created an environment that made it possible. First we see it in the decision of the Court to make the case non-adversarial and making it plain that the exercise was not directed towards fixing guilt but to identify reasons and to build a consensus by involving all government and non-government stakeholders in the long chain of discussions forced upon by the court. The central and state governments were able to convince the tribal communities that the working of the forests on sustainable basis was in their medium and long term interest and that their land holding and tribal identities are not threatened by adoption of modern practices. It would thus be appropriate to see the conduct of
a case in which the highest court in the land uses a strange mechanism to create an environment in which a consensus could be built. For ease of discussion these steps could be seen as follows:

(1) The Court decided to make the case non-adversarial necessary to build genuine consensus;

(2) The Court appointed an eminent lawyer as Amicus Curiae (Friend of the Court) to assist the Court in view of the public interest and the complexities involved in the case. The Amicus Curiae held consultations with the state representatives, non-government organizations and other stakeholders and presented a detailed draft order every point of which was debated in the Court for several days and the final orders were the outcome of this exercise.

(2) The court appointed state and district level bodies to decide what constituted forests. These bodies, which included forestry experts belonging to the local tribes along with others, held wide ranging discussions with the local tribal communities. This helped bring a degree of consensus to what constituted forests and what was expected of the owners of these properties by other tribal communities in the neighborhood and particularly those inhabiting lands below these forests in mountainous ranges;

(3) These wide ranging discussions brought to light apprehensions among the tribal communities about the actions of other tribes in their neighborhood excessive felling by whom was not only threatening their food security but also lowering the prices of timber produced by them due to excessive supply;

(4) The debate also helped highlight the wealth earned from forests by a few tribal people in sharp contrast to the vast majority who earned little or nothing and thus made people aware of intra tribe equity issues also;

(5) The expression of apprehensions by other tribes brought a new dimension to the debate of equity which is normally seen only in the light of economic relationship between the tribal and non-tribal population;

(6) The court appointed a High Powered Committee, with membership that had both the necessary authority and the expertise in the requisite fields, to examine all aspects of the issue and to build consensus to the extent possible in bringing about the desired changes;

(7) The Court prohibited the transport of timber to major timber markets outside the region unless the owner was able to prove that the timber had been harvested following scientific management practices but did not interfere with local trade and transport thus creating an economic rationale for going in for scientific harvesting;

(8) The Court banned subsidized sale of timber to industries thus enhancing price expectancy from the timber harvested legally which could be sold to any place in the world;

(9) The Court recognized the limited financial and technical capabilities of for forest management by the tribal communities and helped establish a rule of thumb for sustainable harvesting that was easy to implement and acceptable to the tribal communities;

(10) The Supreme Court prohibited lower courts from taking cognizance of any case arising out of the decisions of any authority in pursuance of these orders as it recognized that the issues involved could not be dealt in the usual manner of settlement of disputes among different interest groups and that such attempts in bits and pieces by different courts could only hurt, not create, the environment required for establishing sustainable forestry practices among the tribal communities.

**Effect on Economy:**

Let us now look at the effects of limiting tree felling to within the range of sustainability on the economics of the region. In the beginning there were concerns expressed by many well-meaning persons that this is going to bring the economy of the region to its knees as wood based industries were often the only industries in an otherwise agricultural economy. In the year 1990-91, when the tree felling were at their peak in Arunachal Pradesh, the per capita net state domestic product (NSDP) at current prices was Rs 5398 against the All India average of Rs 4983. By 1995-96, just before the control measures started in December 1996, it had risen to Rs 11303 against Rs 9321 for the country as a whole. After the control measures initiated by the Court the per capita NSDP in Arunachal Pradesh was Rs 12032 in 1996-97 and Rs 13424 in 1997-98 against the country average of Rs 9321 and Rs 10399 respectively. The NSDP at constant prices grew at an annual average rate of 3.51% during the period 1993-94 to 1998-99 which was lower than the national average of 6.71% during the same period (NEDFI, 2004). But there is no evidence that this lower rate of growth was on account of the sharply reduced felling of trees. During this period agriculture, which contributes more than one third of the
state NSDP, had a growth of (-) 0.64% whereas forestry sector's contribution actually rose by 3.17%. Mining and quarrying also showed a negative growth of (-) 9.93% and similar slowing down was observed in many other sectors. This suggests that the control on felling did not have much effect on the economy. There was, however, a distinct lowering of NSDP at constant prices in 1996-97 and 1997-98 for Arunachal Pradesh that can only be explained by the effects of sudden reduction in tree felling. The outcry made the central government raise investment levels in other sectors in the state that led to recovery in the year 1998-99 (Tables 2 & 3).

In the case of Meghalaya also, which a good number of wood based industries, the state NSDP grew at the compounded annual rate of growth of 6.27% which was lower than the national average of 6.71% between the period 1993-94. This sector grew by 2.09% during this period but had a sharp peak in 1995-96 and significant decline thereafter. Overall the economy of this state does not appear to have been affected too strongly by the performance of the forestry sector but it is more because of larger central investments in the state in the years following the orders of the Supreme Court as a matter of deliberate policy (Tables 2 & 4).

These macroeconomic indicators, however, may not tell us the effect on the tribal families dependent on the tree felling by way of revenue flows as well as employment. The HPC examined this issue and noted that the share of the local tribal in the employment generated by the wood based industry was negligible as almost the entire work of felling, conversion, transportation and processing was done by migrant laborers. The loss was primarily of the revenues to the households in which the lowered income from sale of lesser quantities now available was also to some extent compensated by rising prices of the timber that rose by almost 30% and even more in specific markets. It would be fair to say that while these lowered revenues would have hurt the tribal families it did not cause poverty because the data for the years does not reveal any increase in the social indicators of poverty like higher mother and child mortality, increased school dropouts, outward migration of males, death by malnutrition and widespread discontent etc.

**Legal and Equity Issues:**

The Constitution of India has several provisions to ensure that the tribal identity is not threatened and that dominance over the lands that have been historically under their influence resides in them permanently. This was necessary because their number is very small and under a majoritarian democratic set up they do not have a strong political presence. In the case of some states like Nagaland the Constitution makes it explicit that the final authority to legislate (and execute) in relation to the tribal lands and the produce thereon lay with the state legislature consisting overwhelmingly of the tribal people. For other states it is not explicitly stated but the Indian state considers honoring the tribal identity an article of faith and all its wings -legislative, executive and judicial -act in furtherance of this ideal. All these authorities, acting separately and independently within their respective spheres, have tended to treat this ideal a bit too liberally even when the acts of the tribal people, undertaken in the name of tradition, harm themselves. The spirit of non-interference taken too far can begin to look like neglect. In this case the customary rights of the tribal people to harvest the product of their lands was linked to the customs prevalent in their society which ensured that the harvesting was invariably sustainable and was only for meeting their minimum needs. In the changed context of today the traditional authority of the tribal leaders has broken down and it can no longer enforce the old values of sustainability in the face of the market forces. Since the very welfare of tribal people is associated with the sustainable productivity of their lands it is necessary to fill this vacuum of authority and replace it with a system that has the necessary wherewithal. This is the legal rationale of restoring the concept of sustainability in the tribal land management and bringing the modern technology of forest working plans. Since the tribal control and enjoyment of their lands is not only not weakened but also actually lengthened indefinitely through enabling sustainability it is in the furtherance of the safeguards enshrined in the Constitution of India.

There is then the question of equity. The special rights to tribal people are to ensure that in the lands of their historical dominance the tribal will continue to have dominance, or equity will lie in their favor within these geographical entities. The test is whether this balance of equity between the tribal and non-tribal people has been disturbed and made more favorable towards the non-tribal people. The Court has very consciously kept it in consideration and this was one of the main reasons that the orders were made after a long and repeated process of discussions involving many levels of the tribal and other civil society. The Court saw that the distortions that had crept in the past few decades had actually transferred the economic dominance in the tribal states to the non-tribal people since the industry was almost totally in their hands and it was getting the wood supply at prices that were a fraction of the market rates. The Court, therefore, placed a ban on all subsidies to the
wood based industry in the supply prices of the wood and issued an explicit order to the effect that the supply to the industry can be affected only at the market rates. Further, since the market rates could have been manipulated by the purchaser industry overwhelmingly in the hands of the non-tribal people it asked the central and state governments too establish fair prices of the wood and make the prices public. This single step, combined with the strict control on the transport of illegally obtained timber has led to a very significant timber price rise in the region benefiting the tribal producer of timber. Thus, while not allowing the tribal ownership of the land to be disturbed the Court has ensured that the product growing on his land does not become a cheap source for the industries established by others but bring a fair income to him. As a result it would be fair to say that the order has corrected the recent distortions and restored the balance of equity in favor of the tribal.

**Limitations of Public Interest Litigation and Conclusions**

While Public Interest Litigation seems to have worked in this case in re-enforcing sustainability concept on the tribal owned forests while restoring the disturbed balance of equity in the favor of the tribal to a significant degree it is doubtful if this could be treated as a regular route of bringing science to forestry. It is because the legal procedures adopted for deciding disputes the world over insists on weighing the evidences presented before the court with the stance of the proverbial ‘blind lady with a balance in hand’, and for good reasons. The court can correct imbalances and address the questions of equity that enter a dynamic and productive system but its directions are essentially inputs, even when they are the best available, suitable to the context at that time. When the context changes, as it must in a dynamic system, it is the management (by the tribal institutions in this case) that must appropriately change course. And that would be possible only if the tribal institutions adopt science, and scientific methods, in the broadest sense of the meanings of these words, in their entire decision making process.

One important factor that must be borne in mind is that wisdom does not reside only in courts. It is possible that the courts may come to an erroneous conclusion in balancing equity among different interest groups. And the chances of committing mistakes increase with the uncertainties in the available information on which the courts must base their decisions. These uncertainties are the highest when the search for equity relate to natural ecosystems. When such a decision affects a large number of people in a democratic set up it remains open to them to use the legislative powers to amend the laws to restore the balance. But such a luxury is not available to very small communities who can only hope that the law as it exists shall be implemented flawlessly. An activist court can focus excessively on the cause of the moment and, in its enthusiasm, misbalance the equity deliberately placed in favor of marginal people in the nation's statutes.

In the instant case the procedure adopted by the Supreme Court of India in examining the public interest litigation ensured that the balance of equity in favor of the tribal people is not disturbed. Even as it did away with the passive balancing of the evidences, otherwise considered a legal virtue, and took an extremely active posture it deliberately adopted a non-punitive consensus building approach. It was not deciding a legal case. It was acting as an assembly of wise men before whom came an issue the import of which were not fully comprehensible to all the concerned actors and the task was to enhance the comprehension of all before they could agree on an appropriate course of action. The Court created an environment in which such a comprehension became possible and ensured that all agencies act sensibly in reaching consensus. The Court also saw to it that the central government makes timely technical inputs to enhance the capacity of the tribal institutions and financial inputs to reduce the immediate adverse impacts of the orders of the Court. The success of this effort is contained more in the procedure adopted rather than the points of law enforced. Thus, if it becomes necessary to resort to public interest litigation in similar situations elsewhere it would be necessary to revive the spirit in which this case was conceived and executed.

**References:**


**Annexure**

Table 1: Changes in Forest Cover

<table>
<thead>
<tr>
<th>State</th>
<th>Area</th>
<th>RF</th>
<th>PF</th>
<th>UF</th>
<th>Forest cover (Dense + Open) 2001</th>
<th>Change between 1991-93</th>
<th>Change between 1993-95</th>
<th>Change between 1995-97</th>
</tr>
</thead>
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<tr>
<td>Arunachal</td>
<td>83743</td>
<td>19880</td>
<td>0</td>
<td>31660</td>
<td>68045 (53932+14113)</td>
<td>-96</td>
<td>-40</td>
<td>-19</td>
</tr>
<tr>
<td>Assam</td>
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<td>18060</td>
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<td>8958</td>
<td>27714 (15830+11884)</td>
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<td>-447</td>
<td>-237</td>
</tr>
<tr>
<td>Manipur</td>
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<td>4171</td>
<td>11780</td>
<td>16926 (5710+11216)</td>
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<td>-63</td>
<td>-140</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>22429</td>
<td>1112</td>
<td>12</td>
<td>8372</td>
<td>15584 (5681+9903)</td>
<td>-106</td>
<td>-55</td>
<td>-57</td>
</tr>
<tr>
<td>Mizoram</td>
<td>21081</td>
<td>7127</td>
<td>3568</td>
<td>5240</td>
<td>17494 (8936+8558)</td>
<td>-156</td>
<td>-121</td>
<td>+199</td>
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<tr>
<td>Nagaland</td>
<td>16579</td>
<td>308</td>
<td>508</td>
<td>7813</td>
<td>13345 (5393+7952)</td>
<td>+27</td>
<td>-57</td>
<td>-70</td>
</tr>
<tr>
<td>Tripura</td>
<td>10486</td>
<td>3588</td>
<td>509</td>
<td>2196</td>
<td>7065 (3463+3602)</td>
<td>+3</td>
<td>0</td>
<td>+8</td>
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<td>Total</td>
<td>255083</td>
<td>51542</td>
<td>8768</td>
<td>76019</td>
<td>168174</td>
<td>-635</td>
<td>-783</td>
<td>-316</td>
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</tbody>
</table>

RF=Reserved Forests, PF=Protected Forests, UF=Unclassed Forests
Area in km²
Source: FSI (2001) and FSI (1999)

Table 2: Per Capita Net State Domestic Product (at Current Prices) for the Entire North Eastern Region (in Rs.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Arunachal</th>
<th>Assam</th>
<th>Manipur</th>
<th>Meghalaya</th>
<th>Mizoram</th>
<th>Nagaland</th>
<th>Tripura</th>
<th>All India</th>
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<tbody>
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<td>1990-91</td>
<td>5398</td>
<td>4281</td>
<td>3976</td>
<td>4375</td>
<td>4479</td>
<td>4990</td>
<td>3370</td>
<td>4,983</td>
</tr>
<tr>
<td>1991-92</td>
<td>6526</td>
<td>4683</td>
<td>4660</td>
<td>4891</td>
<td>5941</td>
<td>5590</td>
<td>3681</td>
<td>5,603</td>
</tr>
<tr>
<td>1992-93</td>
<td>7514</td>
<td>4973</td>
<td>5023</td>
<td>5272</td>
<td>6599</td>
<td>6273</td>
<td>3783</td>
<td>6,262</td>
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<tr>
<td>1993-94</td>
<td>8853</td>
<td>5520</td>
<td>5929</td>
<td>5934</td>
<td>7517</td>
<td>7730</td>
<td>NA</td>
<td>7,185</td>
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<tr>
<td>1994-95</td>
<td>9417</td>
<td>5979</td>
<td>6542</td>
<td>6402</td>
<td>7743</td>
<td>8550</td>
<td>4366</td>
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<td>1995-96</td>
<td>11303</td>
<td>6624</td>
<td>6914</td>
<td>7862</td>
<td>9570</td>
<td>9758(P)</td>
<td>5083</td>
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<td>1996-97</td>
<td>12032</td>
<td>6928(P)</td>
<td>7510(Q)</td>
<td>8474(Q)</td>
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<td>11368(Q)</td>
<td>5432</td>
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<tr>
<td>1997-98</td>
<td>13424</td>
<td>7335(Q)</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>13193*(Q)</td>
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<tr>
<td>1998-99</td>
<td>12929(Q)</td>
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<td>NA</td>
<td>NA</td>
<td>14712</td>
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<td>1999-00</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>11678</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>16047</td>
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### Table 3: Net State Domestic Product for Arunachal Pradesh at Factor Cost by Industry of Origin at Constant Prices  
(1993-94)  
(Rs. in hundred thousands)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1. Agriculture</td>
<td>27721</td>
<td>25558</td>
<td>26202</td>
<td>26294</td>
<td>27932</td>
<td>26849</td>
<td>-0.64</td>
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<tr>
<td>2. Forestry &amp; logging</td>
<td>9324</td>
<td>10563</td>
<td>10927</td>
<td>10732</td>
<td>10820</td>
<td>10896</td>
<td>3.17</td>
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<tr>
<td>3. Fishery</td>
<td>741</td>
<td>794</td>
<td>817</td>
<td>881</td>
<td>938</td>
<td>1014</td>
<td>6.47</td>
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<tr>
<td>4. Mining &amp; Quarrying</td>
<td>1147</td>
<td>628</td>
<td>407</td>
<td>446</td>
<td>431</td>
<td>680</td>
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<tr>
<td><strong>Sub total</strong></td>
<td>38933</td>
<td>37543</td>
<td>38171</td>
<td>38353</td>
<td>40121</td>
<td>39439</td>
<td>0.26</td>
</tr>
</tbody>
</table>

**Primary Sector**

| 5. Manufacturing | 2536    | 2661    | 3067    | 3855    | 6269        | 8038        | 25.95   |
| 5.1. Registered  | --      | --      | --      | --      | --          | --          | --      |
| 5.2. Un-registered | 2536   | 2661    | 3067    | 3855    | 6269        | 8038        | 25.95   |
| 6. Construction | 16444   | 14424   | 23718   | 15728   | 9048        | 12141       | -5.89   |
| **Sub Total**  | 16884   | 17645   | 26430   | 19066   | 14708       | 19708       | 3.14    |

**Secondary Sector**

| 8. Transport, storage & communication | 2470    | 2858    | 2760    | 3089    | 3016        | 3148        | 4.97    |
| 8.1. Railways | 3       | 1       | 1       | 1       | 1           | 1           | -19.73  |
| 8.2. Transport by other means | 2175    | 2571    | 2404    | 2712    | 2570        | 2702        | 4.43    |
| 8.3. Storage | 2       | 2       | 2       | 2       | 2           | 2           | 0.00    |
| 8.4. Communication | 290    | 284     | 353     | 374     | 443         | 443         | 8.84    |
| 9. Trade, Hotel & Restaurant | 4234    | 4613    | 4669    | 4971    | 5221        | 5511        | 5.41    |
| 10. Banking & Insurance | 990     | 1105    | 1223    | 1460    | 1654        | 1654        | 10.81   |
| 11. Real Estate, Ownership of dwellings & Business services | 1623    | 1717    | 1821    | 1932    | 2041        | 2162        | 5.90    |
| 12. Public Administration | 7814    | 8090    | 8417    | 9218    | 13788       | 12350       | 9.59    |
| 13. Other Services | 5862    | 5791    | 7643    | 7575    | 8352        | 9684        | 10.56   |
| **Sub Total**  | 22993   | 24174   | 26533   | 28245   | 34072       | 34509       | 8.46    |

**Tertiary Services**

| NSDP          | 78810   | 79362   | 91134   | 85664   | 88901       | 93656       | 3.51    |
| INDIA         | 68591200 | 73435800 | 78780900 | 85208500 | 89071200    | 94898200    | 6.71    |

CARG - compounded annual rate of growth

### Table 4: Net State Domestic Product of Meghalaya at Factor Cost by Industry of Origin at Constant Prices  
(1993-94)  
(Rs. in hundred thousands)

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<tr>
<td>1. Agriculture</td>
<td>33805</td>
<td>34195</td>
<td>38786</td>
<td>41670</td>
<td>42528</td>
<td>42935</td>
<td>4.90</td>
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<tr>
<td>2. Forestry and Logging</td>
<td>1931</td>
<td>2631</td>
<td>3003</td>
<td>2809</td>
<td>2279</td>
<td>2041</td>
<td>2.09</td>
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<tr>
<td>3. Fishing</td>
<td>1448</td>
<td>1460</td>
<td>1247</td>
<td>1548</td>
<td>1737</td>
<td>1584</td>
<td>1.84</td>
</tr>
<tr>
<td>4. Mining &amp; Quarrying</td>
<td>4428</td>
<td>6722</td>
<td>6537</td>
<td>6856</td>
<td>6626</td>
<td>10195</td>
<td>16.98</td>
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<tr>
<td><strong>Sub Total</strong></td>
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<td>45008</td>
<td>49573</td>
<td>52883</td>
<td>53170</td>
<td>56755</td>
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<tr>
<td>Sector</td>
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<td>2002</td>
<td>2003</td>
<td>2004</td>
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<td>2006</td>
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</tr>
<tr>
<td>Primary Sector</td>
<td></td>
<td></td>
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<td></td>
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<td>2278</td>
<td>2081</td>
<td>2055</td>
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<td>3787</td>
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INFOR:
A new approach to forest extension in New Brunswick, Canada

Anne LeBrun Ruff, Peter deMarsh, Louis-Philippe Albert

ABSTRACT
Finding ways to provide expanded, more effective forest extension services for family-owned forestry enterprises is an important concern in many parts of the world. Recent thinking has stressed three ways in which forest extension needs to adapt to changing circumstances: it must be done with innovative funding mechanisms, demand-driven services and participatory decision-making structures.

In New Brunswick, Canada a very modest project was initiated to develop a new approach to forest extension. Following the elimination of the publicly funded Forest Extension Service (FES) three years ago, the provincial government agreed to fund a private partnership of three organizations representing producers of Christmas trees and maple syrup and woodlot owners, for a transition period of several years as the partnership worked towards financial self-sufficiency. FES’s library and inventory of information and training material was donated, and the local Maritime College of Forest Technology contributed office space. INFOR, as the partnership is known, is attempting to provide a new type of service that will address primary producers’ need for services focusing on the availability and easy access to up-to-date resource material; research and technology transfer activities and organizational support and networking.

The paper will describe the development of INFOR, and provide a preliminary assessment of its progress, and lessons learned since 2000. Financial self-sufficiency has developed less quickly than hoped and some on-going public funding will be necessary. The participatory decision-making structure is working well. Design of services needs to combine demand-driven and leadership/promotion approaches.

Keywords: innovative, demand, partnership, network

INTRODUCTION
There is a growing belief in the research community that forest extension is entering a new period which will have greater focus on partnerships (Holding 2002). This presentation will describe the evolution of extension services in New Brunswick, Canada and how three producer associations are attempting to develop an extension services partnership with government support. In response to changing circumstances, innovative funding mechanisms are crucial. In the New Brunswick example, heavy emphasis has been given to the development of financial self-sufficiency through a cost recovery/user-pay approach. This paper will attempt to answer some common concerns: are the mechanisms in place feasible and to what extent will the sectors and their members be prepared to pay for services? Extension must be demand-driven to thrive but do we know what producers want and need? Do they know how to clearly articulate those needs? And, will there be a means to effectively communicate those needs? Can a partnership-based extension agency provide a coherent set of services, administered in an effective way responding to the expressed needs of producers? Actively involving the users in planning the programs offered is achieved through a partnership of producer associations. Can the associations provide the necessary leadership to ensure that the new organization is effective and sustainable?

The new organization in New Brunswick is now in its fourth year of operation. Strengths and weaknesses of the approach have been described, and an attempt will be made to assess the lessons learned. Finally, we will explore challenges which we are facing concerning the future of extension in New Brunswick.

Background
New Brunswick has a landmass of 73 500 km$^2$, 85 percent of which is forested. These lands are divided in four major categories; provincial government (50%), federal land (2%), industrial freehold (18%) and family forests, known in New Brunswick as private woodlots (30%). The forestry sector is one of the major employers in New Brunswick (N.B.) with about 15,000 people working directly in the industry as employees or contractors and 13,000 more people working in jobs related to this field. There are fourteen New Brunswick communities that depend entirely on the forest industry for their economic survival and close to 40 others rely heavily on forest-related business.
In New Brunswick, there are approximately 40,000 private woodlot owners who own 1,857,884 hectares of the province’s total forested area. From this land-base, private owners generate over 180 million dollars ($135 million US) worth of timber and fuel wood each year. New Brunswick’s woodlot owners are a diverse group, encompassing people of all ages and occupations. The objectives of ownership vary greatly, depending on the values of the individual. These values include, but are not limited to, recreation, spiritual, timber/income, firewood and wildlife. Most owners have a combination of values. Some challenges woodlot owners are facing include uncertain markets, certification, trespassing and landowner rights, increasing government regulation, a declining work force, obtaining pertinent technical advice, and minimizing the use of chemicals.

There are approximately 350 active Christmas tree growers producing an estimated 500 thousand trees a year. This industry generates over 10 million dollars ($7.5 million US) of revenue yearly and creates hundreds of jobs (on a year-round basis). More than 85% of the trees produced in New Brunswick are exported elsewhere in the Americas, with the large portion destined to customers in the United States’ Eastern Seaboard. Also, there were over 4.5 million Christmas wreaths and other types of decorative greenery manufactured in N.B. during 2003, making New Brunswick the largest greenery-exporting province in Canada. This value-added component provides approximately 4,500 full-time seasonal jobs yearly and generates over 20 million dollars ($15 million US) in sales yearly. Some key challenges for Christmas tree growers are the lack of timely information on pest control, an inadequate supply of quality products to meet market demand (relative to their potential), exporting issues, qualified labor shortage and access to quality seedlings.

In Canada, New Brunswick is third in maple syrup production. There are approximately 300 active maple producers in New Brunswick producing close to 1.8 million kilograms of syrup per year worth over 12 million dollars ($9 million US). New Brunswick’s maple producers vary greatly. Some run full-time, year-round operations, combining syrup production with year round packaging and marketing of value-added products. Many others are part-time operators who produce maple products for part-time income. Lack of clear quality standards for the product, high demand for the use of land, and expansion of value-added products are some of the challenges confronting maple producers.

Recent History of Extension Services in N.B.
Prior to 2001, N.B. had a publicly funded Forest Extension program. The Forest Extension Service (FES), was a section of the Department of Natural Resources (DNR), and had a staff of 30. Its objective was to educate woodlot owners and Christmas tree and maple producers on the concepts and benefits of sustainable management, and to encourage and assist them in managing their operations in a sustainable manner. It provided essential services to the three sectors. For maple sugaries and Christmas trees and wreaths, FES employed a specialist who, with other Extension field staff, provided information and technical assistance to maple producers and Christmas tree growers through seminars, courses, field days, and individual contact. Some of the services provided to woodlot owners by extension staff were: technical advice, woodlot management courses, planning and coordinating of field days, promotion of sustainable forest management, maintenance of a resource center for public use and coordination of technical seminars. FES played a key role in the promotion and development of private woodlot management.

The Establishment of INFOR Inc.
In 2000, the Provincial government undertook a comprehensive review of all programs and services in an effort to reduce expenditures. One of the decisions following the review was to eliminate FES. This decision came as a shock to many industry leaders and the general public. After an initial protest, it became obvious that the decision would stand, and producer organizations decided to review options available to ensure continued adequate servicing of the needs of the sector. One of the first questions was: what will happen to the excellent collection of printed and audio-visual material for use at courses and other educational opportunities in the FES library? This simple question led to a meeting of representatives of the associations representing woodlot owners, Christmas tree growers and maple producers. The discussion quickly led to the realization that there was a much bigger challenge facing the three groups of producers. Maintaining access to up to date technical advice, education and training opportunities are essential requirements for continuing to be technically current and competitive in our increasingly knowledge-based society. The associations began to see a larger challenge: could they take on a direct role in ensuring continuity and expansion of the full range of services previously available from FES?

A period of negotiations between the Department of Natural Resources and Energy and the three associations followed. An agreement was reached to transfer the resource center material to a new private sector organization, and to provide financial assistance for a transition period of several years.
INFOR Inc is the partnership of the New Brunswick Federation of Woodlot Owners, the New Brunswick Maple Syrup Producer Associations, and the New Brunswick Christmas Tree Growers Co-op Ltd. created to enter into a formal agreement with the New Brunswick Department of Natural Resources and Energy. The bilingual name combines the information mission and the forestry sector of activity. In July 2001, an agreement was signed between the Government and the three partnering organizations. The agreement had these components: the government would provide financial assistance for a three year transition period and would donate all written and audio-visual material from the Forest Extension Library, and the ownership rights to the education courses developed by FES. In return INFOR would have to work towards financial self-sufficiency. Important support was also provided by the Maritime College of Forest Technology who donated office space including all amenities to house the new organization.

INFOR is governed by a six-person Board of Directors which is made up of two representatives from each partner. It meets quarterly and determines the overall direction of INFOR, including approval of annual budgets and work plans and direction on priorities. The Directors provide strong and ongoing leadership to ensure that INFOR carries out its proposed mission. The partners have many other reasons to learn to work together and collaborate in addressing common issues and opportunities. One of the hopes for the new partnership was closer collaboration among the three associations. They and their members share a number of common issues in addition to extension services. However until 2001, and the FES “crisis”, they had had limited contact.

INFOR has 3 full-time employees: a manager, an information officer and a technician. It was unrealistic to expect such a small staff and very limited resources to provide the range of services that the N.B. Forest Extension Service was able to offer. The effort of this small team is to anticipate the technical information needs of producers and assist in accessing the best possible information sources. Therefore, emphasis has been put on developing learning tools for use by the Associations (course material, field days) and direct technical advice on specific production issues from a network of specialists.

ORIGIONAL EXPECTATIONS
The provision of up-to-date advice on production technology and marketing information, in all parts of the province and in both official languages (English and French), is critical both to new entrants and established producers. The goal of INFOR is to provide world class technical advice and education and training opportunities to be available to all maple, Christmas tree and woodlot producers. The quality of these services would be subject to “continuous improvement”. The proposed center would be the focal point of efforts to carry out the mission of encouraging producers to increase their appreciation of the strategic importance of information and education services to their business, and to take full advantage of the services offered by INFOR.

The original objectives were broad:
- to ensure the integrity, development and use of the library and associated material previously owned by FES;
- to develop methods to provide technical advice to producers and assist with field days and other educational programs;
- to support organizations in their training and other programs; and,
- to participate in research and development with industry and research agencies.

Financial self-sufficiency
The 2001 agreement between the producer groups and the government of New Brunswick was the result of a constructive and sustained dialogue. The $200 000 annual contribution from the province was for 3 years. The intent was that the private sector partners will assume an increasing share of the cost through a cost-recovery/user-pay approach. The agreement indicated that the Province will consider further financial contributions after an evaluation of INFOR’s progress in attaining the intended objectives during that initial period and funding has been extended to a fourth year. The initial policy for generating revenue was that charges should apply when service is of benefit to an individual’s business; when benefits are mainly to the sector or to society as a whole, no charges should apply. INFOR planned on charging for technical advice on a per visit basis, as well as having a fee for all seminars or courses offered. Funding would also be sought on a project basis, especially for research endeavors. A second source of revenue would be the sale of documents donated by the government to producers, students and the public.

Demand-driven services
It was to some extent taken for granted that INFOR’s partnership/participatory structure would by itself ensure that its services would correctly match producers’ needs. The big challenge was believed to be finding ways to
encourage producers to be more proactive in using available services. Communication, through a newsletter and a web site, would therefore be an important task for INFOR.

**Participatory decision-making structure**

A participatory structure was put in place early in the development of the new endeavor. Each of the Associations is directed by a Board of Directors elected by its members. The representatives for each Association on the INFOR Board have been formally given that responsibility by their own Board of Directors. They report to their Boards on INFOR’s progress and challenges on a regular basis, and receive direction on how INFOR should proceed. Each Association has its own mechanism for assessing the extension needs and priorities of its members. The Associations also reviewed their previous studies (NBCTGA 2000; Cormier 2001) which indicated the gaps in information needed relevant to them. As well, an advisory committee was set up in order to access the advice of knowledgeable professionals in fields such as Federal government, provincial government, Non-Government Organizations, Universities and colleges, and professional organizations. The Committee was formed to assist INFOR in assessing the proposed plans, exploring new ideas, expanding the educational material and other resources, and to help review the tasks and projects to be pursued.

**EVALUATION**

After 3 full years of operation, INFOR is an established extension provider in New Brunswick. It is recognized as such by many organizations and producers. The initial establishment took longer than expected; development of this type of organization takes time since in addition to becoming known, it is necessary to gain people’s trust. INFOR is attempting to fill a large gap in services with limited resources.

One tool established to assist in on-going evaluation was a benchmarking exercise. It was initiated in 2002 in order to provide a database for progress evaluation, by determining the situation in the base year for key variables; and by setting up an on-going process to monitor progress in achieving our objectives (Albert 2003). Indicators were designed for each of the INFOR objectives to provide a tool for monitoring the success of the organization. The evaluation of progress by an organization must, by definition, relate to its effectiveness in the attainment of a set of pre-determined objectives. In most cases, there will also be an interest in assessing the efficiency with which the organization is reaching its objectives (Albert 2003). Because INFOR was only recently established, the project did not review the appropriateness of the objectives contained in the Agreement between the Government of New Brunswick and INFOR’s constituting organizations. Performance evaluation of complex and primarily social objectives requires the use of qualitative assessment tools as well as quantifiable indicators. The very short life of INFOR and its even shorter period in the actual provision of services, has lead the project team to recommend an output evaluation approach. As time passes and INFOR refines the focus of its services, it will be possible to assess the impact that it is having on the clientele and the sectors it serves.

**Financial self-sufficiency**

Financial stability is cause for some concern. INFOR still depends on public funding for over 90% of its budget (Table 1).

<table>
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<th>Forecast in original proposal</th>
<th>% of Government funding</th>
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<td>2001-02</td>
<td>88.5</td>
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<td>2002-03</td>
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<td>Actual</td>
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<td>2001-02</td>
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<td>2003-04</td>
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<td>Projected</td>
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<td>2005</td>
<td>81</td>
<td>19</td>
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<tr>
<td>2015</td>
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This dependence is a weakness that potentially threatens the viability of INFOR. Other sources of funding have included: course fees, sale of publications, fees for individual visits and project-based funding from a non-government agency. The anticipated increase in revenue for 2005 is due to the strong demand for use of educational courses that were updated in 2004. Two courses have been recognized by a major forest certification body. Woodlot owners will have to take such a course in order to sell timber.
Continued support from Government is justified by the benefits of forest extension services not only for the target groups but for society in general: the environmental benefits from properly managed forest and watercourses are far from being negligible. Rural communities which are presently relying on forest products are struggling to remain economically viable. The environmental and social benefits of extension are difficult to measure in monetary terms.

Revenue from sales of services has been disappointing. This should have been foreseen since all previous extension services were free. There are great limits in making the transition: the old mind-set is still strong. INFOR was reluctant at first to charge fees since it did not want to deter any possible clients but in turn this made it harder as time went on to effectively set a fee for the services offered. A weakness of our partnership structure may be some reluctance by partners to put too much pressure on their members to pay for INFOR’s services. The incentive to avoid this is the commitment to maintain and build INFOR, which will require showing the government that we are progressing towards self-sufficiency as quickly as possible.

**Demand-driven services**

The list of potential services and activities is immense compared to our capabilities. INFOR has accomplished a great deal since its inception but there is still much to achieve. INFOR provides four types of services; each of which has seen some successes and failures. (1) Training and resource material has received the most effort. It took over a year and a lot of work to update the courses donated by FES. They have been available since late 2003 and demand is growing strongly. The users are willing to pay the fee for the course which is competitively priced with other private providers. The demand for other resource material is fairly strong. Most of the inquiries are on how to start a sugary or Christmas tree farm and that information is mostly free of charges. The sales of books and documents are mostly to the general public who are interested in tree identification or wildlife. (2) Technical advice is a service that is difficult to provide because of limited staff and because our expertise is limited in some areas. To compensate for this we have a good network of resource people and consultants willing to help us. The revenue from the fees set for this service is not yet covering the full cost due to the traveling distance for our staff. Although we are centrally located in the province, we still have to travel some 3 to 4 hours to reach some areas. We now try to assemble small groups of producers with a common problem so that we reach more people in one outing. (3) Organizational support is basically assistance given to each partner organization for either helping in the administration of their organization, representation or even reaching out to their membership. In all three cases, FES organized a major field day each year. The three organizations have taken on responsibility for these events with INFOR’s support. (4) Research and development is not a priority at the present time due to lack of funding. Our approach is primarily to facilitate studies through other agencies by providing them with the issues of concern for our partners. Most of the research done so far was technical e.g. balsam fir tip productivity from pre-commercial thinning treatments and evaluation of chicken compost on the fertility of soil for Christmas tree production. More research and development is planned but at a limited level of involvement.

INFOR has a web site which is receiving positive feedback and the online catalogue of our resource is a very effective way to reach people. The newsletter, INFORnation, reaches over 5500 homes in the province. It is produced quarterly and contains timely information on the three sectors being served.

If producers are reluctant to pay all or part of the cost of services, are there other ways to assess the relevance of the services provided? During the benchmarking exercise, all users of extension services in N.B. were invited to attend one of many input sessions held in all parts of the province. They provided input into what services would benefit them most. This was then compiled and put into a comprehensive work plan for the organization. It is now an on-going process where their demands are fed to us via their meetings or even on an individual basis. It seems that there is a strong component of producers that does not seem interested in acquiring new knowledge and technology. They follow the status quo and contacting them so that they have an opportunity to see the benefits is difficult. Although, we practice a bottom-up approach in theory, we fall somewhat in the paternalistic approach to distributing information: telling the producers what information we believe they need.

A participatory structure would appear to ensure that producer needs are clearly communicated. This assumes the leaders and/or employees of the member partners who represent them at INFOR have a clear sense of what producers want, and can distinguish between that, and what they themselves believe producers need. It also assumes that producers have a clear sense of their needs. Reality in our experience is mixed. An element of assistance in defining needs, and promotion of services believed by leaders and staff to respond to new challenges, or poorly defined needs will need to be combined with a pure “demand-driven” approach.
Participatory structure
The three initial partners remain strongly committed to making INFOR a success in order to address some of their needs. There are good reasons for concern that partners may not give enough priority to INFOR. Each association has pressing, immediate concerns. Two of the partners do not have any staff; their executives are made up of volunteers. This situation causes difficulties in getting full participation/involvement since it takes away from their own time. Furthermore, developing extension might be seen as more of a long-term investment, easily displaced by more immediate pressure. In fact, the contribution from the three associations has been very good, and largely adequate to provide INFOR with the guidance it needs.

There has also been some evidence of indirect benefits from the partnership. They have joined forces on some unrelated issues for example, applying for federal relief funding following an ice storm that damaged many sugarbush and plantations. Although they have common issues, the three associations also have divergent views on some subjects. This is not always addressed adequately. An example would be the woodlot owners that press the province to raise stumpage rates for timber from public forests. This is not viewed favorably by maple producers who might have to pay more to operate their sugars from Crown Land maple trees. Another example is a particular insect (gypsy moth) infestation. Christmas tree growers would prefer to have only the infested area recognized, thus allowing the non-infested areas to ship trees anywhere without a phytosanitary certificate. The lumber industry would have the whole province declared infested, thus allowing unhindered movement of timber within the province. INFOR has provided a forum that has encouraged collaboration on issues of shared interest and dialogue on areas of difference.

A new committee was formed in order to encourage sharing of experiences with extension tools and activities. It is called Networking Across Borders (NAB). It is a network of “Forest Extension” people across Atlantic Canada and New England. It was initiated in 2002 and presents a forum for members to share ideas, resources and challenges pertaining to woodlot owner education and awareness. NAB’s mission is to facilitate communication between jurisdictions. In order to achieve this, the Committee will share experiences on ways to improve efficiencies of delivery. There will be a joint effort to provide woodlot owners with information and education through woodlot owner consultation. INFOR is one of the founding members of NAB and has played a key role in the development, operation and success of this interprovincial/international group.

FUTURE ENDEAVORS AND CHALLENGES
Short term
Clear identification of future issues enables organizations in general to shape the future rather than simply react to it. With this in mind, INFOR held a strategic planning session at the end of the 3 year agreement, where all partners of INFOR were represented (Yerxa, 2004). INFOR has acknowledged the need for planning and has developed the following strategic plan to set direction for the organization for the next 3-4 years. The overall direction of the organization was determined by reformulating a mission & vision statement.

Vision: A partnership of forestry sectors to help our members and clients succeed.
Mission: To fulfill the priority education and information needs of our partners and the sectors they represent.

Four main key result areas were then identified for INFOR (Figure 1):
Funding: Securing financial stability is important for any business; there is a need to be able to produce revenue and to explore options for funding other than government. INFOR will not reduce its services but will deliver them more efficiently.
Public relations: There is a need to increase the familiarity of member groups, the general public, media and government with the role of INFOR. The publication of the newsletter and the expansion of the web site will be on-going efforts.
Services: The services provided to the partners will continue to be demand-driven as INFOR strives to deliver high quality forest extension services.
Governance: The governance of INFOR will effectively involve partners in the planning and management of the organization.

These objectives are currently being worked on and the partnership believes that INFOR will be able to continue in this direction so that the needs of maple producers, Christmas tree growers and woodlot owners are addressed.
Long term

Long-term issues which are expected to challenge INFOR and its partners include:

- The decreasing importance of the primary forestry sectors in the New Brunswick and Canadian socio-economic structure. The size of landownership is decreasing and woodlots are increasingly acquired for recreational use or as a retreat. There is a great need for showing the new woodlot owner they can produce lumber, as well as meet their other objectives and preserve the quality of the woodlot.

- The conflict between highly mechanised and industrialised primary extraction, versus the ecosystem and ‘relationship with nature’ approach (usually small-scale) operations. The trend is for bigger and more efficient operations which in theory produce more profits. The challenge will be to address their environmental impact due to the more intense impact on the forest. On the other hand, the small-scale approach should not be discouraged since it provides supplemental income to rural areas.

- Two of the partner organisations, Maple syrup producers and Christmas tree growers are not strong. For example, less than 20% of operators are members and the revenue is insufficient to continue operating. The concern will be can INFOR operate with only one viable organisation supporting it?

- The recognition by governments that extension and education should receive at least 50% of its financial needs from public funds.

CONCLUSION

INFOR is learning how to deal with the potential and limitations of self-financing. Its partnership/participatory decision making structure has developed very well, and it has learned a great deal about finding an effective balance between leadership/promotion, and a strict demand-driven approach to determining the services it offers. INFOR is still in the making but it has many ingredients for long term success.

References


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ACCELERATING AGROFORESTRY ADOPTION: A CASE OF MOZAMBIQUE

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Abstract

In sub-Saharan Africa, smallholder rural farmers face critical problems of soil fertility and forest resource depletion, contributing to rampant poverty. Agroforestry has the potential to mitigate rural poverty and food insecurity. The major agroforestry dissemination constraints include improper translation of research results into easy and understandable training packages. Identification and building of rightful capacities for effective communication with rural communities has also been inadequate. ICRAF’s multiple strategic partnerships in Mozambique has increased agroforestry awareness and adoption. Partnership memoranda of understanding (MoUs) enhanced interaction and collaboration among all the various agroforestry stakeholders. Hence, about 5000 rural households adopted agroforestry within two years. Formation of local change teams, in the ‘pilot scaling up areas’ (PSUAs), as contact farmers and trainers of fellow farmers were an effective dissemination pathway. Trainings and farmer-to-farmer visits were among the successful communication strategies. Farmers and partners were trained in agroforestry options and in monitoring, evaluation and product processing. Scaling-up agroforestry widely requires farmers’ direct involvement in testing adapting, and disseminating options.

Key words

Agroforestry dissemination, Farmers, Partnerships, Poverty, Scaling-up

Introduction

Most of the inhabited land in Mozambique, like in the other southern African countries, has been subjected to extensive deforestation because of agriculture (McDonald et al 2003) and exploitation of forest products, making the areas vulnerable to soil erosion that leads to soil infertility, one of the major problems facing the region today. The remaining forest cover is also under threat of being wiped out due to high population growth rates in the region (3.3% per annum in Mozambique), which always gives rise to increased demand for farming land. As forests dwindle in number and size, inhabitants experience increased difficult in gaining access to local forests and forest products (Isager et al, 2002). According to the UNDP/SADC human development report (1998) more than 65% of the people in Mozambique lives in rural areas, depending highly on agriculture for their livelihoods. A variety of agricultural crops are produced locally for food and cash. The production of cash crops such as tobacco is among the major causes of deforestation and the related problems in the country due to the large amount of land and wood required to sustain the industry. At the same time, the use of traditional, non-mechanized crop management systems with low food production potential is rife resulting into perpetual food insecurity. Farmers who once relied upon subsidized agricultural inputs, especially fertilizers, no longer do so after many governments in the region embraced the structural adjustment program (SAP) since the 80s, scrapping the subsidies. This increased the cost and unavailability of the chemical fertilizers to the resource poor farmers resulting in widespread food shortages. Such problems have escalated in the recent years with the outbreak and increasing adverse impact of the HIV/AIDS pandemic, and occurrences of natural calamities such as floods and droughts coupled with declining government revenues. However, agroforestry with a range of low cost, low input sustainable land use options presents great potential to significantly minimize the agricultural and environmental problems prevailing in the country and the entire region (Mendonsa and Stott 2003). A huge body of scientific knowledge in agroforestry has been gathered in the last two decades in southern Africa (Sanchez 1995), resulting in options with proven potential to mitigate rural poverty if timely and correctly
implemented. Most of the agroforestry research work in southern Africa has been spearheaded by the World Agroforestry Centre (ICRAF) since the late 80s. Notable options have been developed to addressing problems of soil fertility, scarcity of wood products, and livestock fodder and general environmental degradation. Initially ICRAF worked in four southern African countries; Malawi, Tanzania, Zambia and Zimbabwe, but included Mozambique in late 2002 by introducing the technologies that had proved viable in the other countries. Despite the promising work and results in the region, the rate of agroforestry adoption still remains rather low (Bannister et al 2003), falling far behind the projected goals. This is partly due to inadequate manpower and the other resources to simultaneously carry out the mammoth task of agroforestry research and extension in a vast area, like Mozambique. On the other hand some scientists use inappropriate communication strategies and have inadequate knowledge about smallholder farmers regarding their traditional values, indigenous knowledge on the environment and how they manage landscapes. This has greatly contributed to the slow adoption rate (Isager et al, 2002). Proper dissemination and communication strategies would facilitate wider agroforestry adoption. This also means that agroforestry needs an approach that builds grassroots capacities while simultaneously facilitating adoption. Farmers ought to be the main players in driving this process. The involvement of local communities in the communication process is essential in achieving effective and sustainable dissemination and adoption levels of the agroforestry technologies. Bannister (2003) reported that, working directly through local organizations and farmers trained as extension agents was proved effective by the Haiti USAID-funded Agroforestry Outreach Program, in reaching over 250 000 small scale farmers within a period of nine years (). One constraint, in the dissemination process has been inadequacy in translating and filtering scientific findings into easy and understandable language, hampering the teaching and understanding of these results at farm level. Production of several and simplified teaching and extension materials is one such activity that enables smooth and permanent transition of useful technologies.

Through the use of agroforestry, ICRAF aims to improve the well being of the rural poor. Agroforestry comprises technologies that contribute to food security and help farmers meet the increasingly complex challenge of keeping themselves resilient to diseases, their farming sustainable, and the environment healthy while improving incomes.

In general agroforestry, focuses on low input options with the potential of improving rural household incomes and food security; especially options that improve soil fertility and subsequent crop yields, availability of high value fruit trees, wood and vegetable products. Socio-economic studies which have been conducted elsewhere (Ajayi and Kwesiga 2003) revealed that such tree-based technologies have positive impact on rural livelihoods (Franzel 1999). Though over 110 000 households have been reached and are using agroforestry technologies so far on their farms in southern Africa over the past 15 years, this is still short of the targeted goal of 400 000 households by 2006 (Kwesiga et al. 2003). To contribute significantly to this goal, ICRAF Mozambique embarked on a strong program to build strategic partnerships. This paper highlights the involvement of several stakeholders, heavily including those at grassroots to enhance accelerated agroforestry dissemination and adoption in Tete province of Mozambique.

Materials and methods.

Mozambique, borders with Zambia and Zimbabwe to the west, South Africa and Swaziland to the south, Malawi and Tanzania to the north and it is the African country with the longest coast along the Indian ocean to the east (Figure1).

Initiating agroforestry in Mozambique

The country was affected by a civil strife that negatively affected the socio-economic status of the people for a long time. ICRAF’s work in Mozambique started after signing a memorandum of understanding (MoU) with the government in the year 2002. This was close to two decades of agroforestry research in southern Africa. Through this memorandum, Mozambique was to join the other countries in southern Africa Malawi, Tanzania, Zambia and Zimbabwe which already had over 15 years of agroforestry research...
and dissemination. The MoU was to ensure smooth cooperation between ICRAF and the ministry of agriculture and rural development (MADER) and other national research institutions in advancing agroforestry development in the country.

Though Mozambique is one of the few countries with a reasonably wide forest cover in southern Africa, the rate at which the forest is being destroyed is relatively high (0.7% by 1995).

**Selection of pilot scaling-up areas**

To achieve wide-spread adoption and impact of agroforestry technologies, scaling up platforms had to be built. Initial work started in Tete province of Mozambique in the year 2002 under the USAID/TARGET funded project, which covered Chichewa speaking areas of three southern African countries; Malawi, Zambia and Mozambique. In October 2002 initial survey was conducted to select agroforestry pilot scaling-up areas (PSUAs). Five PSUAs (Furamcungo, Mapanje, Zobue, Matewere and Nkhame) were identified and selected in four districts (Macanga, Tsangano, Moatize and Angonia) of Tete Province in Mozambique.

Selection was carried out jointly with, national government lead agencies, partner institutions and ICRAF using GIS, latest development statistics and human resource/partner information. The objectives of the PSU selection survey were:

1. To assess preferences for scaling-up AF among a list of pre-selected target areas and to recommend a restricted number of PSUAs to be included in a two year USAID/TARGET project in Mozambique.
2. To provide a general characterization and identification of boundaries of PSUAs to be included and to assist in the establishment of some baseline data for the project.

The criteria used for identifying potential target pilot scaling up areas was based on the need and demand for Agroforestry (AF) in the area (levels of vulnerability to food insecurity and poverty, low income and deforestation levels in general), existing production and marketing potentials, existing extension staff competencies and performance and current levels of local participation and innovations, biophysical potential for AF in the area, infrastructure (roads, communications, markets etc.) and availability of potential partners.

**Formation of change teams (CTs)**

In each PSU a small group of people called ‘change team’ consisting on average 30 people (change agents) was formed, whose composition was 2 traditional leaders, 2 government agricultural extension technicians, 2 technicians from partner organizations and 24 farmers. The communities and partner institutions carried out selection of the change agents. Member selection was based on potential to act as change agent, level of activeness in community programs and participation in previous community programs.

The main purpose of the change agents was to facilitate efficient technology transfer from farmer to farmer and ensure a grassroots frontline of extension staff in the target areas, as they were to provide all services necessary for technology adoption. This was to ensure a farmer owned and a farmer driven developmental process having established a viable grassroots extension through a demand driven agroforestry training. The change teams underwent a practical, field based, modular primary training phase. Training programs were arranged to strengthen capacities of the partners and other stakeholders in agroforestry development after assessing the training needs of the change agents. A series of trainings were conducted for the change teams in each PSU. One training session per PSU per month was planned over a period of two years. The primary goal of training the change team, partner staff and farmers was to allow for smooth technology transfer among the farmers and build agroforestry development capacity at grassroots level. The training of change teams was divided into 24 events, conducted in 30 days over the 2 two years. Training was focused on practical nursery and field establishment and management of the agroforestry technologies, monitoring and evaluation, HIV/AIDS awareness and other critical developmental issues. Trainees were encouraged to practice agroforestry on their own farms from the first season. Through mutual planning with partner organizations and the farmer groups, budgets were drawn to meet the requirements. ICRAF and partner organizations, provided support in germplasm and the other tree nursery materials to every farmer reached.
Strategic Partnerships

In addition to the change teams, partner institutions provided a forum for delivering technologies to farmers. Potential partners in the area were identified and a process of developing MoU with each partner was undertaken. ICRAF adheres to a MoU model for partnership which clearly spells out the vision and goals of partnership while also stating the responsibilities of each partner, time frame of the partnership and monitoring as well as evaluation mechanisms of mutual activities for mutual ‘benefits’. The MOUs were partner and activity specific, thus different in nature from partner to partner, depending on each organization’s comparative advantage or and mutual interest with ICRAF.

Training manuals

To adequately take each change team through a practical, field-based, modular training of two years there was need to have adequate training materials for the training officers and other facilitators to use. Training modules were developed in a series of agroforestry technologies to act as training guide.

This project used a two-phased approach to technology transfer according to priority livelihood needs of smallholder farming families in the PSUAs. During the first year, the project focused on increasing farm productivity for food security and marketing of staple foods. Options such as mixed intercrops of trees and crops, and annual relay cropping with trees and crops were used. During the second year, the focus shifted to advanced agroforestry technologies that diversify household incomes—technologies such as biomass transfer for vegetable production, fodder banks, woodlots and integration of fruit trees into farming systems. All the agroforestry options introduced in the Mozambican PSUAs under the project have been tested elsewhere in the region since 1988 under on-station and on-farm research with great success.

In order to adequately measure impact of the project in terms of agroforestry adoption during the project’s span, the number of people in the target areas at the time of implementing the project was established through literature review as part of the baseline data (Table 1).

Table 1: Population in ICRAF target areas based on 1997 national population census -Mozambique

<table>
<thead>
<tr>
<th>PSU A name</th>
<th>No. of Households</th>
<th>Population in selected target area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matewere</td>
<td>6,550</td>
<td>54,803</td>
</tr>
<tr>
<td>Nkhame</td>
<td>8,300</td>
<td>49,902</td>
</tr>
<tr>
<td>Furamcungo</td>
<td>2,500</td>
<td>12,981</td>
</tr>
<tr>
<td>Zobue</td>
<td>2,300</td>
<td>16,433</td>
</tr>
<tr>
<td>Mapanje</td>
<td>5,400</td>
<td>32,420</td>
</tr>
<tr>
<td>TOTAL</td>
<td>25,050</td>
<td>166,539</td>
</tr>
</tbody>
</table>

NB: Table1 was adapted from the Mozambique National Census Report of 1997

Cross border farmer-to-farmer visits

Cross border farmer-to-farmer visits were organized. The visits involved taking the Mozambican farmers (mostly change team members) from the five different PSUAs to visit the more experienced agroforestry practicing farmers in Zambia and Malawi. During the visits the visiting farmers stayed in the homes of the hosting farmers, encouraging free discussions not only during the field day but also in the home at night.

Monitoring and Evaluation

Change team agents and other partners were trained in monitoring and evaluation of the project activities. This involved follow up and evaluation of the implemented technologies. Record keeping was another aspect in the M&E training. Visitors such as the donor organization and policy makers also provided an avenue for monitoring and evaluation of the on-farm activities.
Results

Matewere had more people as by the data shown in Table 1 it had 54,803 and Nkhame had 49,902 people while Furamcungo had the lowest with only 12,98. The total population in the five selected PSUAs was 166,539 people; this implied that the number of people was more than enough to meet the estimated target of sixteen thousand persons. Some change team members could not continue carrying out their scaling-up duties due to a number of reasons, as such size of change teams had generally dropped by 24% at the end of the second year of the project in 2004 (Table 2).

<table>
<thead>
<tr>
<th>PSUAs</th>
<th>Initial No. CT members</th>
<th>No. Dropped</th>
<th>No. Existing</th>
<th>Drop out %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furamcungo</td>
<td>23</td>
<td>3</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>Nkhame</td>
<td>27</td>
<td>2</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>Matewere</td>
<td>27</td>
<td>4</td>
<td>23</td>
<td>15</td>
</tr>
<tr>
<td>Mapanje</td>
<td>50</td>
<td>21</td>
<td>29</td>
<td>42</td>
</tr>
<tr>
<td>Zobue</td>
<td>20</td>
<td>6</td>
<td>14</td>
<td>30</td>
</tr>
<tr>
<td>TOTAL</td>
<td>147</td>
<td>36</td>
<td>111</td>
<td>24</td>
</tr>
</tbody>
</table>

These change agents underwent practical field training in agroforestry prior and during project implementation. The concept of agroforestry and the various technologies were taught to them in a series of modules during the two years of the project. The number of training modules developed during the two years helped in facilitating and guiding the trainings. Below is a list of the actual titles of the agroforestry training modules developed and used in the project.

1. Introduction to agroforestry - trainers’ guide
2. Tree nursery establishment and management
3. Mixed species fallows of Gmelina arborea and Sesbania sesban
4. Improved fallows
5. Woodlots
6. Fodder banks
7. Biomass transfer for vegetable production
8. Fruit trees propagation techniques

Partnerships development and characterization

In order to make significant progress in agroforestry scaling up, ICRAF engaged in the development of strategic partnerships in the province. Firstly, the memorandum that was signed with the Ministry of Agriculture (MADER) provided a wide and conducive platform accelerating agroforestry adoption in the target area since the ministry already had its extension staff on the ground that were in contact with the farmers in PSUAs. The Ministry of Agriculture extension wing was involved in the formation (and was part) of the change teams. To deal with dry season fodder scarcity, ICRAF involved the Institute of Animal Production (IPA) as a partner. IPA is a governmental department, which specializes in livestock fodder research, and development, an issue which was so much part of the ICRAF-USAID project. The project also created partnerships with various other stakeholders. For instance, agricultural and trade private sector, partnerships were made with the tobacco companies Mozambique Leaf Tobacco Company (MLTC) and DIMON Company Limited. This was necessitated by high deforestation rates usually caused by the tobacco industry, and the government, in a social responsibility program, requested these companies to seriously engage in reforestation programs. However, these institutions needed technical support in general tree planting and agroforestry of which ICRAF has the expertise. This made partnership with ICRAF inevitable. To address health matters for both staff and farmers, it was found necessary to make partnerships with ‘Medicos Sem Fronteiras’ (MSF) and Action for Natural Medicines (ANAMED). The partnership was in the area of mitigating the spread and impact of HIV/AIDS among staff and the resource poor rural farming
households. This is an area where ICRAF lacks capacity. Meanwhile, the HIV/AIDS epidemic continues to haunt sub-Saharan Africa, posing a significant threat to trees on farm and thus disrupting positive transformation of lives and landscapes. Increased exploitation of trees for cash, unsustainable use or overuse of medicinal trees has led to severe deforestation in some area. Above all, HIV/AIDS breeds pessimism about the future, which reduces farmers’ interest in long-term investments like Agroforestry. Undoubtedly disease, illness and death among agroforestry experts and the farming community impact negatively on agroforestry knowledge transfer and consequently on agroforestry scaling up efforts. In the long term, Agroforestry can serve as a kind of ‘life insurance’ for communities dealing with the impact of HIV/AIDS. When the HIV/AIDS impact is still low, with HIV/AIDS related infections and deaths still being relatively limited, communities can start to build on a base of trees producing fruits, wood and natural medicines. This requires more labour initially and less over time. We envisage in this way agroforestry would help to proactively build the reliance of communities to better cope with the AIDS impact when (or if) it becomes severest in the future. However, most of the Agroforestry research and dissemination staff including the bulk of the farming community are still not well informed on HIV/AIDS infection rates and prevention and more so on its ravages on human lives. A deliberate effort is needed to widely disseminate HIV/AIDS information in order to provoke appropriate responses to the pandemic in the field of prevention, care and long-term mitigation. Against this backdrop therefore, ICRAF entered into partnership with MSF and ANAMED (who have expertise in HIV/AIDS awareness and prevention operating under the auspices of Mozambican Ministry of Health) to facilitate (or initiate) a sustainable, long-term mitigation strategy for HIV/AIDS in farming communities in ICRAF’s pilot areas of Tete Province in Mozambique.

Lutheran World Federation (LWF), which is promoting rural household food security and income generation strategies in resource poor communities, also became a partner in this agroforestry program. LWF and ICRAF share a common objective of seeking for sustainable ways in which the resource poor rural households can enhance food security and cash income whilst protecting the environment. LWF works with resource poor rural communities in Maravia (which is non-ICRAF operational area) and Macanga. All these areas face a problem of rampant deforestation. Hence, a robust and strategic agroforestry program was required as a major part of the solution to mitigate some of the negative environmental effects caused by land degradation due to deforestation. Some of the notable indicators of land degradation are; erosion, fuelwood scarcity, low soil fertility causing low crop yields and scarcity of fodder for livestock. As such, LWF recognizes the crucial role agroforestry could play in addressing some of the problems faced by the communities with which they work. ICRAF also realized that LWF, which works directly with the farmers, was well placed to facilitate wider farmer adoption of agroforestry technologies, hence the partnership.

Some of these partnerships were developed late in the second year of the two-year project. However, such partners will contribute significantly to the future sustainability of agroforestry adoption in Tete and beyond. Table 3 shows the profile of ICRAF-Mozambique partners in Tete. It is important to note also that some of these partners were located outside the PSUAs, where the ICRAF change teams were not operating at all. Thus, of forming alliances outside ICRAF operational areas was a deliberate strategy to allowed for agroforestry programs to be carried out not only in the ICRAF PSUAs but in all the other parts of Tete Province (Table 3). To date a robust joint program with the partners has been put in place to widely disseminate agroforestry to as many farmers as joint resources and planning can allow (Table 5).

Table 3: The profile of ICRAF partners in Tete Province, Mozambique as of June 2004

<table>
<thead>
<tr>
<th>Name of partner</th>
<th>Acronym</th>
<th>Description of organization (Key function/focus areas)</th>
<th>Type of organization (e.g. Govt., Private, etc.)</th>
<th>Location (e.g. province, district, town, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mozambique Leaf Tobacco</td>
<td>MLTC</td>
<td>Private tobacco industry (Growing and sale of leaf tobacco)</td>
<td>Private</td>
<td>Tete, Tsangano, Macanga, Angonia and Moatize Districts</td>
</tr>
<tr>
<td>Instituto Producao</td>
<td>IPA</td>
<td>Animal production institute (Fodder)</td>
<td>Govt.,</td>
<td>Angonia District</td>
</tr>
</tbody>
</table>
Agroforestry adoption

The main goal with the change team members was to reach 16,000 households over a period of two years, quite an ambitious target. After developing sufficient strategic partnerships, the possibility of a wider reach was achieved thus, the goal was revised upwards in January 2004, to a staggering 50,000. Various agroforestry options were lined up for adoption. Options such as mixed intercropping and relay cropping with *Sesbania sesban*, *Tephrosia vogelli* and *Cajanus cajan* were established in the first season (2002-2003) in all PSUAs for soil fertility improvement. In the second season of 2003-2004, woodlots of *Grivellia robusta*, *Australian acacias* (*A. auriculiformis* and *A. julifera*) as well as biomass transfer for vegetable production with *Gliricidia sepium* and *Tithonia diversifolia* were introduced as additional agroforestry options for farmer adoption (Table 4). Mango fruit trees were also introduced for future grafting to improve fruit quality and value to enhance household income through increased production and hence, sales. A total of 4,491 farmers (of which over 1400 were women) were reached in a span of two years (Table 5). By the end of two years the number of agroforestry adopters attributed to change team members’ participation alone was 4,491 (Table 5), which was about 25% of the targeted goal. This number discounts the farmers reached by various other partners in the ICRAF and non-ICRAF operational areas.
Table 4: Kilograms of seed and number of seedlings distributed to farmers in PSUA by change team members

<table>
<thead>
<tr>
<th>Species</th>
<th>Germplasm type</th>
<th>1st Season</th>
<th>2nd Season</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pigeon pea</td>
<td>Seed</td>
<td>1000</td>
<td>1120</td>
<td>2120</td>
</tr>
<tr>
<td>Sesbania sesban</td>
<td>Seed</td>
<td>405</td>
<td>190</td>
<td>595</td>
</tr>
<tr>
<td>Gliricidia sepium</td>
<td>Seed</td>
<td>75</td>
<td>64</td>
<td>139</td>
</tr>
<tr>
<td>Tephrosia vogelii</td>
<td>Seed</td>
<td>2000</td>
<td>1211</td>
<td>3211</td>
</tr>
<tr>
<td>Mangifera indica</td>
<td>Seedlings</td>
<td>*</td>
<td>4800</td>
<td>4800</td>
</tr>
<tr>
<td>Grivellia robusta</td>
<td>Seedlings</td>
<td>*</td>
<td>5000</td>
<td>2500</td>
</tr>
<tr>
<td>Acacia spp.</td>
<td>Seedlings</td>
<td>*</td>
<td>5000</td>
<td>5000</td>
</tr>
</tbody>
</table>

* Not distributed

---

Table 5: Agroforestry adoption by gender and PSUA from 2002-2004 in Tete, Mozambique

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Total</td>
<td>Female</td>
<td>Male</td>
<td>Total</td>
</tr>
<tr>
<td>Matewere</td>
<td>218</td>
<td>376</td>
<td>594</td>
<td>152</td>
<td>310</td>
<td>462</td>
</tr>
<tr>
<td>Zóbue</td>
<td>54</td>
<td>408</td>
<td>462</td>
<td>76</td>
<td>74</td>
<td>150</td>
</tr>
<tr>
<td>Mapange</td>
<td>70</td>
<td>496</td>
<td>566</td>
<td>274</td>
<td>540</td>
<td>814</td>
</tr>
<tr>
<td>Furankungo</td>
<td>125</td>
<td>321</td>
<td>446</td>
<td>44</td>
<td>47</td>
<td>91</td>
</tr>
<tr>
<td>Nkhame</td>
<td>257</td>
<td>289</td>
<td>546</td>
<td>136</td>
<td>224</td>
<td>360</td>
</tr>
<tr>
<td>Total</td>
<td>724</td>
<td>1890</td>
<td>2614</td>
<td>682</td>
<td>1195</td>
<td>1877</td>
</tr>
</tbody>
</table>

Table 6: The projected agroforestry adoption in partnership programs during the 2004-2005 season in Tete, Mozambique

<table>
<thead>
<tr>
<th>Organization</th>
<th>No. of Farmers</th>
<th>Total No. of plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Teams</td>
<td>4635</td>
<td>2167500</td>
</tr>
<tr>
<td>MLTC</td>
<td>32500</td>
<td>16250000</td>
</tr>
<tr>
<td>DIMON</td>
<td>8400</td>
<td>4200000</td>
</tr>
<tr>
<td>LWF</td>
<td>1830</td>
<td>915000</td>
</tr>
<tr>
<td>GPZ</td>
<td>3150</td>
<td>1475000</td>
</tr>
<tr>
<td>MSF</td>
<td>5000</td>
<td>*</td>
</tr>
<tr>
<td>ANAMED</td>
<td>1000</td>
<td>500000</td>
</tr>
<tr>
<td>Total Budget</td>
<td>56515</td>
<td>25507500</td>
</tr>
</tbody>
</table>

Cross border farmer-to-farmer exposure visits – from Mozambique to Malawi and Zambia

Five cross border farmer-to-farmer exchange visits were conducted between April and July 2003. The visits gave opportunity to about 160 participants from Mozambique to learn and share agroforestry experiences with fellow farmers in Zambia and Malawi. Farmers from Mapanje, Nkhame, Zobue and Matewere were taken to Malawi while those from Furancungo were taken to Zambia (Table 7). A lot was learnt and various exciting experiences were shared between the host and the visiting farmers. Different technologies other than those being practiced by the visiting farmers were seen. In Malawi, the farmers were able to see and learn about various income generating technologies such as indigenous fruit tree propagation, fruit processing, biomass transfer and management of different indigenous and exotic species and fish farming using Leucaena tree foliage to feed the fish in ponds. The farmers who went to Zambia saw improved fallows of Tephrosia, Sesbania and Gliricidia including the biomass transfer technology for soil fertility improvement. The visitors were also exposed to fish farming using Leucaena tree foliage to feed the fish in ponds. Integration of fish farming with agroforestry fits well under advanced agroforestry options for
improving household nutrition, food security and income. A wealth of information and knowledge about difference AF options including their benefits was exchanged, hence creating more lasting AF scaling-up opportunities.

Table 7: Places and dates of the cross border farmer-to-farmer visits

<table>
<thead>
<tr>
<th>PSUAs</th>
<th>Date</th>
<th>Number of farmers taken</th>
<th>Place visited</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>Furamcungo</td>
<td>June 2003</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>Matewere</td>
<td>July 2003</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>Nkhame</td>
<td>July 2003</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>Zobue</td>
<td>July 2003</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>Mapanje</td>
<td>July 2003</td>
<td>10</td>
<td>23</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>79</td>
<td>74</td>
</tr>
</tbody>
</table>

Project staff and partners did monitoring of implemented activities. In addition visitors and reviewers provided a big platform for monitoring and evaluation of activities. These ranged from farmers, developmental workers, scientists, policy makers and students.

Discussion

The relatively high population density in the target area coupled with the existing demand for AF technologies due to the potentially high risk of environmental degradation indicates the potential for wider and quicker agroforestry scaling-up. Only 10% of the population in the selected PSUAs was required to meet the initially targeted goal of 16000 people to use agroforestry technologies. Even though change teams reached only about 30% of the target population in the PSUAs in the two years, enough ground has now been covered with the involvement of partners such that a ten-fold adoption rate increase is anticipated between 2004 and 2005. This projection was based on our experience with the change teams’ influence on adoption in two years. Considering the current robust partnership program in place, it is believed that the adjusted target of 50,000 will be met in a single season (2004-2005) provided such agroforestry pre-requisites, as germplasm are readily and adequately available. The change team strategy has, however, proved that a grassroots organization can be effective in facilitating as an extension tool to communicate with the many farmers who could not be reached by formal government extension staff alone. It also showed that if not closely monitored and evaluated many farmers may face drawbacks, as farmers need continuous support and encouragement from formal structures of government. In the two years of this project, about 24% of the recruited local change team members had withdrawn their services as farmer trainers. The reasons cited for the dropping out were various ranging from illnesses to lack of transport or incentives to facilitate community trainings. This project assumed that the government was better placed to offer such incentives if it deemed them necessary for the overall development of the community. Such incentives were not considered at all, under this project.

Here partnership is found to be an effective strategy to employ in reaching more farmers. In most cases, partnerships are entered into for reasons such as insufficient materials, financial and human resources (Ruttan 1987) to meet targeted goals and achieve project missions. It is known that agroforestry development must address a range of services and concerns extending from the environment, markets, training, and health to general participation. A single organization cannot adequately afford to deal with all these alone without involving other stakeholders. Partners in agroforestry effectively compliment scaling up and extension. For instance, in the awareness of HIV/AIDS to farmers where ICRAF lacks expertise, the rightful partners, in this case MSF and ANAMED, must complement. However, if commitments and specific roles are not spelled out in the partnership, such complementarity usually fails to meet the desired objectives. Even though most of the partnerships in the project were developed late in the second season, these partnerships will play an important role to sustain agroforestry capacity building and adoption in the future. According to our experience, an MoU is a very important aspect in a long term partnership. The MoU is a written record that accords opportunity for other staff to know and understand the collaboration outline. It is also flexible as it can be amended from time to time to the convenient of both parties. The main constraint in the agroforestry dissemination process in Mozambique and probably elsewhere, has been the lack of capacity of our partners in agroforestry development. Therefore, in all the partnerships, the
major role was to build agroforestry capacities and strengthen them where or if they existed. On the other hand, lack of training material always hindered training and smooth transfer of agroforestry technologies. Development of training and extension materials was seen as vital in sustaining of agroforestry scaling-up. The primary training goal was; efficient technology transfer through farmer or other partner trainers who would act as volunteer frontline extension staff in their areas. Once training modules are developed they can continue to be used even beyond the project’s life span, though with some minor modifications from time to time. The other principle goal was to enable partner and extension staff develop into local facilitators in participatory extension and rural development. In Mozambique, there was and still is, undoubtedly need to build adequate AF capacity among all the partners. This is a great tool in successful partnership involvement in agroforestry dissemination. Most our partners such as LWF, MLTC, MSF and DIMON have frontline grass root field personnel who deal directly with farming communities and are thus best suited for AF scaling up with adequate AF training and the trainers guide training modules we developed during the project.

The involvement of local leaders in the formation of the change teams was an effective farmer empowering process. In fact the African rural setting gives the whole lot of regard for traditional leadership. Thus, the presence of the local leaders in the change teams presented notable positive influence to the other team members even when they, the local leaders, reached less farmers than the ordinary members. It was also discovered that, women participated as equally as did men. There was no genda segregation in terms of roles due to adequate genda training given to the farmers.

Benefits derived from agroforestry technologies take long to be seen and this may sometimes adversely affect adoption rates. However, due to the persistent land use problems in the community and the amount of agroforestry awareness received through the efforts of the various stakeholders, participation of farmers in agroforestry increased. The use of agroforestry options like biomass transfer for vegetable production and mixed intercropping, that give benefits within the same season facilitated quicker and wider agroforestry adoption. Maize yields derived from improved fallows in Zambia under farmer conditions typically range from 2.0 to 3.5 t ha$^{-1}$ depending on fallow management and seasonal rainfall variations (Chintu et al. 2004). In addition, wood harvests typically amount to 10 t ha$^{-1}$, and are sold or used for fuel or light constructions (Chirwa et al. 2003). Therefore, appropriately selected agroforestry technologies to solve particular problems inevitably acts as an incentives for wider farmer adoption. It must also be known that though the right partnerships may be formed in agroforestry, germplasm availability is a pre-requisite to successful implementation of agroforestry scaling-up. However, acquisition of the right quantity and quality of the required (appropriate) germplasm at the right time, continues to be a challenging task and has to a greater extent, affected adoption. Private and communal seed orchards would lead to sustainable self-sufficiency in agroforestry germplasm.

Further more, exposing farmers to various options through visits to other farming communities is very effective in facilitating adoption through exchange of experiences. In the Mozambique case, farmers visiting Malawi and Zambia had a feel of the hosts’ way and standard of living. Farmer-to-farmers exchange visits had a lasting positive impact on both the participating and the host farmers. The visits created a lot of enthusiasm among the Mozambican farmers and the fact that the visiting farmers were change team members meant that, their experiences were shared with most of their trainees back home. Hence such exchange visits would be said to have multiplier effect in terms of agroforestry adoption and scaling-up.

**Conclusion**

The inherent diversity of proposed agroforestry technologies enabled smallholder farmers to adopt options that fit differences in biophysical conditions and socio-cultural settings. When agroforestry technologies are introduced, they serve as solutions for improving livelihoods and incomes and as learning tools for all stakeholders. Experience has shown that, building local capacities can effectively be combined with scaling-up of technology use among large numbers of farming families. In order to make significant strides in scaling-up agroforestry in the region, with scanty fiscal and trained human resources, donors, ICRAF and the other stakeholders have to heavily rely on strategic or complementary partnerships. ICRAF
Mozambique has fast awakened to this reality and has thus played its own part in that regard. The following are some of the notable lessons learnt during the two years of the project:

1. Strategic partnerships with appropriate stakeholders is key to achieving the short- and long-term project goals
2. Joint planning with partners is key to successful program implementation and must begin and be finalized long before the intended date of program implementation
3. Required resources like time, funds, human, material and others, and those available to fulfill commitments in a partnership should be fully elaborated at planning stage before fixing datelines, otherwise commitments and deadlines would be declared but rarely fulfilled, hence causing failure of the whole program.
4. Developing MoUs with partners assists in separating and sharing responsibilities fairly for success

Finally, development of training modules is key to a consistent and effective farmer training as they assist in guiding the trainer at every stage. Partner organizations including those at grassroots level are a major tool in accelerating adoption of agroforestry and need well-planned and strategic training based on the identified training needs. The other lessoned learnt during in this project are that:

1. Farmers have keen interest in acquiring new knowledge and skills imparted to them through training. Joint planning with farmers and frequent on farm M & E is key to success of AF scaling up programs.
2. Monitoring and evaluation tours are an effective way of sharing useful experiences in agroforestry. They also serve as encouragement to the farmers visited to do more and better, because farmers begin to feel that the other people, especially policy makers, have interest in them and in what they do.
3. Linking farmers to proper markets is still a challenge that must be address in order to raise the household income levels through the sale of crop harvests thereby accelerating AF scaling up for poverty reduction.

We strongly note that, the involvement of several partners in scaling-up offers an opportunity to a joint control, management and ownership of the dissemination processes and the land use options. The strengthening and building of partner capacities in agroforestry development is very crucial since agroforestry technologies are complex and knowledge based systems.

**Literature cited**


Greening Afghanistan: Restoring severely degraded natural resources through livelihoods

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Kabul, Afghanistan

The Post-Conflict Environment

Arguably few countries have suffered greater degradation in recent decades than the mountainous terrain of Afghanistan, now emerging from two debilitating decades of conflict.

For geographical reasons, Afghanistan has always had little forest cover: only 3.5% of the territory, or around 1,900,000 hectares, was historically wooded and 40-50% of those forests are already lost or destroyed. “As for the pistachio forests of Badghis, Herat and Takhar,” Mr. Haavisto (leader of UNEP study) said at a news conference, "some areas have lost 50 percent of forest cover.” The UNEP team in its report stated they observed “vast landscapes of bare or eroding soil where dense woodlands of pistachio once stood less than 30 years ago.” Reportedly much of this deforestation occurred during the time of the Soviet occupation. Staff from the ACC have seen these areas too, and thus have first-hand knowledge of the problem, but also of the interest of villagers to rehabilitate these degraded Pistachio woodlands.

In the past 30 years, the remaining forest areas of Afghanistan have decreased by half. These include the unique Pistachio woodlands of the north and western parts of the country, and the rapidly dwindling coniferous forests of the mountains of eastern Afghanistan. In a recent report released by UNEP\(^2\), satellite imagery demonstrates severe degradation in all natural resource rich areas of Afghanistan. Forest cover abundant in pictures of the northern and eastern provinces that appears green in 1977, is completely barren in the same images from 2002. Without intervention these forest areas, already small, will likely continue to shrink, possibly beyond any hope of recovery.

A customary division of resources according to tribal and ethnic traditions dictated land use patterns throughout the country. However due to the severity of resource exhaustion, these established systems have been ineffective in preservation of valuable fuel sources. Returning refugees and Internally Displaced Persons (IDPs) further exacerbate this dependence. “The deforestation process has now reached a stage where near total loss of forests may be imminent unless urgent and decisive conservation measures are taken.”\(^3\) Pastureland, covering nearly 60% of total land cover, has also suffered greatly. Grazing patterns have altered in response, overstressing now scarce grasses and shrubs. Severe erosion of topsoil and micronutrients, and degradation of entire watersheds is diminishing the value of that which remains.

This declining natural resource base has resulted in a widespread loss of plant and animal diversity as well. Conifer forests in Kunar and Nuristan, Haloxylon forests across Northern provinces, and Pistachio forests in the Northern & Western provinces have all markedly declined. In a recent report released by UNEP\(^4\), satellite imagery demonstrates severe degradation in all natural resource rich areas of Afghanistan. Forest cover abundant in pictures of the northern and eastern provinces appears green in

1977, but in 2002 images the photos are completely barren. The wetlands that were rich in bird and wildlife just four years ago now show up as blank space.

"As for the pistachio forests of Badghis, Herat and Takhar," Mr. Haavisto (leader of UNEP study) said at a news conference, "some areas have lost 50 percent of forest cover. In Kunar and Nuristan there is 30 percent loss of forests from illegal logging and the timber trade."

Proposed working strategies to rehabilitate Afghanistan’s Northern forests are comprehensive and cover aspects from nursery establishment, seed management, terracing and sapling planting to irrigation and intensive restoration of the land. These projects would generate millions of work days and would result in large scale rehabilitation of the degraded forests belts across the Northern half of Afghanistan. Intense and uncontrolled logging of Afghanistan’s eastern conifer forests, especially for deodar cedar, is having a severe impact on current drought conditions and vital resource availability.

In Kunar and Nuristan there is 30 percent loss of forests from illegal logging and the timber trade. Intense and uncontrolled logging of Afghanistan’s eastern conifer forests, especially for Deodar cedar, is having a severe impact on current drought conditions and vital resource availability. After 25 years of conflict in Afghanistan, uncontrolled deforestation in Kunar and Nuristan has contributed to the extinction of certain tree species and rapid soil erosion. These forests have been burned and overexploited for export to neighboring countries.

Grasping Poverty at its Roots

The Afghan Conservation Corps (ACC), a Government of Afghanistan project, implemented by the United Nations Office for Project Services (UNOPS), proposes to expand and intensify its reforestation activities to re-establish trees in the Pistachio woodlands, and in the Eastern Conifer forests. The ACC in its first year of operation has been successful in mobilizing thousands of laborers in work crews in local communities throughout much of Afghanistan to re-establish tree nurseries, prepare planting sites, plant trees, and water trees after planting. Over the next year, ACC would utilize resources requested in this proposal to organize, train and field conservation crews from the communities in the Pistachio woodlands, and the eastern coniferous forests to propagate seedlings, control soil erosion to prepare planting sites, plant saplings available in the coming year, and maintain planted trees to reforest these areas.

Projects target vulnerable populations to provide needed employment opportunities for those most in need. This functions firstly as a self-selecting mechanism as the government approved base labor rate automatically selects from the lower end of the labor market. This ensures only those most in need benefit from projects. ACC projects specifically target the following:

- Persons with disabilities
- Widowed women
- Refugees and IDPs
- Former combatants
First Year Achievements:

- 110 projects operational in 19 provinces
- 2,750 vulnerable Afghans employed per day
- 50,000 trees planted in Kabul Green Belt project
- 14,500 families assisted
- 380,000 labor days created
- 12 project management / technical training workshops held for Ministry staff
- 48 nurseries under rehabilitation
- 10 public parks restored
- 1,500 ACC vests made by women’s cooperative
- Over 40,000 pistachio seeds sown
- 750,000 trees planted during Kabul Green Week
- 4 Women’s Conservation Corps projects
- 15 chapters of Youth Conservation Corps established
- 200 hectares of native forest under reforestation in Kabul Green Belt

The average ACC project is 10 months long, generates approximately 5,700 labor days, and has a budget of $14,000; over 75% of which pays labor. ACC projects across the country employ over 2,000 vulnerable people per month. In addition to unskilled male laborers, ACC presently employs women, persons with disability, returning refugees, internally displaced persons (IDPs) and disarmed soldiers, extending benefits to 14,500 families in the first year. Projects rotate labor to ensure maximum dispersion of benefits and participation.

The overall aim is to utilize environmental conservation, in tandem with strategic government partnerships, as entry points for a nation-wide employment program that ensures that most vulnerable have access to income generation opportunities while simultaneously producing contributing to the country’s long-term development and environmental sustainability. ACC selects projects that adhere to a series of guidelines through a transparent selection process ensuring equity among beneficiaries.\(^5\) The management and implementation structure and direct contracts with the communities makes certain the entire process is accountable and efficient in all regards.

Kabul Green Belt

In close coordination with Forestry and Range department of the Ministry of Agriculture, ACC is taking the lead in rehabilitating the Kabul Green Belt after 33 years of progressive deterioration. This precious resource suffered during the years of war, creating widespread flooding and erosion and depleting most tree stands. Reforestation work of the Green Belt began with Qargha Dam hills and Bagh-e-Bala areas and currently operates in 16 sites around the city.

The plan, if fully funded and managed, will envelope the city in green hillsides providing green spaces to picnic, mitigating erosion and improving soil and water health. The intensive work of terracing, placing retaining walls and check dams, repairing water intakes, digging pits, preparing raised plots and planting seedlings will restore a vital watershed to the region.

Youth Conservation Corps (YCC)

Recognizing the importance of involving and educating children in the long-term sustainable development of the country, primary students were chosen to launch Afghanistan’s first chapters of Youth Conservation Corps (YCC). The YCC is a youth initiative encouraging interest and participation in the environment by forming active groups in which children engage in community service activities. A national curriculum, presented to and approved by the Ministry of Education is currently being introduced to schools as a basis for more formal inclusion of Environmental Science later this school year. Key results:

- 83 public schools in Kabul cleaned of garbage
- 5,000 students participated in Youth Conservation Corps inauguration
- 9 public environmental murals painted
- 25,000 primary school students receive Environmental Education

\(^5\) See attached Appendix 1: Project Proposal Guidelines
380,000 Kabul students participate in World Environment Day

Women’s Conservation Corps (WCC)

The WCC pilot project responds to the urgent need to target employment programs at women following years of war. Many widows and women with disabled husbands are relied on to provide for their families. The pilot project at a 400-bed hospital in Kabul provides jobs, develops management and technical skills and beautifies public grounds.

Between 25-50 vulnerable women are employed per day to landscape grounds, establish a vegetable garden for patient meals; rehabilitate the orchard, children's playground, flower nursery and gardens; create a waste separation and composting area; garbage cleanup, repair a damaged irrigation system and construct a small greenhouse. Women have also benefited from fruit saplings which will act to supplement household income and nutrition. WCC has recently added 3 new projects in the provinces, and will continue its focus on employing disabled, widowed, sole provider and landless women.

Collaborative Management of Scarce resources

ACC maintains a focus on local control and local benefit. Community level shura’s (community councils) mobilize and manage the corps across the country, community by community with Level 1 contracts. Projects are proposed based on district-level needs and accepted in accordance with ACC’s conservation priorities. Contracts are signed directly with shura representatives, who with a provincial Ministry representative manage the project. To encourage the Sustainable Management of Forest Resources, all projects allow the community to decide fate of the restored land.

Kabul Green Week

The United States Embassy and the Afghan Conservation Corps (ACC), in collaboration with the Ministry of Irrigation, Water Resources and Environment (MIWRE), Ministry of Information and Culture (MIC), Kabul Municipality, and the Ministry of Education concluded a week of greening activities and free tree distribution in Kabul on March 22-27, 2004 to coincide with the “Nawroz” Afghan New Year Holiday, with events ongoing throughout the year.

Through concerted coordination in and among various Governments and international agencies, 750,000 trees were distributed and planted in Kabul during the week. This was tied into public events, including children’s activities, formal receptions, art exhibitions, and educational initiatives. This follow-up will be crucial to the long-term success of the effort, reminding residents to care for their trees and the larger role they play in reclamation of their country, while also serving to build on earlier environmental messages through public announcements and activities. Next year, organizers hope to expand the initiative to other provincial cities.

An overview of results achieved to date:

- 25,000 primary school students received Environmental Education Curriculum
- 750,000 trees distributed and planted
- 1.5 million Kabul residents received Environmental Education through media
- 530,000 Kabul families receive and plant trees
- 65,000 trees planted by Municipality in public locations in Kabul’s 15 districts
- 380,000 Kabul students cleaned garbage on school grounds for World Environment Day
- 9 public murals with environmental message painted
- 5,000 students launch chapters of Youth Conservation Corps
- 15 Government Ministries cooperated in public tree plantings

Of the 600,000 trees procured domestically, inspection by the Kabul Green Week Ministry Joint Advisory Group determined 95% of trees distributed were approved to be in good condition; less than 5% died from overexposure to sun or inadequate water. The statistical average of trees planted in public locations over Kabul Green Week: 75% Survival Rate

Navigating the Political Climate

In the complicated political context within the country, the support of legal frameworks from institutions prevents ant viable systems of protection. Lack of a functioning central government will continue to pose an
impediment to real enforceable mechanisms of environmental conservation. The creation of a National Forest Program will first necessitate clear mandates from the relevant Government bodies. How these strategies directly address poverty reduction efforts presents a more formidable challenge.

To address these challenges, Memoranda of Understanding (MOUs) have been drafted to delineate the respective responsibilities of the Ministries. Reference to Natural Resource Management generally and forests specifically have been absent in any form beyond rhetoric in Poverty Reduction Strategy Papers. Less often have specific program strategies made a compelling case for environmental conservation as a primary contribution to poverty reduction.

Consultative Groups were established within the Multi-ministerial Advisory Group developed as reputable forums for problem-solving strategies in Creation of Advisory Group on the Environment facilitates inter-agency discussions across a broad sector of activity.

**Greening Afghanistan: Beginning Again**

An approved plan to rehabilitate Afghanistan’s Northern forests will include the following: nursery establishment, seed management, terracing and sapling planting to irrigation and intensive restoration of the land. These projects would generate millions of work days and would result in large scale rehabilitation of the degraded forests belts across the Northern half of Afghanistan. Intense and uncontrolled logging of Afghanistan’s eastern conifer forests, especially for deodar cedar, is having a severe impact on current drought conditions and vital resource availability.

Successful reforestation is the result of a series of steps, each of which the ACC implements in its work:

- **Seed management** (seed collection, extraction, storage)
- **Nursery Management** (seed treatment, seedling production and maintenance)
- **Site preparation** (hillside ditching and pit digging, water conservation activities, etc.)
- **Tree planting** (proper transport to site, correct planting)
- **Sapling maintenance** (watering, protection from livestock, community support and conservation education)
- **Capacity development through technical training and planning** (Ministry staff trained in project and sustainable forestry management)
- **Awareness-raising and education for communities and government** (maintenance of replanted areas with community support and conservation education)
- **SUCCESSFUL REFORESTATION**

ACC will integrate the activities proposed here with other ACC activities and their available resources (e.g. use of seed to be collected under ACC’s biodiversity activity, water conservation and erosion control activities taking place through other ACC subprojects) to ensure that each of the above steps is addressed in reforestation of Pistachio woodland and coniferous forests. Most of the funds received under this proposal will be used primarily for labor. The ACC works with the Head of *shuras* (local village councils), who identify, mobilize and monitor payment of vulnerable people from the local communities. ACC also works with the local government authorities to determine local priorities, undertake site assessments, develop workplans, implement, manage and monitor the subprojects. ACC Regional Coordinators and provincial and Ministry government staff provide technical direction, and project supervisors provide some basic conservation education to the labor crews. Labor is used in each of the steps described above for successful reforestation.

**Promoting Biodiversity and Natural Resource Conservation**

In its first year, ACC has shown how a program with a clear purpose, good on-the-ground organization and logistics, dedicated field staff, and relevant technical guidance can start up and achieve results within a few months. The challenge ahead is to solidify the ACC into an enduring national program that continues to employ Afghans and rehabilitate vital natural resources. With an increased focus on conservation of biodiversity, skills training and environmental education, ACC demonstrates long-term commitment to the development of Afghanistan.

Planned activities will build on traditional labor-intensive activities:
• Continued **Capacity development** of Afghan Ministries and their staff;
• Expanded **Environmental education** through a Youth Conservation Corps, media and conservation education material creation and distribution;
• Biodiversity Conservation Plans: build and manage seed collection, care and bank facilities, develop inventories of nursery species, identify environmentally significant areas and begin labor projects to set up protected areas, and disseminate environmental/conservation education messages across the country.

**Biodiversity Conservation Strategy**

Conduct wildlife and native plant surveys, build and manage seed collection, care and bank facilities, develop inventories of nursery species, identify environmentally significant areas, initiate local environmental awareness campaigns, begin labor projects to set up protected areas, and disseminate environmental/conservation education messages across the country.

**In the Interest of the Long-term Environmental Sustainability:** While the above demonstrates immediate benefits, the projects generate long-term provide multiple long-term economic and environmental benefits as detailed below:

- Soil conservation / Erosion control
- Improved air quality
- Renewed water quality and availability
- Restoration of fruit, nut and timber resources
- Improved watershed stabilization
- Increased vegetation and green space
- Protection of environmentally significant areas
- Capacity and skills development
- Social and environmental awareness

**Afghanistan Emergency Drought Appeal**

The aim of the Reforestation/Environment Working Group, appointed by the UN Humanitarian Coordinator, is to improve the capacity of vulnerable groups to cope with the medium to longer-term effects of recurrent drought through activities aimed at mitigating drought, e.g. restoration of national vegetation, production of fruit/nut bearing trees, planting of live fences, grassland and watershed management, expansion of educational programming, restoration of native forests and training of Government staff.

Collaborating agencies will be WFP, FAO, Afghan Conservation Corps (ACC), UNEP, UNIFEM, UNICEF, UNMACA and relevant Ministries and key NGO partners to ensure maximum coverage and impact. It is hoped that out of each agency’s direct immediate relief assistance, longer-term strategies will begin to address the root causes and long term solutions to meaningfully mitigate the environmentally devastating effects of drought.

**Afghan Conservation Corps (UNOPS)** will liaise with relevant ministries to continue its labor-intensive projects to rehabilitate canals and water intakes, clean and improve karezes, build check dams and gabions and adapt soil and water conservation schemes with hillside ditching and terracing, reforestation of native forests and plantations, and managing restored public nurseries. Workshops on “Sustainable Forestry”, “Seed Collection and Multiplication”, “Soil Erosion Control Methods” will continue to train Ministry staff and local partners. This compliments an increased focus on Environmental Education and public awareness campaigns. ACC will also assist in Food For Work with technical expertise and will provide technical guidelines, work norms and training.
A Four-part Biodiversity Strategy

I. Genetic Diversity
Identify, collect and conserve seeds of indigenous and locally adapted varieties of fruit, nut and forest trees, flowers, grasses and shrubs. Construct seed storage facilities using locally available materials, implement cultivation training for women, and identify regionally endemic species for conservation.

II. Conserve Biodiversity of Degraded, Vulnerable or Sensitive areas
Replicate the current project model of labor-intensive restoration in areas identified by project supervisors, Ministry officials and other experts as degraded, vulnerable, or ecologically sensitive. These areas are subject to resource extraction by communities for their livelihoods. Projects can replace income based on exploitation with restoration.

III. Protecting Environmentally Significant Areas / National Parks
Create large-scale labor projects by coordinating with Ministry officials, experts and donors to designate protected areas and parks. Include conservation education and participation for communities (including park ranger training) living in or near protected areas. Targeted areas include Kole Hashmat Khan, Band-e-Mir, Wakhan Corridor and Northeast native Pistachio forests.

IV. Community Environmental Education/Vocational Training
Education is crucial to the conservation of biodiversity, including the creation and maintenance of parks and protected areas. Conservation education material will be created for schools and Ministry staff around the country, and local communities living in or near protected areas. Projects will also encourage community ownership of these resources by tying income generation to protection.

Improve technical capacity of Government
Creation and dissemination of training materials focusing on identifying and understanding the role of Afghanistan’s native species and ecology to appropriately rehabilitate the environment. Develop a nursery species inventory of native grasses, forbs and shrubs.

Preserve Agrobiodiversity
Identify, collect and conserve seeds of indigenous and locally adapted varieties of fruit, nut and forest trees, grasses and shrubs. Construct seed storage facilities and implement training, particularly geared to women.

Conserve Natural Resources and Biodiversity of Degraded, Vulnerable or Sensitive areas
An increased focus this year on conservation of biodiversity will coordinate with Government strategies and other experts to identify degraded, vulnerable, or sensitive areas. The four-part Biodiversity Conservation Strategy consists of wildlife and native plant surveys; building and managing seed collection, care and bank facilities; developing inventories of nursery species; identifying environmentally significant areas; initiating local environmental awareness campaigns and beginning labor projects to set up protected areas, and disseminate environmental/conservation education messages across the country.

Protecting Environmentally Significant areas / National Parks
Coordinate with Ministry officials, experts and donors to designate protected areas. Use labor projects to set up/rehabilitate protected areas and parks. Include conservation education and participation for communities (including park ranger training) living in or near protected areas.
Targeted areas include Kole Hashmat Khan, Band-e-Mir, Wakhan Corridor and Northeast native Pistachio forests.

This move into conservation of Protected Areas would signal a welcome shift in concerted efforts to protect what remains of the rich biologic diversity of Afghanistan.

As of September 2004, UNOPS is setting up a Conservation Corps in other post-conflict countries (Haiti, Liberia, Sudan) to employ thousands of unemployed in those countries living in poverty. If donors continue to respond with the enthusiasm generated from the success of ACC’s debut year – we can maintain an earnest sense of hope for the prospects of our forests in arguably the most challenging places on earth.
Bibliography


Participatory monitoring of agro-ecological practices implemented in the buffer zone of the Private Reserve Mata do Sossego in the scope of the Doces Matas Project in Minas Gerais, Brazil

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Lêda Luž⁴
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Abstract

This contribution presents and analyzes a participatory monitoring of agro-ecological experiments in the vicinity of a Private Reserve (Mata do Sossego) in the Brazilian Mata Atlântica in Minas Gerais. Since 1995 the Fundação Biodiversitas is executing initiatives to promote sustainable agricultural alternatives in rural communities in the scope of an international technical cooperation project. One of the activities implemented concerns soil conservation and recuperation in a participatory experimentation with small scale coffee farmers. The experiments involved intercropping with legumes, changed land management, diversification and agro-forestry. A system of participatory monitoring was designed in 2001 to provide for periodic exchange between the farmers about the more technical questions of the experiments and evaluate them. Indicators were established jointly with the farmers based on their expectations of the experiments, such as increased soil cover, to prevent erosion, or increased soil fertility. After one and two years of monitoring seminars discussing the results were held. Success and challenges of the experiments were analyzed jointly and new indicators were established. Participatory monitoring contributed to a closer accompaniment of the experiments through reserve staff compared to before and facilitated exchange between the farmers involved. It can thus be an important instrument not only to prove success of agricultural experiments, but as well to stimulate adaptation of agricultural alternatives to local realities and spreading of successful experiments.

Keywords
participation, monitoring, agro-ecological experiments, conservation, coffee-monoculture

1. Introduction and research context

The Brazilian Costal Rain Forest or Mata Atlântica is one of the most threatened conservation hotspots worldwide (Myers et al. 2000) and little of the original forest cover still exists today (Fundação-SOS-Mata-Atlântica 2002). Conservation of the remaining forest fragments and creation of buffers and corridors seem essential conservation measures. The Project for the Conservation and Management of the Natural Resources of the Mata Atlântica in Minas Gerais has been conducted in this context since 1995 in the scope of the Bilateral Cooperation between Brazil and Germany. It received the name Doces Matas Project for being carried out in remaining forest fragments in the watershed of the Doce River. Three protected areas are involved in the project: the Rio Doce State Park, the Caparaó National Park and the Private Natural Heritage Reserve (RPPN) Mata do Sossego. They are managed by three different Brazilian institutions participating in the project, the State Forest Institute (IEF), the National Environmental Institute (IBAMA) and the Fundação Biodiversitas, a non-governmental organization (NGO), respectively. The project receives financial and technical support through the German technical cooperation agency (GTZ). It aims at assuring the conservation of the participating protected areas and supports the sustainable development of their buffer zones. The Doces Matas Project is innovative in its participatory approaches, which it applies in the vicinity of the protected areas and in the areas itself. A detailed analyses of the participatory processes is given by Mannigel (2004, submitted). The present work focuses on one of these approaches carried out in the Private Reserve Mata do Sossego: the participatory monitoring of agro-ecological experiments.

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The Private Natural Heritage Reserve (RPPN) Mata do Sossego was officially established in 1998. The area is owned and managed since the early 1990s by the Fundação Biodiversitas, a scientific-technical NGO, founded by professors from the Federal University of Minas Gerais in 1989. Although the small area of the reserve (180 hectares) is inserted in a larger forest remain, habitat fragmentation in the surrounding region and fires are the largest threats. The region where the reserve is located is dominated by coffee monoculture by small scale farmers (mostly *Coffea arabica*). Access to the rural communities is through unpaved roads and often difficult in the rainy season. Most of the households receive public energy, while telephones are rare, especially in the more remote areas. Coffee is grown even in higher elevations and on steeper slopes, leaving few remaining forest patches as reserves for fire wood, medicinal plants and future use. The area surrounding the reserve belongs to the municipalities of Simonésia and Manhuaçu. Rural population dominates in Simonésia, the smaller municipality and in both municipalities agriculture is the dominant economic sector (Mannigel 2004, submitted). The rural community Sossego is defined by the basin of the Sossego watercourse, which originates in the Mata do Sossego Private Reserve. The valley is relatively steep and small coffee farms (five to 30 ha per capita) are scattered within the area of about 800 ha. Around 80 families (300 persons) live in the community and the main income source is coffee (Biodiversitas 1997). Most farmers use mainly manual labor of family members in their plantations and chemical fertilizer and pesticides are regularly applied, if income allows for the purchase of these products. Commercialization occurs mainly through dealers, buying the untreated dry coffee directly from the farms. Prices achieved are often considerably lower than on the next regional market.

Since 1997 work of the Fundação Biodiversitas and the Doces Matas Project focuses on the region adjacent to the reserve, promoting local development in the rural communities as well as institution building on municipal level. The objective of this document is to relate and analyze the process of the participatory monitoring of the alternative agricultural practices applied by the Fundação Biodiversitas and the Doces Matas Project in the Sossego Community in the vicinity of the Mata do Sossego Private Reserve in Minas Gerais, Brazil.

2. Beginning and methods of the participatory monitoring

2.1 Preceding processes

Work in the Sossego community started in 1997 with a Participatory Rural Appraisal (PRA) initiated by the Fundação Biodiversitas and the Doces Matas Project. The PRA was planned and executed with the involvement of local institutional stakeholders. Objectives were to initiate contact and find environmentally sound solutions to community problems. Of the four commissions originating from this PRA process, the group “Weak Soil”, was the only one more related to natural resources (Biodiversitas 1997). Various courses, technical visits to other properties and agricultural experiments (mainly intercropping with legumes and use of natural fertilizers) were initiated, with support of local partners. Experiments with agro-ecological systems, soil conservation techniques, a more divers production, organic agriculture and recuperation of the vegetation were supported and accompanied by the technical staff, providing continued training for the farmers. The small experiments aimed at the motivation of the farmers to change their previous production system with high impacts on the natural environment and to spread successful experiments. Further objectives of the experiments were the increase of soil fertility, erosion control and the supply of forest products, such as wood, normally harvested from the remaining forest fragments. Difficulties of the Fundação Biodiversitas to guarantee financial resources and employment of the manager led to a variation in intensity of support over the next few years. Presence of other local institutions, such as a local NGO, the state rural extension service and a local agricultural workers union, in the community increased right after the PRA, but diminished again over time. In 2000 a joint evaluation was initiated by the Doces Matas Project and the Fundação Biodiversitas to verify the evolution of the agricultural experiments and reinitiate contact after changes in reserve management. The necessity of a more regular technical support and a systematic documentation of the experiments became evident as requirements of both community and Fundação Biodiversitas, during discussions in a workshop in the scope of this evaluation (FRANCO 2001).

2.2 The monitoring process

A participatory monitoring of the experiments was, therefore, initiated in 2001, trying to face the challenge of combining local and scientific knowledge to measure changes caused by the implementation of alternative agricultural techniques (FRANCO 2002). A monitoring process was designed, consisting of data collection and periodic analyses of the data, using indicators at short, medium and long terms and involving effectively all the actors participating in the Doces Matas Project. As such a process is continuous, it was designed as a monitoring cycle with different steps (Figure 1).
The methodology was based on works of Guijt (1999) and adapted to the local conditions. The methodological principals were adopted following this guidebook for the elaboration of monitoring systems establishing seminaries, meetings and field activities involving technicians and farmers. During the conduction of the monitoring adjustments might become necessary, due to changes in external factors. Therefore it was important to always revise prior steps to verify and assure the coherence of the phases in the cycle.

2.2.1 First year of the monitoring

The first activity of the participatory monitoring was the realization of a monitoring seminary on a weekend in May 2001 in the Sossego community. The objectives of this first seminary were awareness building and the clarification of the general concepts concerning monitoring, as well as the planning of the initial system to be implemented. Activities and objectives of the Doces Matas Project, the Fundação Biodiversitas and the farmers involved in the conduction of agro-ecological experiments were discussed. Indicators were introduced as one of the key elements of a monitoring process and possible methods for data collection were discussed. Activities of the agro-ecological experiments to be monitored and their respective short, medium and long term objectives were determined using a cause and effect flow diagram. Viability and practicability for their analyses was taken into account, while choosing objectives to be monitored. Farmers decided to monitor only one objective for each activity, mainly to avoid an increase of their workload. Same held true for the indicators (Figure 2). Participants established that objectives and indicators chosen at this moment might be dropped or changed, once they established their goal or proved inefficient. Others were left to be discussed later in the process. Methods for data collection were designed jointly. Two days were to short to allow for an additional joint elaboration of the monitoring sheets and determination of date to initiate the monitoring. These tasks were carried out later by the technicians. Participants of the seminary agreed to carry out monthly meetings to discuss the monitoring and to create a monitoring group for that end. Along with this monthly meetings, visits to the experiments, and seminars to reevaluate and adjust the monitoring were combined.
Monitoring of the agro-ecological experiments was initiated in late 2001, with the end of the previous harvest and the beginning preparations for the new cultivation cycle. 12 farmers participated regularly. Monitoring sheets were distributed and collected monthly to the farmers participating by the reserve staff. Farmers collected data on the indicators agreed upon in their plantations with agro-ecological experiments and, for comparison, in another area without experiment. Regular meetings and seminars of the group to discuss the monitoring as well as the experiments were held.

2.2.2 The second monitoring year

A second monitoring seminar was realized in the end of 2002. The objective was to evaluate the implemented monitoring process and analyze the data collected during one year, aiming at the establishment of the continuation of the participatory monitoring. An objective was as well the evaluation of the experiments as a whole and the discussion of the necessity to extend the experiments to other properties in the community and to other communities in the vicinity of the Private Reserve. The objectives and indicators chosen in the first seminar were questioned according to their necessity for continued monitoring and others to be included were discussed.

Participants concluded that the monitoring had proved that the activities of legume intercropping, alternative pest controls and agro-forestry reached their objectives and should be continued in the plantations. The indicators “working days needed” and “soil exposition” were considered to have provided sufficient data to stop monitoring. More measurements were thought necessary for the yearly soil analyses to determine differences between areas with and without experiments. Following a discussion to establish priorities for new objectives or indicators to be measured, the farmers and technicians agreed, that the ecological sustainability of the experiments has been proven in the first year. Economic aspects, related to productivity of the plantations and income for the farmers, were thought to be more important in the following year. The new objectives and indicators reflect this (Figure 3).
During the monitoring of the second year changes in staff occurred for the reserve administration. Personal contact to all farmers and meetings were less frequent. Most of the new indicators established were to be measured only once in the year, reducing further the need of monthly encounters. Nevertheless, data on production expenses as well as pests and diseases continued to be collected by eight farmers.

2.2.3. The third year

In the end of 2003 the third monitoring seminary was held to evaluate the monitoring process implemented until now and analyze the collected data, aiming at the determination of the continuation of the monitoring and the experiments. In the beginning of the seminary the history of the monitoring and experimentations was recalled from the start in 1997 until 2003. This allowed a reflection of the process as a whole, indicating interfering and favoring factors. Data for the indicators were analyzed, showing difficulties in determining the results separately for areas with and without experiments, as separation was not always straightforward during annotations. Data concerning production costs varied substantially, as notes were quite different for each farmer. Discussions of the different coffee qualities showed farmers limited knowledge and raising interest in the subject. Further measurements were thought necessary especially concerning the costs and profits of the production. Continuation of the process was left to be discussed at a later date in a meeting of the community association. The possibility and necessity to involve farmers from other communities experimenting with agro-ecological practices and thus extend the monitoring were discussed in this seminary, but no concrete action was planned or taken afterwards.

Since this last seminary only few farmers continued with the experiments, some of which have increased the area for alternative cultivation to encompass their whole property. They emphasize that the alternative practices are no longer experiments for them, but sustainable land use techniques. An expansion of the monitoring activities did not take place until now, as municipal elections in October 2004 created differences between local partners and made coordination of the activities more difficult.

3. Results

During the last monitoring seminary in December 2003 all present farmers agreed that the experiments and the monitoring was “worth it”. Farmers stated to be convinced of the positive results of the practices, knowing that changes take time to occur. Nevertheless numbers of farmers participating in the experiments and the monitoring changed over time. From the initial “monitoring group” with 12 farmers participating on a regular basis, less then half participated in the last monitoring seminary. After the first year of monitoring farmers formed an association and conversion to organic agriculture was initiated by many, seen as a result of the enthusiasm created by the experiments and the monitoring. However, most of the farmers left the conversion process in the second year, claiming that certification costs were too high. This might have had an impact on the monitoring as well. Results of the two year monitoring process are presented here first for the indicators analyzed, second for the certification and conversion to organic coffee culture and afterwards focusing on the relationship between the farmers and the reserve administration.

3.1. Indicators analyzed

As stated above, the indicators varied between the first and the second year and are therefore listed separately here.
**First year**

**Working days needed:** data showed that labor decreased in the areas with experiment. Even considering the additional work for seeding and taking care of the legumes, intercropping reduced spontaneous weeds and less workdays were needed for weeding. Farmers agreed that this indicator showed conclusive results and saw no need to continue measurements.

**Soil exposure:** legumes were found to increase soil cover substantially and let farmers and technicians to conclude that legumes protected the soil and reduced erosion especially during the rainy season. They voiced the opinion that results can be used to pass techniques on to other farmers and that no further monitoring of this indicator is needed.

**Soil analyses:** Farmers observed and noted visual changes of the soil in the areas of the experiments, showing not only enhanced soil cover, but different weed species identified by farmers as indicators of better soil conditions. This was not totally sustained by soil analyses and it was concluded that changes in soil properties take more time and that continued monitoring is necessary to verify this indicator.

**Pests and diseases:** This indicator proved to be difficult to analyze, as not many farmers used the alternative pest controls in their plantations systematically.

**Second year**

**Soil analyses:** as for the previous year all participants related changes in soil quality indicators. Values for nutrition and organic matter content from soil analyses however changed little, indicating, that timeframes even longer than one year are necessary to allow for significant measurable changes of soil quality factors.

**Pests and diseases:** once again analyses of this indicator proved difficult, as alternative pest control was either applied to the whole property and not only to the area of the experiment or not applied at all. Nevertheless, farmers stated that they will continue to use the alternatives, as they proved efficient to reduce pests and provide additional fertilizer for the coffee plants. Farmers agreed to stop monitoring this indicator, as they are already convinced of the results.

**Coffee production:** comparison of coffee production in areas with and without experiment was difficult, as farmers often did not separate the harvest in areas with and without experiment. Where analyses was possible, areas with experiment did not show significant differences in production, some being slightly higher than in the areas without experiment. Further monitoring was thought necessary by all participants.

**Production costs:** monitoring of this indicator was very new to most of the farmers participating, who did not have the habit of noting regularly the expenses spent for the coffee cultivation. Annotation therefore proved difficult for most of them and results varied substantially. To facilitate discussions, data from all farmers were evaluated jointly. The general picture showed high expenses with chemical fertilizer and pest controls on the areas without experiments and lesser costs of seeds for legumes and ingredients of alternative pest controls. Coffee was the main income source for all, providing only a small surplus, once the production costs were subtracted. This picture was confirmed by all participants. Farmers agreed that the annotation of costs and incomes is very important and that they should note them more carefully on a monthly basis in the future.

**Quality:** coffee quality was determined by an external consultant for areas with and without experiment for all farmers participating in the monitoring. As for the other indicators separation between areas with and without experiment proved difficult, but the discussion of this indicator showed farmers limited knowledge about the quality of their product. Many knew the different measurements, but not how to determine coffee quality, nor which kind of post-harvest treatments could enhance coffee quality. They were interested in acquire more knowledge and improve coffee quality to increase their income.

### 3.2. Certification for organic coffee cultivation

Initial enthusiasm to convert to organic agriculture was high in the beginning of 2002, not only in the Sossego community, but also in other communities of the municipality. Supported by the Fundação Biodiversitas and the union of agricultural workers, a total of 50 farmers registered for the two year certification process. Prospects of high market prices stimulated farmers’ decisions more than environmental or health concerns. In 2003 most
farmers from the Sossego community left the certification process, claiming that certification costs were too high. During the last monitoring seminar, reasons were specified by farmers: low coffee prices in the earlier year made purchase of chemical fertilizer too expensive for most of them and organic agriculture seemed an interesting alternative. As manure was not readily available, most farmers did not apply any kind of fertilizer to their plantations and registered a reduction in productivity in the following harvest. This, combined with higher coffee prices in the next year, led many to purchase chemical fertilizer once more. They voiced concerns that their income might not be assured through organic coffee culture, not trusting a new technology. Neither the experiments, nor the participatory monitoring managed to prepare the farmers for a conversion of their whole property into an organic production system, as attention focused on the small areas of the experiments. Limited knowledge of the technicians concerning commercialization of the obtained product led to a stronger focus on agricultural techniques than on changes in the production process as a whole. Technicians alerted farmers that conversion of the whole property to organic farming is not that easy and recommended to test the methods in a smaller area of their property. However, certification, and thus expected higher market prices, was only possible if all processes on a single property were according to the directions of organic agriculture. A more integrated approach, focusing not only on a small part of the plantations, but on the farms as complex systems, probably would have shown more long term results. Farmers stated in the meeting in December 2003 that they are still interested in learning more about organic farming, but that the initiation of the conversion process in 2002 was too soon and based on only a fragmented understanding of the biological processes. The failure of the conversion to organic agriculture lowered the enthusiasm in participating in the agricultural experiments and the monitoring, observed in the second year.

3.3. Changes in relationship between the farmers and the reserve administration

During the PRA in 1997 it became evident that environmental issues were not a priority for the farmers. The PRA was described as positive by Biodiversitas staff as well as community members, as shown through interviews by Mattes (1998). An increase in community organization was noted afterwards stimulated through the formation of commissions. Changes in staff and difficulties with financial support for the continuation of the work in 1999 and 2000 caused contact between reserve staff and farmers to decrease over the next years prior to the initiation of the monitoring.

The participatory evaluation of the experiments in the end of 2000 re-approximated farmers and technicians. Although some farmers were still using legumes at that time, many planted only small areas. Others claimed that they did not manage to get seeds without the support of the project, alleging that they did not manage to plant some legumes further away from the plantations to grow the seeds themselves. A strong dependence from outside support is evident here. The monitoring provided a closer contact of reserve staff with the farmers carrying out experiments on their farms, as well as an increased exchange between farmers. Monthly visits to the farmers and regular meetings and seminars for the monitoring group in the first year strengthened contact and interactions of farmers and technicians. This might have contributed to the formation of a farmers association within the Sossego community in 2002.

During the second monitoring seminar the group evaluated that they should continue earnestly with the experiments and not be preoccupied to increase the group of farmers or spread the techniques. They agreed to rather concentrate on “good results” of the experiments, which would allow other persons to see the interesting work done. The monitoring has, thus, had an important contribution to the systematization, analyses and spreading of the alternative practices.

Not only the difficulties with the conversion to organic farming in the second monitoring year, but also less frequent meetings and visits lowered enthusiasm of farmers to participate substantially. However, the deception concerning fast and high profits, which farmers imagined from organic farming, lowered the enthusiasm of many farmers to continue the experiments. Although they voices interest in exchange visits to each others properties, these did not occur very frequently, showing the still low self-organization capacity.

During the last monitoring meeting in December 2003 farmers and technicians evaluated jointly the monitoring process. The experiments were clearly seen as a strength of the process and the joint learning was emphasized. The opportunity to involve more people in the process and to increase knowledge were named. Main weakness stated was the frequent change in staff, when technicians who supported the process changed. Difficulties to involve other people and the limited knowledge were named as other weaknesses. Demoralization and lost enthusiasm were named as threats to the process. Missing technical support through the state rural extension service and low patience were named as well.
4. Discussion

The discussion of the results with the monitoring group stimulated an exchange about the technical questions of the agro-ecological experiments between the farmers participating. They used the opportunity provided by the regular meetings to talk about their experiences with the alternative practices as well as their doubts and questions related to the experiments. The monitoring therefore provided an important mean to recover and spread knowledge obtained in the individual experiences and look for answers of the questions that arouse. Organization of the farmers increased through the monitoring, which facilitated discussions about objectives and activities of the work and within their community. The monitoring served, as well, to involve the youth in the experiments, as they often helped with the monthly annotations of the data. The regular meetings aroused the curiosity of other community members to get to know more about the ongoing work, thus contributing to a further spreading of the alternative techniques. The data obtained in the monitoring process can be used to argue advantages and disadvantages of the different techniques and justify their implementation.

A focus only on alternative agricultural production techniques without taking into account the financial implications for the farmers led to a lower long term interest of the farmers. Many expected increases in income through the alternative techniques or cooperation with the project. This was especially shown by the failed process of conversion to organic farming. It is therefore important to consider the property as a whole and apply an integrated approach with emphasis on the whole production chain. Farmers interest in increasing income should be taken into account. Although farmers income from coffee sales did not increase substantially, farmers participating in the process argue that they are spending less money on chemical fertilizer and pesticides and are using some of the by products from the alternative cultivation. Thus although they did not manage to sell their product for a higher price, they have fewer expenses and a higher income. This argumentation focusing on lower costs instead of higher gains, could be used from the beginning on and during further spreading of the techniques, as it reduces false expectations.

The joint planning of the monitoring provided a new opportunity to discuss the techniques employed until now. Paraíso 2003 identified communication difficulties during the first monitoring seminar. Although technicians were alert not to use a technical language and to adapt concepts to local realities, attention of the farmers was not as high for the more theoretical discussions and concepts. Difficulties to combine scientific and local knowledge becomes evident here, although the organizers tried to stay alert for these challenges. The combination of a theoretical introduction and the planning of the monitoring system in a two day seminary was probably too much compact input. It did not allow for reflection about the newly attained knowledge. Introduction and joint planning of the monitoring might therefore be better achieved through several shorter meetings and discussions. Nevertheless, during the first year and in the second seminary it became evident that most farmers understood the principal concepts of the monitoring (Franco 2002). Difficulties existed still in understanding the necessity of comparisons between areas with and without experiment, as many farmers did not separate the plantations strictly.

For some of the farmers participating in the monitoring the experiments are no longer only tests. They are using the practices on their whole property. Nevertheless, this understanding of the whole farm as one production unit, common in organic and agro-ecological agriculture, is still limited. Many farmers do not regard coffee production as integrated in the other activities on their farms. This separation might have contributed to the failure of the conversion to organic agriculture. Most farmers still use only a small area of their plantations for the experiments. The monitoring did not manage to deal with this issues adequately, as it was focused on the experiments and not on the whole production process. Although a broader approach was chosen in the second year, monitoring production expenses and incomes, focus was on economic issues and not on the agricultural techniques. Farmers were not used to monitor expenses and income and the variations in annotations made comparison difficult.

Involvement of local organizations, such as the local NGO, the union of agricultural workers and the state rural extension service varied substantially over time. It was high during the initial PRA and ceased later. Although they participated in the first monitoring seminary, participation in the monitoring meetings throughout the first year proved difficult, as they had many other obligations. Some technicians did not want to work on weekends, which were often chosen for meetings, as they were more convenient for the farmers. As rural extension was not a main goal of the Fundação Biodiversitas, the missing involvement of these local institutional stakeholders increased the lacking technical advice. One technician from the rural extension service even opposed to the alternative practices, recommending use of chemical fertilizers and pesticide in the plantations and raising insecurity of the farmers concerning the experiments. Although the monitoring did not manage to achieve
changes in the practices of all the local organizations, farmers are now more secure in arguing in favor of the alternative practices and request the alternative support they need.

5. Conclusion

It could be observed that the participatory monitoring was not only a technical support to gather data and information, but that it provided possibilities of an increased contact, motivation, information exchange and social organization. Monitoring contributed to a closer accompaniment of the experiments through reserve staff compared to before and facilitated exchange between the farmers involved. It can thus be an important instrument not only to prove success of agricultural experiments, but to stimulate adaptation of agricultural alternatives to local realities and spreading of successful experiments.

Communication difficulties between local and technical languages are important issues to be addressed and several successive meetings at the beginning might help to overcome this challenge easier. Regular personal meetings provide spaces for exchanges and discussions of doubts and experiences. They enhance enthusiasm and motivation and reduce problems and conflicts. However workload of farmers and technicians has to be taken into account to prevent excess meetings and tiresome discussions without concrete results.

Strong partnerships with local organizations in the process can enhance long term sustainability and facilitate a necessary closer technical support for the farmers. Continuation of financial support or at least long term perspectives are important not only for the technicians involved, but also for the farmers participating in the process.

6. Literature cited


Information transfer during the timber transaction period in West Virginia, USA.

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Abstract

Timber harvesting has long-lasting impacts on the productivity and aesthetics of private forests. In many instances, landowners who possess high quality timber are at a competitive disadvantage during timber transactions—the time between a decision by the landowner to sell timber and the completion of the timber harvesting operation—as they may lack understanding of markets, the value of their trees, or the amount of wood that is standing in their woodlots. In order to improve forestry outreach efforts to private forest owners, we surveyed 3166 landowners who experienced a timber transaction between 2000 and 2001 to assess the amount of silvicultural information conveyed during these transactions. We found that only 21\% of the transactions were conducted on properties that contained a forest management plan. On 52\% of the transactions, wood volume was estimated by either the timber purchaser (28\%), the logger (12\%), or not inventoried at all (12\%). Satisfaction ratings for information provided to the landowner during the transaction indicated that little information was conveyed on topics like timber harvesting methods, regeneration, deer and wildlife, and undesirable vegetation. Satisfaction of respondents with the condition of their woodlands following the timber transaction was related to having a timber management objective, seeded skid roads, and satisfactory information on timber harvest methods and future timber values.

Introduction

Over 90\% of the forestland in West Virginia, USA is privately owned. During the past decade, dramatic increases in the value of the broadleaved trees that dominate the landscape have led to increased timber harvesting in the state, especially on these private lands. Timber harvesting has long-lasting impacts on the productivity and aesthetics of private forests. In many instances, landowners who possess high quality timber on their properties are at a competitive disadvantage during timber transactions as they may lack understanding of markets, the value of their trees, or the amount of wood that is standing in their woodlots. Timber transactions—the time between a decision by the landowner to sell timber and the completion of the timber harvesting operation—are complex processes involving interactions of multiple participants: landowners, foresters, lawyers, loggers, purchasing agents, and the West Virginia Division of Forestry (WVDOF).

The forest products industry generates the local and regional demand for timber and is one of the most important and fastest growing industries in West Virginia. In the 1990's, wood products industries generated over $1 billion in manufacturing output (U.S. Census Bureau 1997), representing 6 percent of the total manufacturing output in West Virginia; this 6 percent is exclusive of logging and forest management activities. Several large mills have been established in the state during this period as well, adding to the demand for timber from private forests. In addition, several new transportation corridors that will facilitate the transport of wood to mills have been opened, or are in the process of opening; however, these may also increase “exurbanization” and the “greening” of rural communities which can lead to changes in conservation perceptions in these communities (Egan and Luloff 2000, Johnson and Beale 1998, Jones et al. 2003) and potentially influence timber transactions in the future.

There are often disagreements even among professional foresters on the best ways to manage the forest resource that supports this growing industry. This is understandable when foresters are confronted with a large number of species, each with different silvical characteristics and growing on a wide range of sites. Despite likely differences of opinions concerning forest management, a recent survey of WVDOF Service Foresters identified harvesting with little regard for desired future conditions and the overuse of diameter-limit harvesting as the second and fourth most important issues facing the forestry sector in West Virginia (Westfall 2001, McGill et al. 2004). Indeed, timber harvesting is frequently carried out guided by diameter-limit cutting, where trees greater
than a designated diameter are harvested (Fajvan et al. 1998). This harvesting practice often leaves only poorly
formed or previously suppressed trees as residuals. But timber harvesting is itself a complex subject with
landowners, foresters, and loggers influenced by monetary resources, available markets, and personal objectives
(Keefer et al 2002).

Loggers harvesting timber in West Virginia are required to use Best Management Practices (BMPs) to control
soil erosion and sedimentation during and after harvesting. They are also required to be licensed to conduct
logging operations and to file a harvesting notification application with the WVDOF. However, there are no
forest practice laws in West Virginia that regulate silvicultural activities except for a set of recommended forest
practice standards developed in 1972 that describe various silviculture options (Burke et al. 1972). There is
increasing concern among foresters that the partial cutting widely practiced in the Appalachians will not sustain
a desirable mix of high value intolerant species in Appalachian forests. Long term research studies on the
Fernow Experimental Forest (near Parsons, West Virginia) indicate that high value intolerant species originating
from the heavy cutting at the turn of the century are often being replaced with more tolerant species under
partial cutting regimes which often have lower wildlife and timber values (McGill and Schuler 2003; Schuler
2004).

When landowner objectives and the confounding effects of deer and other regeneration issues are injected into
the mix, it makes management even more complex. Nevertheless it is imperative that the timber resource be
properly managed to sustain the forest industry and the multitude of values produced on managed forestland.

The dramatic increases in stumpage prices in conjunction with the cessation of most timber sales on public land,
has generated intense competition for hardwood sawtimber size trees on private woodlots. There is concern
among some natural resources professionals that “silviculture issues” do not receive the attention they merit in
this atmosphere. Decisions made during timber sale transactions can affect future forest values for several
generations.

There is a wide disparity in stumpage values among the various species indigenous to the Appalachian region.
During the past 10 years, prices for veneer and sawlog-sized trees have continued in an upward spiral. Only
individuals actively engaged in marketing wood products can keep abreast of changing market values.
Forestland owners of diverse backgrounds are generally open to a wide variety of forestry topics and
educational delivery methods offered through extension and outreach organizations (Magill et al. 2004), but
most of West Virginia’s 270,000 private forestland owners are likely to be at a disadvantaged negotiating
position when entering into the timber market with prospective sales of their timber. Not only do these
landowners face marketing challenges during timber transactions, but they also risk compromising the future
productivity of their timber stands following harvesting.

To support private forestland owners in their forest management efforts, we carried out an investigation of
timber sale transactions in order to further our understanding of this crucial period in the management of forest
stands. Our underlying assumption is that forestland owners provided with information on sustainable forest
management will act to maintain or improve forest resources in their possession. Specifically our objective in
this study was to evaluate the amount and quality of silvicultural information conveyed during the timber
transaction period.

**Methods**

The survey instrument and process

We used a mailed questionnaire to investigate West Virginia timber transactions and the amount of silviculture
information conveyed during this period. Questions in the survey document can be classified into four major
areas: property and management objectives, timber harvest attributes, technical assistance, and information
conveyed during the timber transaction period.

Prior to beginning a timber harvesting operation, notification forms must be submitted to the WVDOF. Our
mailing list for this survey was taken from the 2000-2001 timber harvesting notification form database and
included 3166 addresses. The questionnaire process was implemented following methods proposed by Dillman
(2000):

1. Initial introduction postcard
2. Initial mailing of questionnaire
3. Reminder postcard  
4. Second questionnaire mailing.

The questionnaire mailings consisted of a cover letter explaining the project, a questionnaire, and a stamped return envelope. All envelopes, including return envelopes were coded to allow us to both assure that duplicate mailings were not made to respondents and to link responses to other data present in the notification list. These mailings were made approximately at two-week intervals beginning in late January 2003. Within days of mailing either postcards or questionnaire packets, many came back announcing insufficient addresses or other reasons why the packet could not be delivered. On some of these it was possible to correct the address and send it again; at times this was successful, but often not.

Data analysis

Summary statistics of survey responses were generated along with an evaluation of variables related to satisfaction levels following the timber transaction. We used logistic regression models (Hosmer and Lemeshow 2000) to assess the relationship between a satisfaction ranking with the condition of the respondents’ property after the harvest (Satisfied/ Dissatisfied) and 23 variables that describe the respondents ownership objectives, timber harvest attributes, technical assistance, and satisfaction with information conveyed to them in their recent timber transactions. Regression modeling was conducted using SAS (Allison 1999). We used the STEPWISE option in PROC LOGISTIC for generating a multinomial model. For this variable selection procedure we used an $\alpha=0.05$ cutoff to select significant variables.

Results

The 1297 questionnaires returned by landowners represent 41% of the initial number (n=3166) of mailing addresses. The overall survey response rate, however, is 46% (not including bad addresses, deceased, and refused at post office).

Property and management objectives

The majority (79%) of private forest owners selling timber over the period of our study did not have written management plans for their forested properties. Despite the scarcity of written plans, forestland owners had a wide array of objectives for their properties. Most landowners had multiple objectives. Timber management ranked highest with 416 (50%) of the total 831 responses for this question followed closely by the desire to improve habitat for wildlife species (45%). Forest recreation and investment were objectives for nearly one out of six forestland owners. Only 6% of our respondents indicated they did not have management objectives.

The mailing list we used for the survey contained a wide variety of property owners. This is reflected in the ownership size reported by the respondents. The 247 ha average property size is skewed by a few large properties; woodland size of respondents ranged from 0.4 to 60,705 ha. Median woodland size was 32 ha with 75% of all properties being less than 81 ha.

Timber harvest attributes

From many angles, the nature of timber transactions is diverse. The process of harvesting timber on private property begins with a decision to sell a particular quantity of timber, followed by the development of relationships among various participants in the timber transaction, and finally ends with the physical removal of timber and completion of the transaction. This section of questions was aimed at identifying personal motivations or objectives for harvesting timber, and physical aspects of the timber transaction process.

With respect to the timber harvests conducted on respondents’ property, income was the most frequently cited reason for harvesting timber. Of the 386 returned questionnaires listing a single reason, 143 (37%) indicated they had harvested their timber to generate income. The second most frequently occurring reason for harvesting timber for those listing a single reason was that someone had asked (19%).

Others answered that they had sold timber because someone had advised them that it was either “mature” or needed to be thinned, or it was recommended in their management plan. Few sales resulted from insect, storm, or fire damage. These results will likely vary from sales conducted in 2003 and later due to the catastrophic ice storm that struck West Virginia in February 2003, severely damaging 124,243 ha.
Harvesting was mostly done on a diameter limit basis with 554 respondents (62%) indicating this harvesting strategy was used during the transaction period. The second most frequently cited method used to harvest timber was the “selection” method. In the questionnaire, the descriptive phrase we included for the selection harvesting method was “cut to leave good quality trees of all sizes”. Most respondents indicated only one type of harvest, however 192 checked two or more types and 64 checked three or more.

Timber sales without marked trees were more frequent than sales with marked trees. This difference, however, was not exceptionally large, with unmarked sales exceeding marked sales by ten percentage points or a total of 88 sales.

A majority (53%) of the timber sales carried out on respondents’ properties during our survey period either did not eliminate cull trees or the owners were not sure if these trees were eliminated. Nearly three fourths of the respondents in our survey stated that skid roads were seeded with grass or clover species after timber harvesting to help minimize soil erosion. Despite the fact that our survey was designed to target individual transactions that had occurred for two years, beginning with notification forms three years old, six percent of the transactions were still in progress. Most respondents with completed sales were satisfied with the on-the-ground outcomes of their transactions; however, one out of four were either very dissatisfied or somewhat dissatisfied with their respective outcomes.

Timber sale contracts were used in 82 percent of the timber transactions in this survey. Despite this large majority of timber sale contracts present, nearly one in five sales were carried out without a contract. Most timber transactions involved lump sum type sales (Table 1). Moreover, most respondents (91%) listed only one type of marketing method. For these listing a single method, however, lump sum sales and sales on percentages were nearly equal. A small percentage (<5%) indicated that they were unaware of the way their timber was sold.

**Table 1.** Types of marketing methods used to sell timber. Total reflects the number of responses excluding missing values (434 missing).

<table>
<thead>
<tr>
<th>Number of methods used</th>
<th>Number of responses</th>
<th>Not sure</th>
<th>Lump Sum</th>
<th>Negotiated</th>
<th>Closed bid</th>
<th>Shares or percentages</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>434</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>787</td>
<td>36</td>
<td>252</td>
<td>125</td>
<td>114</td>
<td>260</td>
<td>787</td>
</tr>
<tr>
<td>2</td>
<td>69</td>
<td>2</td>
<td>56</td>
<td>30</td>
<td>30</td>
<td>20</td>
<td>138</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>863</td>
<td>38</td>
<td>313</td>
<td>160</td>
<td>150</td>
<td>285</td>
<td>863</td>
</tr>
</tbody>
</table>

Mean area harvested by the respondents was 41 ha. A few large sales, or perhaps annual totals from large holdings, disproportionately inflate the mean. Only 15 percent of the timber transactions were greater than 130 ha. The median area harvested was 16 has. Three out of four of the timber transactions in our survey were less than 36 ha.

Technical assistance is one of three main categories of forestland owner assistance activities, the others being financial assistance and educational programs. Recently in West Virginia, research has shown that this is the mechanism most preferred by landowners for receiving assistance. Technical assistance usually comes in the form of a visit, one-on-one, to the landowner’s property by a natural resources professional. This section contains responses to questions that aim at identifying the type of professionals providing these services relative to timber transactions.

Almost three out of five timber sales in West Virginia during the sampling period of 2000-2001 were conducted under the guidance of a professional forester. These foresters were split nearly equally between industry foresters (41%) and private consultants (38%), with WVDOF service foresters providing 21 percent of the technical assistance.
Despite the fact that respondents reported that 60 percent of the timber sales were conducted using a professional forester (above), only 39 percent of the people who indicated a single agent estimated their wood volume selected a forester as the one who estimated the amount of timber that was being sold. In 52% of the transactions, wood volume was estimated by either the timber purchaser (28%), the logger (12%), or not inventoried at all (12%). Foresters selected trees to cut on 38% of 642 transactions. On greater than one in four sales, landowners themselves were the agents that designated which trees would be cut.

In regard to timber contract advice and assistance, foresters and timber purchasers were nearly equal with respondents listing a single agent as their source for this technical service with timber contracts. Attorneys assisted with only 3 percent of the contracts written.

Information conveyed to landowners during the timber transaction period

To quantify silviculture information that has been conveyed to private forest owners during a timber transaction period, we asked questions about respondents’ level of satisfaction or their assessment rating of the information they received during this significant process. In most of the questions, there were majorities of the respondents that did not receive information on a particular topic (Table 2). West Virginia Best Management Practices, however, were provided in the majority of timber transactions (57%; not listed in Table 2). Particularly elevated are the number of respondents who claim that they received no information on unwanted plant species and deer impact topics. Among respondents who did indicate they did not receive information on one or more of the forest management topics listed in Table 2, the rating and satisfaction levels were skewed upward into the very satisfied and excellent categories; that is, there few respondents who were either dissatisfied or somewhat dissatisfied with information they did receive.

Table 2. Number (n) and percentages of respondents answering questions regarding information transfer of various topics during the timber transaction process.

<table>
<thead>
<tr>
<th>Topics</th>
<th>n</th>
<th>Did not receive</th>
<th>Very dissatisfied</th>
<th>Somewhat dissatisfied</th>
<th>Somewhat satisfied</th>
<th>Very satisfied</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timber harvest methods</td>
<td>896</td>
<td>43</td>
<td>4</td>
<td>9</td>
<td>28</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Unwanted plant species</td>
<td>886</td>
<td>70</td>
<td>2</td>
<td>2</td>
<td>9</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Post-harvest regeneration</td>
<td>890</td>
<td>57</td>
<td>3</td>
<td>7</td>
<td>24</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Future timber values</td>
<td>893</td>
<td>48</td>
<td>2</td>
<td>4</td>
<td>19</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Effects on wildlife</td>
<td>892</td>
<td>55</td>
<td>3</td>
<td>10</td>
<td>17</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Post-harvest deer impact</td>
<td>893</td>
<td>71</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>892</td>
<td>57</td>
<td>3</td>
<td>7</td>
<td>18</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Variables related to post-harvest satisfaction

Four of the 23 variables describing the respondents’ ownership objectives, timber harvest attributes, technical assistance, and satisfaction with information conveyed to them in their recent timber transactions were statistically related to their level of post-harvest satisfaction with the condition of their woodlands. These included 1) whether the skid roads were seeded following harvest, 2) whether timber was a specified management objective, 3) satisfaction level with information provided on harvesting methods, and 4) satisfaction level with information provided on future timber values (Table 3).

Respondents who had timber transactions in which roads had been reseeded or claimed to have timber as a management objective were 2.49 and 1.62 times more likely, respectively, to have indicated satisfaction with the on-the-ground results of their timber harvest (Table 3). Those respondents who were satisfied with information on different timber harvesting methods were 2.5 times more likely to be satisfied with the outcome of timber harvesting than those not provided with similar information. Similarly, respondents satisfied with information provided on future timber values were 2.6 times more likely to be satisfied with timbering outcomes. The regression model indicates that respondents who were dissatisfied with information on future timber values were less likely to be satisfied with timbering outcomes than those who received no information on the topic (OR=0.38; p<0.001).
Discussion

The timber transaction process is played out in crucial period that impacts heavily on the future productivity of forest stands associated with the transaction. Landowner decisions made during this period will affect the economic and biological productivity of the forest stands for decades into the future. As shown from this survey of landowners conducting timber transactions between 2000 and 2001, an average of 57 percent of the respondents who had recently completed a timber transaction did not receive information on sustainable forestry topics. An additional 10 percent felt dissatisfied with information provided to them during the transaction period.

While we do not substantiate whether satisfaction with information provided on forest management will lead to sustained forest productivity, we have found that this is related to post-harvest satisfaction with the appearance and condition of harvested properties. In a study conducted in Pennsylvania, a state that borders West Virginia to the north, landowner knowledge of forest management topics was shown to be related to on-the-ground impacts of timber harvesting (Egan and Jones 1993). Hence, we feel that the provision of information on forest management during the transaction period will lead to better timber harvesting outcomes.

Table 3. Results of stepwise regression of independent variables on the binary response—satisfaction with condition of woodland after the harvest (satisfied, dissatisfied). Intercept statistics for the model were present in the analysis but are not shown. Levels column describes the independent variables; the last listed level for a particular variable effect is the “reference” category. Odds ratios (OR) are shown with their respective 95% confidence intervals (CI). Prob>Chisq is the probability level for the overall type III analysis of effects for the slope (beta) term in the univariate model based on the Wald Chi-square test statistic.

<table>
<thead>
<tr>
<th>Variable effect</th>
<th>Levels</th>
<th>OR</th>
<th>95% CI</th>
<th>p&gt;Chisq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reseeded roads</td>
<td>Y/N&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.49</td>
<td>(1.7-3.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Timber objective</td>
<td>Y/N</td>
<td>1.62</td>
<td>(1.1-2.3)</td>
<td>0.011</td>
</tr>
<tr>
<td>Satisfaction level with info on timber harvest methods</td>
<td>S v. NI</td>
<td>2.53</td>
<td>(1.6-4.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>D v. NI</td>
<td>0.73</td>
<td>(0.4-1.2)</td>
<td>0.001</td>
</tr>
<tr>
<td>Satisfaction level with info on future timber values</td>
<td>S v. NI</td>
<td>2.59</td>
<td>(1.6-4.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>D v. NI</td>
<td>0.38</td>
<td>(0.2-0.8)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

The relationship between forest management information, post-harvest condition of roads, and timber objectives and post-harvest property satisfaction level, however, may be confounded with financial aspects of the transaction. As McGill et al. (2004) have shown, West Virginia forest owners were 38 times more likely to express satisfaction with the post-harvest condition of their properties if they had been satisfied with the revenue generated from their timber sales. Hence, some satisfaction—and dissatisfaction—expressed in this survey may be—at least in part—a function of the financial portion of the transaction, an area that we did not take into account in this study.

The biggest challenge in supporting sustainable forestry by promoting efforts of private forestland owners may be found within the timber transaction process. Currently, loggers in West Virginia must file a timbering notification form. One of the questions on the form is “Was the landowner provided with information on best management practices?” This question, however, is answered by the logger—the purchaser of the timber—and irrespective of the quality of best management practice information provided to the landowner, the logging contract at the notification form stage in the timbering process is already in place.

It seems a certainty that timing of information transfer during the timber transaction period is important in promoting future forest productivity. For example, if information regarding methods to assure ample natural regeneration (the primary regeneration mode in Appalachian hardwood forests) and conditions that support the development of that regeneration are provided following the signing of a timbering contract, the landowner may have few options in changing how the logger goes about removing timber. However, information conveyed to...
the landowner prior to signing the contract would allow the landowner and associated participants to the timber transaction to consider certain harvesting specifications that promote regeneration.

As forestry extension and outreach organizations continue to develop communication strategies to convey sustainable forest management information to forestland owners, it is important to understand the variation in these transactions to avoid program development pitfalls (Jones et al. 1995). Clearly, all timber transactions are not created equally. It is the obligation of forestry extension and outreach organizations to move forward to assure that forestland owners are prepared to engage in the timber transaction process before it begins.

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FORESTRY EXTENSION FOR PRIVATE FOREST OWNERS IN LITHUANIA

Diana Mizaraite

Abstract

Lithuania has been undergoing a transition from one political culture (based on a centrally planned economy and a one-party system) to a very different political culture (market economy and a democratic political system). After the declaration of independence in Lithuania some new phenomena emerged in forestry: the formation of a free timber market; increasing timber export levels; new modes ownership (private forests) and enterprise (private business logging companies); and the privatization of forest industry. 641,900 of forests were owned by private forest owners as at January 2004. This is 31.4 % of total forest area, a figure that is projected to increase to 40-45% in the future. Small-scale private forestry is developing in Lithuania. The average size of private forest holding is 4-5 hectares.

One of the most important private forest management problems is providing private forest owners with training, consulting and education systems.

The development of extension system for private forest owners is ongoing in Lithuania. During few years legal base, institutional framework for development of extension system of private forest owners have been partly created.

Key words: private forestry, problems, extension system, institutional framework.

Introduction

Situated on the eastern coast of the Baltic Sea, Lithuania (capital, Vilnius) is an independent republic occupying 6,530 thousand hectares. Agricultural land constitutes 3,947 thousand hectares (62% of the land), while forests occupy 1,976 thousand hectares (31% of the land). Lithuania has a population of 3,610,500, of which 68% live in urban areas and 32% in rural areas. The population density is 55 inhabitants per square kilometer. For administrative purposes the country is divided into ten counties. The major cities include Vilnius (population 576,400), Kaunas (409,700) and the seaport Klaipeda (201,800). 331,100 people are employed in agriculture, compared with 326,400 in industry.

The total forested area has been steadily increasing, from 21.8% in 1938 to 30.9% in 2001. Furthermore, timber volume has increased. The growing stock volume increased over the period from 1938 to 1998 to 213.7 million cubic meters. The mean volume has increased from 125 cubic meters per hectare to 193 cubic meters per hectare over the same period. The gross annual increment in forests is 11-12 million cubic meters, while annual removal is 6-7 million cubic meters. As well as timber, Lithuania also provides non-timber products, such as berries, medicinal herbs, mushrooms and game.

Protected areas in Lithuania occupy 775 thousand hectares, of which forests occupy 380 thousand hectares. In addition, 293 thousand hectares of forests are under restricted forestry activities: multipurpose protective forests, urban and recreational forests, soil and field protecting forests, etc. As a result of the environmentally-oriented forest policy, forestry areas distribution by forest groups has changed in favour of strict reserves, special purpose forests and protective forests. An overview of private forestry sector in Lithuania, the information and training needs of private forest owners and institutional framework of forest extension for private forest owners is provided in the article.

Private Forestry of Lithuania

The structure of forest ownership has changed due to an ongoing land reform process since Lithuania regained independence. The private forest constitutes 209,000 private forest owners and 641,900 hectares of private forest. This is 31.4% of total forest area, a figure that is projected to increase to 40-45% in the future. The forest area under restitution comprises 18.9% as well as state forests 49.7% of total forest area.

After the declaration of independence in Lithuania the major part of wood working industry have been privatized, with the exception of wood working production in the State Forest Enterprises.

Small-sized private forest properties are formed in Lithuania. Average area of private forest holding is 4.5 hectares (in 2003). Holdings with the area of up to 3 ha accounted to 58% of the total number of private forest holdings in Lithuania. 44% of private forest owners reside in towns. The majority of landowners are over 60 years old (Mizaras, Mizaraite 2004).

The round wood supply from private forest has increased over the past 10 years. The felling volume of private forest was over 2 million cubic meters in 2003. This is 40% of total round wood supply in Lithuania. Small-sized
private forest holdings are an impending factor on the development of sustainable supply of wood from private forest to the market.

Since regaining independence the structure of Lithuania’s forestry authorities has changed several times: the Ministry of Forestry of the Republic of Lithuania (1990); the Ministry of Agriculture and Forestry of the Republic of Lithuania (1996); the Department of Forest and Protected Areas under the Ministry of Environment of the Republic of Lithuania (1998). Since 2002 the Department of Forests at the Ministry of Environment has been the lead forests agency of the government and is primarily responsible for forest policy and legislation concerning the Lithuanian forestry sector. This Department includes Private Forestry Division. The forestry administration also includes the Forests Control Division of the State Environmental Protection Inspection (Forest Control Division), the General Forest Enterprise, and the State Service of Protected Areas. All these institutions, like the Department of Forests, come under the auspices of the Ministry of Environment.

Private forest owners are not yet a fully organized group. The Forest Owners Association of Lithuania (FOAL) is the organization that represents and unites private forest owners. FOAL was established in 1993 and has 38 local units. Regional units of FOAL will be established in all regions of Lithuania. The establishment of co-operatives of private forest owners is also ongoing.

Co-operation of private forest owners is strengthening in Lithuania. Forest Owners Association of Lithuania (FOAL) supports the development of the network of forest owners’ co-operatives and others forest-related companies. These companies provide all forestry-related services and employ more than 130 skilled specialists. The consolidated round wood supply from FOAL companies has increased over the past two years. These companies supply over 10% of round wood from private forest and have become the biggest suppliers in the private forest sector.

Private forest owners manage forest according to forest legislation and forest management plans. The forest management plan is obligatory. A large number of requirements are incorporated for private forest management such as such cutting age, cutting area, licenses for commercial felling, forbidding of felling etc. For example, the cutting age in protected forest are: Pine – 171, Spruce – 121, Oak – 201, Birch, Black alder – 91, Aspen – 61. The Environmental Protection Inspection administers the issuing of licenses for commercial felling by private forests owners. The clear cut area reforestation after three years period is also obligatory for private forest owners.

**Legal Base for Development of Extension for Private Forest Owners**

The new *Policy of Lithuanian Forestry and its Implementation Strategy* was approved in September 2002 by the government of Lithuania (Lietuvos ... 2002). Forest ownership variety, the participation of society, development and strengthening of international relations, and efficiency of forestry activity and goals of rural development are all emphasised strongly in this Strategy. The main strategic goals of the *Lithuanian Forest Policy and its implementation strategy* are preservation and enrichment of forest resources; ensuring the variety of forest ownership forms; participation of society in the solution of major forestry issues; presentation of information to society about the country’s forests, their condition and management; *development of education and training on forest issues*; strengthening and development of international relations; sustainable and continuous usage of the forest resources with an increase of forest productivity and economic efficiency of forestry; ensuring the stability of ecosystems; preservation of biodiversity and improvement of forest health; meeting the general forest-related needs of society; and development of the state and private forest sectors in the rural development context. The *Policy of Lithuanian Forestry and its Implementation Strategy* defines the key instruments for forest policy implementation for the period until 2015. The detailed action plan for 2003-2006 of the implementation of these instruments is already prepared, and implementation has started.

The main problems of private forestry sector are small-sized private forest properties; weak co-operation of private forest owners; lack of their forest management knowledge; establishment of new protected areas; no subsidies from the state for private forest management. In *Policy of Lithuanian Forestry and its Implementation Strategy* a number of the objectives have been formulated for the above-mentioned problems solving: development of private forest owners training, consulting and education system; correction of non-rational boundaries between the forests of the state and the private sector through equivalent forest property exchanges; introduction of a compensation system due to the restrictions of forest utilisation in new established protected areas; integration of private forestry development into the general rural development programmes supporting by EU; support from the state for private forest management.

The Ministry of Environment approved the Education, training and advisory programme for private forest owners in 2003. This document consisted of two parts: programme and Action plan for 2003-2005. The main chapters on programme are: state of the art private forest ownership; the main objective, goals and principles of the programme implementation; the private forest owner’s education, training and advising system. The main objective of programme is to create a basis for solid forest owner’s education, training and advising system, which ensure SFM of private forests. In programme number of the goals have been formulated for the
above-mentioned objective fulfilment. The Action plane for 2003-2005 consists 15 activities and means for programme implementation such as establishment of regional informational centers, publication of special education material and literature for private forest owners etc.

Institutional Framework of Forest Extension for private forest owners

Since regaining independence the system of private forest owners extension has changed several times. Since 1998 different state institutions as well as private arrange the special training courses for private forest owners. Over 2,300 private forest owners attended these training courses in 2003 (Figure 1.).

![Figure 1. Private forest owners attended training courses.]

The institutional framework of forest extension for private forest owners consists following institutions (Fig. 2): 1) State authorities (Figure 2): Forest department of the Environment Ministry; the General forest enterprise under the Environment Ministry, State forest enterprises (42); Directorates of National parks (4); Regional environmental protection departments (8); Informational centers (4).

![Figure 2. State institutions dealing with extension for private forest owners.]

Since 2002 the Department of Forests at the Ministry of Environment has been the lead forests agency of the government and is primarily responsible for forest policy and legislation concerning the Lithuanian forestry sector. This Department includes Private Forestry Division. The Private Forest Division is responsible for the development of private forest sector as well as extension for private forest owners.

The General Forest Enterprise is the state forest management institution that coordinates forest use, reforestation, maintenance and protection in state forests. This institution coordinates activity of 42 State Forest Enterprises. One of the functions of state forest enterprises is advising of private forest owners. Moreover, state forest enterprises can provide all forestry-related (with the exception of preparation of individual forest management plans) services for private forest owners. During last few years state forest enterprises provided more than 25,000 individual consultation for private forest owners, arranged 89 special trainings, established over 750 special demonstration plots for training of private forest owners and advisors. Moreover, a staff of forest enterprises participated as teachers in the special trainings and education courses for private forest owners organized by other institutions.

The State Service of Protected Areas has responsibility for coordinating nature protection in Lithuania, including forests. All these institutions combine to make up the state forest administration. Directorates of National Parks come under the auspices of State Service of Protected Areas. Directorates of National Parks advise private forest owners about the management of private forest estates in protected areas.

The State Environmental Protection Inspectorate is the main institution responsible for monitoring the implementation of the Forests Act. This institution has eight (8) regional departments. Regional Environmental Protection Departments performs a control function with respect to forest condition, utilization, reforestation and protection for both private and state ownership. According to the legislation the staff of Regional Environmental Protection Departments should constantly advise private forests owners about forest management.

Since 2001 four Informational Centers have been established in Lithuania. One of the main functions of these Centers is providing private forest owners with training, consulting and education.

2) NGO’s and others institutions (Figure 3): Forest owners association of Lithuania; local units (38) of FOAL; Private forest extension center; Private forest owner’s association; Lithuanian Chamber of Agriculture; Private forest owners cooperatives (20) and other private companies.

![Diagram](Figure 3. NGO’s dealing with extension for private forest owners.)

The Forest Owners Association of Lithuania (FOAL) is the organization that represents and unites private forest owners. FOAL was established in 1993 and has 38 local units. Regional units of FOAL will be established in all regions of Lithuania. The main purposes and activities of the Association are: to represent forest owners interests in the Government and other institutions, to have influence upon legal acts, to consults private forest owners, to arrange trainings and education courses for forest owners, to support cooperation among forest owners and cooperate with foreign Forest Owners Associations.

Private Forest Extension Center (PFEC) established in 2000. The founders are the Forest Owners Association of Lithuania, Lithuanian Chamber of Agriculture and Danish Forestry Extension. PFEC is non-profit organization. The overall objective of the PFEC is to promote, support and strengthen the sustainable development of the private forest sector in Lithuania by providing advisory, training and commercial services to forest owners. Private Forest Extension Center actively participates on arranging trainings, education courses for private forests, publishing special material and literature.

During last decade over 20 private forest owner’s cooperatives have been established in Lithuania. The establishment of cooperatives of private forest owners is still ongoing. Forest Owners Association of Lithuania
(FOAL) supports the development of the network of forest owners’ co-operatives and others forest-related companies. These companies provide all forestry-related services and employ more than 130 skilled specialists. Services provided by forest owners’ cooperatives are: information, consultancies, teaching and education; timber trade; forest management plans; afforestation; forest cuttings etc.

Lithuanian Chamber of Agriculture is an umbrella organization, uniting more than 100 agricultural and rural non-governmental organizations. This organization consists 6 departments. Department of Rural Development is responsible for advising, teaching and training of private forest owners.

Other private companies such as small-middle sized joint stock companies, individual companies provide all forestry-related services as well as advising of private forest owners.

Trainings, courses, advising, educational and training material and literature, demonstrations plots, field trips and others means are used for extension of private forest owners by all before-mentioned institutions.

### The Information and Training Needs of Private Forest Owners

The new modes of ownership (private forests) brought new tasks for both private forest owners and forest authority responsible for the forest policy and its implementation. It is often the case that the forest authority makes decisions related to the private forest owners training and advisory system, organizational structures of private forests owners, wood trading, private forest management despite the needs of private forest owners and new political culture in forestry.

It is necessary to carry out the detailed studies for defining the information and training needs of private forests owners. First survey was carried out in 1999 (Mizaraite 2001). The main aim of the survey was to find out the objectives and problems of private forest management as well as information and training needs of private forest owners. The representative sample of respondents has been selected using the stratified random sampling method. 267 respondents were interviewed during the survey, while 65.9% constituted males and 34.1% females. The average age of respondents was 53 years. The average size of private properties managed by respondents was 24.6 hectares, while average size of forest properties was 5.8 hectares. The average distance from forest holding’s location till owners’ residence was about 30.6 kilometers.

For survey has been designed a questionnaire. A questionnaire consisted four parts: general information on the private forest owner and the forest property; objectives of the private forest management and forestry activity in the property; the private forest management problems; the private forest owner needs. The questionnaire includes 41 questions. The respondents were grouped by education background into three groups (high and higher, vocational, other education). The great majority respondents have high and higher education background (48.7%). The respondents were grouped by occupation into seven groups (wage-earner, student, retiree, farmer, homemaker, unemployed and others). 54.7% respondents were wage-earners, 27.7% - retirees, 9.4% - farmers, 4.5% - unemployed, 3.7% respondents had other occupation.

According the survey results the most important forest management problems are: the forest property is too small to achieve efficiency (73.8% of respondents); to strict legal regulations related forest management (61.0% of respondents); lack of money for the silviculture activities (52.4% of respondents).

During survey the respondents indicated the forest property management objectives. The most important objective for respondents was to provide themselves with timber for their own purposes (77.5% of respondents) and cut the wood for selling, seeking stable level of income (63.3% of respondents). The objectives of aesthetic value (beauty, tourism, recreation etc.) (61.4% of respondents) and protection of nature has also big priority for the respondents (45.3% of respondents).

The information needs of Lithuanian forest owners were classified by asking how much information and training they need on various forestry-related issues. Private forest owners would need particularly much information about silviculture, cuttings, logging, and trade with wood. Information related issues about afforestation of agricultural land, growing of seedlings, wood measurement, wood quality estimation and sorting, forest economics were not very important for private forest owners. The most necessary services for private forest owners are: forest services for forest protection against fire, insects etc. (39.7% of respondents); advisory services (60.3% of respondents); preparation of special material and literature (52.8% of respondents). 45% of all respondents would like to be members of cooperatives with the main activities targeted at forest protection and commercial services.

The most necessary services for private forest owners are grouped into three groups: training, education and consulting services (48-60% of all respondents); forest protection and commercial services (48-70% of all respondents); other services (9-48% of all respondents).

### Conclusions

The structure of forest ownership has changed due to an ongoing land reform process since Lithuania regained independence. Small-scale private forestry is developing in Lithuania. The private forest constitutes 209,000
private forest owners and 641,900 hectares of private forest. This is 31.4% of total forest area, a figure that is projected to increase to 40-45% in the future. The felling volume of private forest was over 2 million cubic meters in 2003. During the past two years roundwood supplies from private forest were consistently increasing in Lithuania. This is 40% of total roundwood supplies. The private forest owners association and cooperation process is developing in Lithuania.

One of the most important private forest management problems is lack of silviculture and forest management knowledge and information. The development of extension system for private forest owners is ongoing in Lithuania. During few years legal base, institutional framework for development of extension system of private forest owners have been partly created. The main institutions providing private forest owners with training, consulting and education are Forest Owners Association of Lithuania and state forest service.

References


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E-mail: ekonsk@mi.lt
Knowledge transfer and attitude adjustment through experiential learning:  
The North Carolina Sustainable Forestry Teachers’ Tour  

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Abstract  
Negative public attitudes about forestry can stem from a lack of easily accessible and understandable information, as well as people’s lack of firsthand experience with forestry. Many organizations are striving to educate the public as to the importance of forest management. Addressing this need, The North Carolina (NC) State University Forestry Educational Outreach Program, the North Carolina Forestry Association and the North Carolina Division of Forest Resources have partnered to create the North Carolina Sustainable Forestry Teachers’ Tour.  

The model for this tour combines residential education with experiential learning. This event immerses the teachers in hands-on, interactive activities about multiple aspects of forests, forest management and forest product manufacturing during a 5-day residential workshop.  

Teachers’ pre- and post-tour perceptions of forestry in NC were evaluated. The evaluations reveal teachers’ positive opinions of the experiential learning method, and impressive changes in attitudes and forestry-related knowledge due to the experience of the tour. Based on these results and teacher comments, the partnering organizations have found this to be an extremely effective communication strategy for forestry extension and education of this stakeholder group.  

Keywords  
Experiential learning, Forestry outreach, Teacher training, Forestry extension, Residential education  

Introduction  
Negative public attitudes about forestry can stem from a lack of easily accessible and understandable information, as well as people’s lack of firsthand experience with forestry. Many organizations are striving to educate the public as to the importance of forest management. Addressing this need, The North Carolina (NC) State University Forestry Educational Outreach Program, the North Carolina Forestry Association and the North Carolina Division of Forest Resources have partnered to create the North Carolina Sustainable Forestry Teachers’ Tour. We chose teachers as our target audience because teachers have perhaps the largest influence on our state’s future landowners, land managers and decision makers – their students. It is therefore imperative that teachers have the first-hand experience and understanding of forestry necessary to help their students think critically and make informed choices, either as forest landowners, managers or as voting citizens of our state. Teachers not only share their learning experiences with students, but as valued and respected members of the community, they share information with other teachers, friends, neighbors and family members. As our state becomes more urbanized, the challenges for the industry and the resource will continue to grow. Providing an improved understanding of forestry and its importance to our communities will help assure the certainty of the future of forest management.  

The stated objectives for our program were to 1) build an understanding of the importance and techniques of forest management and maintaining land in forest; 2) increase knowledge of forest ecology and the importance of trees to our communities; 3) increase the understanding of the importance and function of the forest products industry in our state and local communities; 4) show that North Carolina’s forest resources are being managed in a sustainable manner; and 5) build awareness of various careers within the forest products industry. An overriding goal that encompasses these objectives is to generate more positive teacher attitudes toward forestry and the forest products industry. The objectives were to be met through
hands-on investigation of many components of forestry with varied forestry professionals. It was our expectation that through this experiential learning (learning involving a ‘direct encounter with the phenomena being studied rather than merely thinking about [it]’ (Borzak 1981)), any negative attitude teachers might have about forestry was likely to be re-examined. Through the tour visits to public and private forests, research centers, and a range of forest products manufacturing facilities, teachers learned how foresters and the forest products industry are meeting society’s demand for wood products while ensuring the future of our forest resources through sound forest management.

Methods
The Teachers’ Tour was designed as a 5-day residential program with hands-on, direct interaction with varied aspects of the forest products industry and a diversity of forestry professionals. Tours were offered in two locations, one in the western, or mountain region of the state, and one in the eastern, or coastal region.

Teachers were selected by application. Qualifications included being a fulltime classroom teacher of a relevant subject (for example, we did not accept physical education teachers). Teachers of all grade levels were eligible. In their application, teachers were asked to describe: a) why they wanted to participate in the Teachers’ Tour, b) how they would use they information they receive when they return to their classroom and c) in what ways they would share what they learned with their colleagues. The answers to these questions were to be used to evaluate applicants, should the Tours over-enroll. We were able to accommodate all who applied and wished to attend. A total of 56 teachers participated in the two tours with the breakdown as follows:

<table>
<thead>
<tr>
<th>Grade Level</th>
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<th>Mountains</th>
<th>Total</th>
</tr>
</thead>
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<td>11</td>
<td>20</td>
</tr>
<tr>
<td>6-8</td>
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<tr>
<td>9-12</td>
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<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>29</td>
<td>56</td>
</tr>
</tbody>
</table>

The Tour schedule was designed to include a variety of the aspects of forestry and forest management in our state. Various manufacturing facilities were contacted and asked to host tours, as well as a mixture of landowners and land managers. All hosts enthusiastically greeted this audience. The Tour schedule was intense, generally running from 07:30 to 21:00 each day, and included a myriad of activities and experiences. The general schedule for the tours was as follows, and also included daily group dinners at high quality restaurants: Day 1: Teachers were introduced to forestry and current issues affecting NC’s forests; introduction to urban forestry and the importance of trees to our communities and quality of life; presentation on the history of forest management in the USA and in NC. Day 2: Visit to non-industrial private forestlands - presentations include: wildlife management; silviculture and forest measurements; visit to a National Forest - forest ecology, public forest management and endangered species management presentation. Day 3: Visit to industrial forestlands, a recycled paper mill and a hardwood saw mill. Day 4: Visit a wood energy plant, a plywood mill, a furniture manufacturing facility. Day 5: Presentations by local Community Colleges and Universities with forestry curriculums, from NC Educational State Forest representatives, and a presentation on the restoration of the American chestnut tree. Teachers also had a facilitated discussion of what they learned on the tour followed by review and individual written teacher evaluations of the tour.

Teachers were transported on a high quality air-conditioned tour bus with reclining individual seats, large windows and a bathroom on board. Tour facilitators provided cold drinks and snacks all day for the teachers’ comfort. In addition, a “door prize” was drawn for one participant each time the group boarded the bus. The prizes were carefully chosen materials designed for use in the teachers’ classrooms and were awarded on a grade-level specific basis. In addition, on the final day of the tour, multiple classroom materials and resources regarding forestry were given to all teachers. Teachers ate all three daily meals together and walked or rode the bus as a group to all events. All teachers were lodged in one hotel and a
hospitality suite was provided each evening for teachers to network informally with each other and with the facilitators.

Teachers were sent a pre-tour assessment in which they were asked

What is your perception of forestry in North Carolina? and
What is your definition of sustainable forestry?

among other questions. (Appendix A). The pre-tour assessment is designed to get teachers thinking about forestry and the role of forest products in their lives, before the start of the Tour. The pre-tour assessments also give the facilitators an idea of the current level of understanding and attitudes of the teachers regarding forestry. In addition, prior to the Tour, teachers are sent reading materials to familiarize themselves with forestry terms and various aspects of the forest products industry in our state.

On the final day of the Tour, teachers were given a post-tour evaluation form (Appendix B). Teachers’ attitudes were measured using a one to five scale rating their perception of forestry in NC both pre- and post-Tour, as below:

Please RATE your perception of forestry in NC. (Circle the number of your choice.)

<table>
<thead>
<tr>
<th>Extremely Favorable</th>
<th>Extremely Unfavorable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Tour</td>
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</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>Post-Tour</td>
<td></td>
</tr>
<tr>
<td>5 4 3 2 1 0</td>
<td></td>
</tr>
</tbody>
</table>

Open-ended written questions were also posed to teachers to allow expansion on the ranking, such as:

How has your understanding and perception of forests, forestry and the forest products industry changed as a result of this tour?

In addition, short oral evaluation interviews were held where teachers were asked to describe what they liked or didn’t like about the Tour, what suggestions they had and how they would use the information they had learned. The oral evaluations took place in front of the entire group.

Results

Teachers’ attitudes and perceptions of forestry improved dramatically post tour. Of the 34 respondents with a pre-tour response of 3 or below, over 70 percent had a post-tour response of 5, and over 26 percent had a post-tour response of 4. Only one teacher responded with an unchanged perception, and none reported lower perceptions.

<table>
<thead>
<tr>
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<th>4</th>
<th>5</th>
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</thead>
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<td>0</td>
</tr>
<tr>
<td></td>
<td>Coast</td>
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</table>

<table>
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<tr>
<th>Post-Tour</th>
<th>Location</th>
<th>3 and below</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Mountains</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Coast</td>
<td>5</td>
<td>1</td>
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</tr>
<tr>
<td></td>
<td>Both</td>
<td>9</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

|         | Mountains| 14          | 5 | 1 |
|         | Coast    | 10          | 6 | 4 |
|         | Both     | 24          | 11| 5 |
Teachers’ written responses reflected their changed perceptions (underlining is theirs):

“Forestry is more important to NC than I realized.”
“My perception was a somewhat negative one because all I saw was harvesting of trees, but now I have a better understanding…”
“This tour has truly changed my perception of the forest products industry. I will not criticize the [US Forest Service] about cutting trees.”
“My understanding, perception, and respect has improved greatly.”
“My perception has greatly changed… I have a greater appreciation of our forest areas, a cardboard box, a piece of furniture and our work force in America.”
“Changed from negative perception to a positive one.”
“I feel better about the forest products industry’s care and concern for the future of forests.”
 “[Tour] has reinforced my feeling that people are concerned and not the “bad” guys that some environmental groups make them out to [be.] These folks I have met are the true environmentalists.”
“I had a very negative attitude about the companies that I visited this week. But my attitude has changed.”
“It did change many of my attitudes and certainly added to my knowledge base. Zeal is necessary, but without knowledge it can be incredibly harmful.”
“We tend to hear only about the “bad” guys – so nice to see so many people doing things right!”
“My understanding and perceptions have been supplemented with a product that begins in the woods and is later purchased in Home Depot. The overall importance is more obvious to me now. I can see the “forests for the trees” now!”

Written responses also overwhelmingly highlighted how much the teachers learned on the Tour, and many wrote that the knowledge helped build their understanding and respect for the profession/industry. The teachers expressed excitement and enthusiasm for using their newly acquired knowledge within their classroom, with other teachers, and with family and friends in various ways:

“I’ll provide examples and experiences to demonstrate the importance of conservation.”
“90% of my students are very ignorant about natural forest resources. [I will] educate them about the history of forestry [and] educate them about modern forest management.”
“The information I have learned will help greatly when teaching my students…”
“Every year I do lessons on trees & plants and on recycling (esp. paper). I will approach the lessons differently… because I have a new understanding.”
“I’m planning on making [my students] more aware of efforts to preserve forests, but still use forests to meet certain needs.”
“[I will] definitely share with students and encourage other teachers to come to this workshop.”
“I will teach my own children and grandchildren the value of trees.”
“I will educate my friends but first of all my fellow teachers.”
“Information will [also] be shared with 2 scout troops and a church youth group.”
I will use my knowledge to share with teachers and friends and family. It is important to set the record straight.”

When asked about what they liked most about the Tour, many teachers cited the hands-on, experiential method in which we presented the information:

“I enjoyed being in the forest.”
“Being in the forests was the most fun.”
“The hands on aspect – going out into the forests and see what we are learning about.”
“I think to experience this hands-on is very important.”
“Hands on experiences. Getting out of the classroom environment (lectures) and into the “natural” environment. More effective learning!”
“I enjoyed being in the field with the presenters. We were able to see and learn on the spot.”
“The program is heavy in hands-on learning that is most applicable immediately to my classroom.”

Teachers were also asked if they would recommend this program to others. One hundred percent of respondents replied in the affirmative:

“Yes, enhanced perceptions of forestry that I didn’t have prior. The knowledge acquired through this program is immense.”
“Yes, very informative and useful workshop…”
“Yes, it combines learning and fun…”
“Yes, it gives you a new perspective on what forestry really entails.”
“Yes, the educational value is limitless…”
“Definitely. It is a great way to really understand up close & personal what forestry & what the plants & mills are trying to do. Excellent!”
“I feel this program should be expanded and made mandatory for teachers, not optional.”
“Absolutely! There is no preaching, just lots of information from many parts of the forest umbrella. It is easy to draw educated conclusions.”

Clearly, the participants in these Tours had an overwhelmingly positive experience and a powerful learning encounter. Our objectives were met along with our overriding goal of generating more positive teacher attitudes toward forestry. As one teacher reflected on her evaluation:

“All this knowledge has definitely given me a better awareness of forestry and it will help me to help students as well as the public to understand the importance of sustainable forestry.”

Discussion

The role of teacher attitudes in teaching about forestry and the environment cannot be ignored. Teacher attitudes can influence student learning both positively and negatively (Suarez 2003). Our challenge with this project was to determine how teachers can develop more positive attitudes about forestry and the forest products industry. With teachers being a highly intelligent segment of society, the idea of experiential learning appealed to us. Successful educational leaders know that regardless of the age of students, personal experiences lead to learning (Henderson 2004). Experiential learning allows the learner to actually be present in the moment of knowledge acquisition – they can see, hear, question, touch, do – all actions that reinforce what is being said. Learning is context-based (Mouton 2001), therefore learning about forestry while actually in the woods or about forest products in the actual mill, should be more effective than classroom lecture.

Kolb (1984) holds that to be effective as learners, people need to be able to involve themselves fully, openly and without bias in their new experiences, and in fact require four different kinds of abilities:
concrete experience abilities, reflective observation abilities, abstract conceptualization abilities and active experimentation abilities. The importance of reflection on the experience is emphasized. This in particular is one reason we stimulate thought on the subject prior to the experiences, to put the teachers into reflective mode. This seems to make them more open to the experience at hand because they have thoughtfully and formally considered their current biases and ideas, and the experiences these are based on. Ideas are not fixed elements of thought, but rather are formed and revised through experience (Kolb 1984). By providing the concrete experiences to the teachers, we are providing stimuli for reflecting on and questioning their current beliefs. Teachers, no one really, do not like to be preached to, or just told “this is what is” without evidence of it, particularly evidence they can experience. These experiences act as breakthrough learning events in which new knowledge is created. Teachers’ reflections on the evaluation forms very much indicated the effectiveness of this hands-on learning method.

Simply having experiences does not imply that they are reflected upon, understood, or analyzed critically (Brookfield 1996). We believe the residential aspect of the Tour, where the participants both lived and learned together, provided an atmosphere promoting teachers’ collective or small group reflection on and analysis of the experiences for better understanding. Residential environmental programs offer many benefits, including time to be “in” nature (Dettmann-Easler and Pease 1999), additional time in the evenings for instruction, discussion or reflection, and ongoing fellowship between and among participants. Some teachers commented that building relationships with other teachers over the 5-day Tour was one of the most enjoyable and valuable aspects. In addition, the immersion aspect of residential learning, including the withdrawal from other aspects of the participants’ lives, can make the learning more integrated and continuous (Mouton 2001).

**Conclusion**

Providing a safe, supportive, open environment where experiences can be questioned, analyzed and reflected upon promoted learning and changes in attitude. Participants had ample time to compare the meaning of what they were experiencing versus their currently held beliefs and attitudes. They were able to question what experiences their currently held beliefs were based on, and whether these prior experiences were as valid, rich, and unbiased as the new experiences. If the prior experiences were not “knowledge experiences” - in other words, no one was there to explain what was being seen or heard, (such as driving by a clearcut or a prescribed burn site and thinking “that looks terrible!” or “that is so awful”, respectively), perhaps upon reflection these experiences were valued less.

Forestry is an art, science and profession that is greatly misunderstood and often vilified by our society. Fortunately, this often stems from a complete lack of understanding and knowledge of its value and professionalism, and a little knowledge can go a long way in correcting this misunderstanding. Following our Tour, teachers’ evaluation responses overwhelmingly indicated increased understanding and appreciation of the forest products industry and forest management. In addition, teachers expressed enthusiasm for incorporating the information into their teaching. We will be doing a 6-month follow-up survey to verify the classroom impacts of the Tour.

**Literature Cited**


Appendix A

2004 North Carolina Sustainable Forestry Teachers’ Tour

PRE-TOUR ASSESSMENT

**Return this form to us no later than Wednesday, April 30th**

- By Fax: 919-832-6188
- By Mail: Jennifer Grantham, 1600 Glenwood Avenue, Suite I, Raleigh, NC 27608

Your Name:

1. What is your perception of forestry in North Carolina?

2. How do you perceive the management of public vs. private forests?

3. What is your definition of sustainable forestry?

4. How do you use wood products?

5. As a teacher, what can you do to help your students make good decisions about the conservation and development of natural resources?

6. Which concepts do you already address in your classroom?  
   (Check all that apply)
   - [ ] Career opportunities in forestry
   - [ ] Importance of the forest products industry to our state
   - [ ] Principles of forest ecology
   - [ ] Forest measurements
   - [ ] State of North Carolina’s forests
   - [ ] History of North Carolina’s forests
   - [ ] Importance of forest management
   - [ ] Techniques of forest management
   - [ ] Other forestry concepts (please describe) __________________________

7. Please rank the importance of concepts you hope to learn from the tour.  
   (1=most important, 8=least important, use each number only once)
   - [ ] Career opportunities in forestry
   - [ ] Importance of the forest products industry to our state
   - [ ] Principles of forest ecology
   - [ ] Forest measurements
   - [ ] State of North Carolina’s forests
   - [ ] History of North Carolina’s forests
   - [ ] Importance of forest management
   - [ ] Techniques of forest management

8. Are there other forestry-related topics you would like to see addressed? Please describe.

9. Which materials/resources regarding forestry would you find most useful?  
   (Check all that apply)
   - [ ] Posters
   - [ ] Environmental Educator certification information
   - [ ] Photos/Video you take during the tour
   - [ ] Videos
   - [ ] Curriculum materials (i.e. workbooks, teachers’ guides)
   - [ ] CD-Roms
   - [ ] Others: ____________________________ (Thank you!)
Appendix B

2004 North Carolina Sustainable Forestry Teachers’ Tour
Post Tour Evaluation

Name: ___________________________ Grade(s) Taught: ____________

1. What is your perception of forestry in North Carolina?
2. How do you perceive the management of public vs. private forests?
3. What is your definition of sustainable forestry?
4. How do you use wood products?
5. How has your understanding and perceptions about forests, forestry and the forest products industry changed as a result of this tour?
6. Please RATE your perception of forestry in NC. (Circle the number of your choice.)

<table>
<thead>
<tr>
<th></th>
<th>Extremely favorable</th>
<th>Extremely unfavorable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Tour</td>
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<td>4</td>
</tr>
<tr>
<td>Post-Tour</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

7. Please RATE your experience at each site based on the level of enjoyment to you. (Circle the number of your choice.)

<table>
<thead>
<tr>
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<th>Extremely enjoyable</th>
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</tr>
</thead>
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<tr>
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</tr>
<tr>
<td>Biltmore Forest</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Bent Creek</td>
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<td>4</td>
</tr>
<tr>
<td>Jackson Paper</td>
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<td>4</td>
</tr>
<tr>
<td>Logging Site</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>T&amp;S Hardwoods</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Cradle of Forestry</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Ethan Allen</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Columbia Carolina</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Biltmore House</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

8. Please RATE your experience at each site based on the value to you as an educator. (Circle the number of your choice.)

<table>
<thead>
<tr>
<th></th>
<th>Extremely valuable</th>
<th>No value</th>
</tr>
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<tr>
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<td>Logging Site</td>
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</tbody>
</table>
9. Please RATE the concepts below based on how much you learned about each during the tour.  
(Circle the number of your choice.)

<table>
<thead>
<tr>
<th>Concept</th>
<th>Learned a lot</th>
<th>Learned nothing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career opportunities in forestry</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Importance of the forest products industry to our state</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Principles of forest ecology</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Forest measurements</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>State of North Carolina’s forests</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>History of North Carolina’s forests</td>
<td>5</td>
<td>0</td>
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<tr>
<td>Importance of forest management</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Techniques of forest management</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

10. Please CHECK any concepts that you would like to have been addressed more in depth during the tour.
___ Career opportunities in forestry
___ Importance of the forest products industry to our state
___ Principles of forest ecology
___ Forest measurements
___ State of North Carolina’s forests
___ History of North Carolina’s forests
___ Importance of forest management
___ Techniques of forest management
___ Other: (please describe) ____________________________

11. Are there any materials/resources regarding forestry that you wish had been made available?
12. As a teacher, how will you use the information you learned from the Tour to help your students make good decisions about the conservation and development of natural resources? *Be specific.*

13. How will you *personally* use the new knowledge you have acquired?
14. What did you enjoy most about this program?
15. Would you recommend this program to others? Why or why not?
16. How could we improve the program?
17. How did you find out about the program?
   _____ NCSU Science House web site
   _____ Forest Service Ranger
   _____ Educational State Forest
   _____ Friend/Coworker
   _____ Other: (please describe) ____________________________

18. Other comments or suggestions:

*Thank you for attending!*
Bridging Science and Society to Conserve Ghana’s Rainforest

By K.S. Nketiah, Anneke Wieman and Patience Agyare Kwabi
Tropenbos International – Ghana

Paper presented at the IUFRO Extension Working Party symposium
September, 2004

Abstract
Ghana’s rainforest has been the subject of much research. Unfortunately the impact of research on the status of the forest is not apparent. Much of the research information has remained in reports and scientific journals which are hardly accessible even to the average forest manager, let alone the rural communities. It is therefore not surprising that over the last century, the country has lost over 75% of its high forest resources; the rate of forest degradation has been very high, especially over the last decade. There have been attempts at biodiversity conservation, but still much biodiversity is being lost each year.

This paper is based on experiences from a project which targeted crucial, but often ignored, stakeholders in forest conservation. It sought to bridge the gap between science and society for the purposes of improving on people’s attitudes and contribution to forest conservation and management.

The first aspect of the paper discusses ways of repackaging scientific information, forest policy and legislation for the benefit of the wider society. The second aspect deals with strategies for reaching the forest fringe communities and rural school children in particular and the general populace at large with the repackaged information.

The final part of the paper looks at the feedback received or observed from monitoring visits to the target areas, two months after the project.

Background

State of the nation’s forest resources
The closed forests of Ghana cover slightly more than a third of the country’s total land area. About 75% of the original high forest is now bush fallow or land under shifting cultivation; 20% is under reserve whilst the remaining 5% is unreserved land. The basic idea behind the declaration of Forest Reserves was to check uncontrolled conversion of forests into farmland (or any other use besides forestry), and to manage the forest in such a way as to secure its permanent existence. But a closer look often reveals a much-degraded resource, both in structure and content. Only about half of the reserved forests are still in reasonable condition with only 15% of the total area having experienced slight or no disturbance.

In 1992, it was estimated that there were about 15,000 km$^2$ of intact closed forests remaining in Ghana (IUCN). This covered almost 7 per cent of the country’s total land area of 230,020 km$^2$. This is basically secured in 214 forest reserves. A third of Ghana’s forests has been estimated to have disappeared in the 17 years between 1955 and 1972 whilst the average annual rate of deforestation has been estimated at 750 km$^2$. 
In many parts of the tropics conversion of forest to farmland is seen as the major threat to the forest resource, but in Ghana forest reserves are generally well-respected by local farmers. Nevertheless, some forest reserves have suffered as a result of farming by the local communities. Indiscriminate harvesting of NTFPs by forest communities has sometimes caused severe damage to some forest reserves. Majority of forest fires are as a result of hunting, farming, palm wine tapping and poaching.

**Forest Management Practices**

The forests of Ghana are essentially managed by the Forest Services Division (FSD) of the Forestry Commission (FC); management practices until the mid 1990s were largely timber-driven. But since the promulgation of a new Forest and Wildlife Policy in 1994, these practices, have been giving way to ecological and environmental management systems that seek to integrate various forest functions and benefits. The state did not at any time take the forest from its owners nor was it intended to ban forest management by the owners. But it has become apparent that this objective for forest reservation has not been met. In the past, communities living on the fringes of Forest Reserves were not adequately informed about the purposes for forest reservation and what benefits they were entitled to. What was more, members of the communities were warded off from the protection, management and utilization of the resource except for the collection of what was considered as “Minor Produce or Non-Timber Products” under stringent conditions.

This scenario has created the impression that these forest-fringe communities have no stake at all in the forest. In the meantime, the official managers of the resource (FSD) can not single-handedly match the task of managing the forests, mainly due to inadequate human and material resources. This has led to a situation where some communities condone the raping of the forests in broad daylight.

In recent times however, The FSD has devised a strategy of forest management in collaboration with local people. Collaboration is expected to re-establish the local communities as the primary clients of the FSD with an absolute right to the wise stewardship of their resource. Collaboration is also expected to help ensure that reserve management is equitable and more efficient and ultimately sustainable.

The concept of Collaborative Resource Management is very laudable on paper, but in practice, the pace has been very slow due to factors including lack of awareness, one-way information flow (top-down), serious mistrust of the forest managers by the forest fringe communities in particular, and perceived sidelining of the fringe communities, or some unwillingness on the part of FSD to let go.

**Forestry research and the gap between science and society in Ghana**

Ghana has a groundswell of very knowledgeable scientists, and forestry in Ghana has also been the subject of study by several researchers. Forestry research is carried out principally by the Forestry Research Institute of Ghana; but also by the universities and to some extent the Forestry Commission and the industry. Some very useful scientific research has been done over the years. Most of the findings however, still remain buried in scientific journals or consultancy reports as grey literature. Student thesis also contain some very useful
scientific information that is never implemented or used, except by other researchers only to produce more thesis reports with no application. Forest management is still bedevilled with several crucial issues including illegal logging, forest conflicts, degradation and loss of biodiversity. The linkages between research and policy and also with forest fringe communities and the wider society have been very weak. Policy is still largely a top-down phenomenon. There is hardly any forum for informed debates and analysis of forestry issues. There is thus a yawning gap between scientific findings and forestry practice.

Attempts to bridge the gap

In the mid-nineties, FORIG initiated a process to enhance the uptake of research results. They initiated annual research planning sessions which brought together what they considered to be their key stakeholders. There was also a move towards demand-driven research as the institute was pushed to commercialise its activities. This also led to the recruitment of a Marketing Officer and creation of a division for Commercialisation and Information. Modifications were also made in the promotion criteria to reflect the new thinking.

Such efforts, though very laudable, have had limited effects for reasons of scope the long turn around time for forestry research. They have also not aimed at influencing policy directly. Moreover, no attention was given to forest fringe communities and the wider society.

The Case Study: TBI-Ghana’s Approach

We now present a case study on ‘Bridging Science and Society to Conserve Ghana’s Rainforest’. The project was aimed at:

1. Providing important actors in the forestry sector like policy makers, forest managers, users and forest-fringe communities with tailor-made information to improve their understanding and performance
2. Facilitating two-way communication between important stakeholders in the forestry sector: policy makers, forest managers and scientists
3. Raising the awareness of forest fringe communities and the general public on how to use the forest in a sustainable way and to facilitate bottom-up information flow.

Methodology

Three approaches were used; these are discussed below:

1. Repackaging of scientific information

This approach consists of a critical review of recent research works to identify scientific information generated that could address specific forestry issues. Such materials are distilled into one page formats using popular writing style. Each of these fact sheets contains tailor-made information targeted at different stakeholder groups. The groups have included policy makers, forest managers, Forest Fringe Communities and the general public.
2. Facilitating two-way communication between important stakeholders

The second method seeks to marshal existing knowledge to inform forest policy and practice. Under this component of the project, a platform is provided for all relevant stakeholder groups to discuss topical issues. This has been dubbed ‘focus group discussion’. Knowledgeable people debate topical forestry issues with the view to presenting position papers in factual forms. This approach consists:

a. Identification of key societal forestry issues. These may be issues on which different opinions, especially those held by different interest groups are paraded as facts, or issues which are considered delicate and therefore not openly discussed. They could also be contentious issues which need to be subjected to critical analysis or debate. For each issue, the objective of the discussion should be very clear and shared by the participants from the start.

b. Selection of a facilitator or moderator: A good facilitator or moderator should be seen to be independent and also perceived to be neutral. The person should also be able to focus the discussion to achieve the set objectives.

c. Identification of resource people to prepare discussion papers. Such papers could present the view of a stakeholder group (i.e. position papers), but should also include papers that give factual information from credible or authentic sources.

d. Selection of participants: The participants must be representative and balanced. These may include opinion leaders and key actors. If one group dominates, the outcome of the discussion could give a wrong impression.

e. An effective follow-up is essential if the effort is not to remain a talk shop. The proceedings of the discussions should be prepared promptly, and where necessary, relevant extracts prepared as tailor-made information for important target groups. To this end, a team of rapporteurs may be appointed to cover the discussions.

Issues

The forestry sector in Ghana is a complex arena. Over-harvesting, resulting from illegal logging, chainsaw lumber production, corruption and also inequities in the system are but a few examples of the issues plague the sector. Challenges identified by the sector ministry also include poverty alleviation, capacity building, increase flow of revenue to local communities and landowners and the development of effective monitoring systems. Law enforcement and governance are also cited.

The primary stakeholders are also many, each with their own interests and perceptions and blaming one another for the rapid forest degradation. Bringing the different stakeholders together to discuss topical issues thus provides a helpful way in managing the complex problems and minimising conflicts.
Two such discussions have so far been organised: the first was on challenges to professionalism in natural resource management. Issues that hinder good governance and professionalism in the forestry sector were identified. Among these were corruption, political interference and weaknesses in the educational/training curricula. Recommendations that came up included revision of the educational curricula, institution of refresher courses and provision of support for practical training. The professional forestry institute also needed to be strengthened to support any practitioner who would be victimised for standing for good professional practice.

The focus group discussion on professionalism in natural resource management mentioned insufficient education of the future manager as one of the problems. Practical fieldwork and interdisciplinary experience is what is lacking in the current educational system. In response to this need, TBI-Ghana has in a modest effort been running an interdisciplinary and intercultural student project, which gives an opportunity for some practical fieldwork. Kwame Nkrumah University of Science and Technology has also shown interest in integrating such projects in its curriculum.

A frequently heard suggestion in the discussion was to set up customer service centres. The discussions urged the Forestry Commission to hasten the setting up of customer service centres on a pilot basis in 21 districts.

The second focus group discussion was on chainsaw lumber production. Key participants for this focus group discussion were politicians, law enforcement agencies, forest managers, and hitherto criminalised chainsaw operators. Others included timber sellers and people from the building and construction industry. This afforded each stakeholder group the opportunity to hear how the other stakeholders saw the issue. It became apparent that the ban on chainsaw lumber production was rather difficult to enforce, and that such lumber accounted for over 80% of lumber on the local market. It was all the same acknowledged that the practice can be very destructive, even though farmers find that less damaging to their farms and therefore tend to condone the practice. The meeting generated a lot of interest and proposals for the way forward.

The two focus group discussions have already brought about some changes. The report on chainsaw lumber caught international attention; so far, one big project proposal involving three countries has emanated from the discussions.

3. Raising awareness of forest fringe communities and the general public

With the current dwindling of forest resources, the livelihood of forest-fringe communities who depend so much on the forest also seems threatened. Such communities have their own perceptions about forest management and yet are still not participating in the policy making process; this is in spite of attempts at making collaborative management a reality in the sector.

The project sought to streamline the information flow to and from communities through the organization of a travelling poster exhibition and participatory rapid appraisal (PRA), as
well as Participatory Learning Action (PLA) in a number of villages within one Forest District in Ghana.

To ensure that posters would appropriately communicate issues to members of fringe communities, many of whom were illiterates and semi-illiterates, the posters had minimum text descriptions. The Poster Exhibition covered the following general forestry problems in Ghana: Sharing of Forest Benefits; Collaboration in forest management; Forest Degradation; and Production of Non-Timber Forest Products.

**Formulation of PRA / PLA Strategy**

The PLA strategy adopted sought to promote Participatory Forest Conservation and Management Transformation, building on the knowledge and ability of forest fringe communities and peoples to address and resolve their own forest conservation related problems, and providing them the knowledge base needed to collaborate in the management of forests.

Re-packaging of information for the benefit of fringe communities needed to be done again bearing in mind the socio-cultural background of fringe communities. General messages and information on sustainable use of natural resources do not necessarily change practices. Behavioural change is a process comprising several steps and includes beliefs and values, developed attitude, influence of others and enabling factors. Communal behaviour change is only possible when the individual community members themselves feel that there is a problem and jointly undertaken action that will permanently improve their conditions and behaviours.

The aim of the PLA approach was to design a participatory strategy using tools and techniques that would promote the sustainable management and conservation of forest resources by the fringe communities making use of all the available information translated from research findings, secondary data and also dialogue. The objective was invariably to raise the awareness of forest fringe communities on how to use the forest in a sustainable way, facilitating a bottom-up information flow.

The definition of PLA keeps on evolving and one definition which particularly fits into current development context is as following:

"a growing family of approaches, methods and behaviours to enable people to share, enhance and analyse their knowledge of life and conditions and to plan, act, and monitor and evaluate”.

PLA approach is based on the premise that problem identification, their solutions and opportunities to solving them are better identified with/by the people. Community members & outside facilitators interact to assess and analyze rural needs & situations, brainstorm to agree on the causes their problems and agree on the steps to be taken to solve the problems, using inputs, skills and knowledge available in the community.

PLA requires two way communication, sharing knowledge and commitment. Some principles of the PLA approach used involved:

♦ patiently respecting the views, rhythm, and form of dialogue, of Stakeholders;
♦ Work with methods that empower community members to take their future into their own hands;
♦ Visually share and verify information gathered with them;
♦ Clearly outline the objectives and reason for the meetings, jointly identifying opportunities for resolving identified constraints and;

The PLA tools used included the following:
- Story Telling
- Open discussions
- Causal / Effects Matrix Analysis
- Gender Analysis tools using KARI (knowledge, attitude, roles/responsibility and interest / incentives analysis
- Pie Chart of Causes of degradation
- Access to Resource Ranking
- Availability Resource of Ranking
- Trend lines / Time lines
- Local Institutional Analysis Charts
- Venn Diagram of Local Institutional Charts
- Problem Analysis Charts
- Etc. when and as applicable

PLA Strategy
The participatory methodology used employed the following strategies:
1. **Stage One** - Knowing the Communities / Stakeholders
2. **Stage Two** - Problem Identification
3. **Stage Three** - Participatory problem analysis
4. **Stage Four** - Planning for Solutions
5. **Stage Five** - Selecting effective options
6. **Final Stage** - Planning for new ways
7. **Follow up Stages** - Participatory Monitoring and evaluation plan / Backstopping
OUTLINE OF METHODOLOGY / PLA STRATEGY

Steps and Activities

A. Knowing the Communities
   1. Familiarization Visits –
   2. Stakeholder Analysis
   3. Selection of Communities
   4. Assessing knowledge

B. Problem Identification -
   Current Knowledge of Communities and peoples in the following: Policies, Guidelines on the sustainable use and conservation of forest resource, TUC/ TUP / SRA, collaborative forest management and NTFPs

C. Participatory Problem Analysis (PPA) - Do communities still consider their forests as important to their livelihood and existence?

D. Planning for Solutions:
   Communities to position themselves as fringe communities to take action; decision-making on sustainable use of forest resources, Conflict Management.

E. Selecting Options
   Identify opportunities and networks for effective Collaboration

PLA Tools

- Secondary Data
- Stakeholder Identification
- Observations
- Contacts
- Semi-structured Interviews
- Field Visits

- Discussions,
- Story telling,
- Experience sharing
- Presentations

- Open discussions on the issues such as the use value of forests as considered by the community members (direct, indirect, non-tangible, ethical, cultural and aesthetic values)
- Problem Analysis Charts
- Resource Mapping
- Identification of Utilization patterns
- Access to resource ranking
- Benefits sharing (Issues of SRA, Compensations)

Photo Exhibition

- Benefits Sharing
- Stakeholder Collaboration
- Sustainable Forest Management Options
- Role of FFCs in SFRM
- Working together -Breaking down the barriers
- Gender Division of Roles and division of tasks
- Mobilizing for change

Stage One

Stage Two

Stage Three

Stage Four

Stage Five

Final Stage
Transfer of Communication Skills from DFLRI (Denmark) to LSFRI "Silava" (Latvia) and Involvement of New Partners from Baltic States into Nordic Forest Extension Network

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Abstract
Nearly 50% of Latvia total land area is covered by forest. This forest secures a high level of biodiversity. Extensive forest legislation is in place. However, there is a lack of extension of knowledge on forest matter to forest practice and policy making. Scientific advice should play a significant role in promoting good forest management practices that are environmentally friendly and socio-economic well-balanced. In the case of Latvia, there is a clear need for considering new ways to improve this link to ensure the viability and high quality of the Latvian forests and the sustainable management. In this paper we suggest and critically discuss new ways in which the gap between forest science, policy making and practice can be bridged – using an ongoing Danish /Latvian project model as a case for working towards better transfer of scientifically based knowledge into forestry. We examine the current state of affairs with regard to sustaining a forest science base in Latvia, following drastic changes in policy and economy after the Declaration of independence in 1990, where the forest research environment was heavily reduced. The importance of involvement in professional forest extension networks is stressed. Suggestions are given as how to improve communication skills in forest research institutions.

Key words: extension, communication, Denmark, forestry, Latvia

Introduction
Latvian forests cover nearly half of the total land area, and the forests generally possess a high structural variety – securing high levels of biodiversity. Moreover, the forests, of which most are semi-natural, are home to several species, which are endangered or threatened in Europe or in a global context. Although extensive forest legislation is in place there are no specific provisions concerning the involvement of the public in decision-making, and the current science financing system lacks initiatives to promote the extension of practical knowledge generated by research and use of this knowledge within policy making (Nielsen, 2002). Moreover, in spite of a high level of the environmental and silvicultural sciences in countries in transition, such as Latvia, it is also recognized that the implementation at more practical levels and into decision-making systems is insufficient (Lazdins, 2002).
Latvia regained real independence in 1991 and a fundamental transformation of the political system implied a radical change in the institutional set-up in all sectors and the changes are still ongoing. In January 2000, the State forest sector underwent crucial administrative reorganisation, when, instead of the former integrated State Forest Service, two new major units were established and subordinated to the Ministry of Agriculture: LVM (the State Joint Stock Company) and SFS (The State Forest Service). As a result, regulatory, supervisory, and normative functions of state authority were separated from managing and ownership of state forests. LVM carries out the ownership function, i.e. it governs and manages State forest property and ensures preservation and enhancement of its value. Eight regional units act independently and they are the major venue to disseminate research results to practice with regard to State forestry.

The primary mission of the SFS is to ensure implementation of the supervisory and support functions in accordance with the Latvian forest policy. One of the primary tasks is to ensure enforcement of legislation in all forests regardless of ownership type. Today one of important functions of the State Forest Service is also forestry extension.

The institutional bodies in the private forestry are still in permanent readjustment. A rapid development of structures has been observed during the last year – before and after entering in EU. FOA (The Association of Latvian Forest Owners) presently unifies following structures: one cooperative society for development of business activities in all territory of Latvia and 21 local forest owners’ unions. One of the primary tasks of FOA is to provide and develop forestry education and consulting for the members. The improvement of consulting services is one the most urgent issues at present and FOA management recognises the high need for development of integrated services, where up-to-date scientific knowledge is used (Oslejs, Albertina, 2003). The transition to market economy related environmental concerns and the emergence of numerous inexperienced forest owners (>155 000 forest holdings) after 1991 create acute need for improved knowledge at the level of practical forest management.

Environmental and silvicultural sciences are at a very high level in Latvia but the implementation at more practical levels is insufficient and weak. This observation applies to the Latvian forest sector, where the Latvian State Forestry Research Institute “Silava” (SILAVA) is the only institution, whose primary mission is to conduct forest research. The transition to market economy has brought about big challenges for the forest sector in general and has led to a changed role of forest research in particular. Scientific advice should play a significant role in promoting environmentally friendly practices in private forestry, implementing environmentally and socio-economic balanced forest management.

The Third Ministerial Conference on the Protection of Forest in Europe (Lisbon, 1998) focused on the implementation of sustainable forest management in practice, which was confirmed by the adoption of the resolution on Pan-European Criteria, Indicators and Operational Level Guidelines for Sustainable Forest Management. The resolution provides, among other things, indicators for forest research and education and for public awareness. The outline of these concept areas unambiguously points towards the importance of forest research and appropriate extension of research based knowledge when contributing to sustainable forest management practices.
The need for readily understandable and accessible information based on reliable research results and development of an appropriate extension service challenge SILAVA for a number of reasons. During the Soviet period, little attention was given to the dissemination of research results. Consequently, there is little know-how and experience on how to communicate research to practice, and how to feed into the knowledge-based policy making. SILAVA currently faces stringent monetary constraints, which implies that priority is given for maintaining the previous extent and forms of research, while such an important question as the “appropriate” links between research, practice, and policy making do not receive sufficient weight. A DANCEE (Danish Cooperation for Environment in Eastern Europe) supported project undertaken by the Centre for Forest, Landscape and Planning, DFLRI, based in Denmark, and the Latvian counterpart, the Latvian State Forestry Research Institute “Silava” to enhance the use of scientific results in practice and decision-making is being carried out in the period 2001 to 2005.

In this paper we use the experiences and some of the results from this project to try to identify the needs and interests of forest stakeholders using forest science based knowledge and look at how to improve communication skills, partly through participation in regional extension network. This is done through a characterisation and analysis of the Latvian forest situation, the institutional capacity present and the expectations of the stakeholders. The stakeholders include forest advisors in private organisations, state agencies, policy departments and trading and management bodies. This analysis enables us to discuss new ways in which to make a better interface between forest science on the one hand and forest practice and policy making on the other hand, in a country in transition, and a country that possesses valuable forest assets.

**Gap between forest science, and forest practice and policy**

Forests cover 46 % of the total land area in Latvia, and forestry and the forest related sector is one of the most important sectors both economically and socially. Last year the forest sector provided about 14 % of the GNP and forest products form more than 43 % of the total export. Timber supply from state forests cannot meet the growing needs of the industry for raw materials and the private forest sector becomes increasingly important as a supplier in market.

At the same time, most Latvian forests are natural or semi-natural, i.e. they are regenerated naturally, and are dominated by spruce, pine or birch in single-species or mixed stands. An evidence for the environmentally high standard of forest management is the fact that many valuable forest types can be found in Latvia, while the variety of habitats is considerably less diverse in the forests at the Western shoreline of the Baltic Sea, where silvicultural practices have been more intensive.

What could be interpreted as a result of the 45-year period of Soviet leadership, the traditions of forest management practices were partly lost. After the declaration of independence it was necessary not only to re-establish the proprietary rights but also the forest management traditions. Some of the inherent faults of the commercially oriented forest management practices can be observed in Latvian forestry. For example, heavy logging machinery has often had negative environmental impact on harvesting sites. Forestry practitioners still...
often consider thorough removals of dead wood to be a feature of ‘good’ silvicultural practice instead of looking at the aspect of the coarse woody debris as a habitat for many species of micro-fauna and flora.

These negative side-effects is pronounced in connection with the transition and the ensuing extensive forest privatisation that has taken place since 1991 with private forests making up approximately one half of the total forest area. The private forest owners have become new actors in the forest sector; yet they lack the skills and experience in forest management, which is further aggravated by the small average size of forest holdings (about 10 ha) and lack of co-operative structures in the private forestry. There are 26 regions in Latvia where the proportion of private owned forests differs greatly. The number of private forest owners and also the size of an average forest holding are variable (Oslejs, 2002). Characteristics of forest holdings together with the overall socio-economic conditions in a particular region as well as the influence of the forest industry determine privatisation processes and forest management tendencies. The distribution of private forest holdings by size is shown in Figure 1.

According to the goals defined by the Latvian Forest Policy the development of the private forest sector is an essential condition for the overall development of the national economy and the preservation and maintenance of natural resources. The development tendencies in the private forest sector indicate that management of private forests has not been done in compliance with the objectives of the Forest Policy – the principles of sustainable management have not been maintained.

Nevertheless, comprehensive legislation on forestry is in place. The Forest Law entered into force in March 2000 and replaced the previous main statute, the Law on Forests Use and Management (1994). The new law lays down stricter conditions for felling than previously existing legislation and also envisages activities for forestry development. The Inventory system was revised (demonopolised and privatised). A concept for the reorganisation of the State institutional structures for the forest sector was also elaborated in 2000. There are several important subordinated statutes elaborated to specify the Forest Law.

Apparently, forest legislation takes an important position in the environmental legal system. It is connected with the land and planning legislation, but also with nature conservancy legislation, which sometimes imposes more strict requirements, especially in protected areas. However, there are no specific provisions concerning the involvement of the public in the decision-making, e.g. to safeguard nature conservation interests. Similarly, the current science financing system lacks initiatives to promote extension of practical knowledge generated by research.

Considering that successful implementation of the Forest Policy will be influenced by the high number of private forest owners and their attitude to various policy instruments, the Latvian state has paid greater attention to education and extension services for private forest owners. The extension and education services offered to private forest owners has become crucial in Latvia after changes in the Forest Law (in force since 2001), as well as due to the adoption of the requirements of European Union. Until year 2001 several recommendations of forest management had compulsory status and a legal liability for disobeying was in force. Today the Forest Law
determines only the main goals of forestry, but forest management is up to the private forest owners themselves. Changes in Forest Law coincide with Forest Policy principles and objectives to reduce the state regulation of management activities.

Thus there is a gap between forest science and forest practice and policy making because of a lack of tradition of making the forest science based knowledge available to forest practice, and because there is a new situation in Latvia, with new forest laws, many private forest owners, a state forest service which has been altered. The question is how this situation can be brought forward to gain a better interface between forest science and forest practice and policy making.

**Efforts to bridge the gap – by institutional building**

Since Declaration of independence in 1990, the international assistance to the country’s environmental sector gradually gained impetus and part of it has been related to the forest sector. The so-called H3 database was established to implement the H3 resolution of the second Ministerial Conference on the Protection of Forest in Europe. The database concerns forestry assistance to countries in transition (Csoka, 1997) and currently includes 36 forestry related projects with the beneficiary being Latvia, even though the database is far from being complete (Brukas et al. 2000). The projects highly vary according to their scope and contents; however, prevailing subjects are the development of nature conservation and protection systems, education and training of staff at selected institutions, development of education and information networks.

The beginning of the forest science in Latvia goes back to the 19th century. It was being formed under influence of the German and Russian school traditions. As far as not all references were good for the local climatic and geographic conditions, the need in a relevant national research institution arose. During the First period of Latvian independence (1922-1940), scientific research was carried out in the Forest Management Department of the Faculty of Agriculture of the Latvian University as well as in the Forest Research Station (after 1928). Emphasis in research was on the settlement of the then most important practical problems - afforestation of infertile and sandy lands, felling area reclamation, contribution to the natural restoration, rational preparation of timber, and so on.

In 1946, the Institute of Forestry Problems was established, engaging 38 research officers and 15 technologists who carried out studies in the forest biology and forest management, forest working, forestry and forest taxation, wood chemistry and woodworking. During its 58-year history, the Institute came through a number of reorganizations, operating at special blast in the status of the Research and Production Association “Silava” (ZRA SILAVA) (1976-1991) when the Scientific Research Institute of Forestry Problems, Design and Engineering Research Organization, Specialized Design Office, Experimental Forestry Engineering Works, Forest Research Station "Kalsnava" and Computation Centre were pooled into a united complex. Hundreds of researchers were engaged in the research operations at that time.
However, along with the restoration of the Latvian state independence in 1991, drastic changes in the policy and economy crushed down the structures created by the socialism, also ZRA SILAVA. Drastic reductions in staff and funding took place.

Yet today, although at a reduced level compared to the period 20 years ago, SILAVA is the main centre of forest science in Latvia, performing research on forest ecosystems and their components; as well as working out recommendations for sustainable forest management and a rational and effective utilization of forest resources and forest products. The extension service in SILAVA at the beginning stage: Just like in other Latvian research and education institutions SILAVA does not enjoy any stable financial support from the state budget or forestry companies and organizations.

However, there is a common agreement that forest research should play a significant role in the forestry extension. Research at SILAVA covers a broad range of subjects from preservation of forest gene resources over models for sustainable silvicultural practices to forest valuation and general issues of forest policy. Improved dissemination of research results is a necessary condition for enhancing positive impacts of forest science on forest management practices, especially in terms of environmental and conservation-related issues. Thanks to Danish/Latvian project, Information unit has been created in SILAVA and the extension work has been started.

Stakeholder expectations to science-based forest management and policy making
A deliberate stakeholder analysis has been carried out in the frame of the project since outreach to the appropriate target groups and establishment of proper institutional/informational networks is considered to be crucial for retrieving a better interface between forest science and practice as well as policy making. A joint working group of Latvian and Danish experts began by listing the most relevant stakeholders and analysed their strengths, weaknesses, and interests in an extension service at SILAVA. This allowed addressing the following crucial questions: How will the stakeholders influence the making of a genuine extension unit? How can such a unit take advantage of the stakeholders? What can the unit do for the stakeholders? Finally, the relative importance of each stakeholder was evaluated.

The most straightforward evidence for success of the project will be an efficiently working extension service at SILAVA. Its efficiency will be indicated by:

- the level of awareness of the existence of the service among the appropriate target groups
- the stakeholders’ judgement on the quality of the service.

The analysis showed that Latvian Ministry of Environment, a number of other organisations showed a positive (although highly varying) interest in the establishment of a proper extension unit at SILAVA (with a potential significant contribution from the Forestry Faculty at the Latvian University of Agriculture). The main target organisations of the dissemination were shown to be the State Forest Service (SFS), the State Joint Stock Company (LVM), Latvian Forest Owners Association (FOA), The Latvian Agricultural and Training Centre (LAAC) as well as decision-makers from within relevant ministries and public agencies. Other target groups
could also be considered, for example the wood processing industry and nurseries. A comprehensive
survey was carried out to reveal the needs and interests of these target groups in relation to forest science based
information access.

The SFS has 26 regional offices. In each of these offices an extension officer is responsible for different aspects
associated with an extension service e.g. advice and seminars for private forest owners. Most advisors had a
higher education in forestry. All of them had computers and access to the Internet. A high proportion of the
advisors spent about 5 hours a month updating their knowledge by reading, by Internet or other sources.
Seminars and professional magazines were by far the most important sources of information. Almost all of the
advisors had knowledge of SILAVA.

LVM organizes the management of the forest owned by the state and consists of 10 regional units and 116 local
units. LVM had no particular consulting unit. Although LVM did not provide advice, the company employed
highly educated specialists in different fields of forestry. These specialists were responsible for compiling
internal instructions that are used by the forestry officers. The staff also participated in seminars, and often
specialists from SILAVA were invited to provide knowledge and experience. The specialists seated at LVM had
access to both computers and the Internet.

FOA is an association of private forest owners. The organization promotes forest management and trade timber
and forest products and offers advice and extension services. FOA had contracts with 42 advisors. 40,000 private
forest owners were passive members of the association and 960 private forest owners were active members that
seek advice and are paying for services. Two thirds of the advisors at FOA had a higher education in forestry and
77% of the advisors had access to a computer. Only 46% had access to the Internet. Most of the advisors spent
about 5 hours a month updating their knowledge mainly by reading professional magazines and attending
seminars. 15% of the advisors had no knowledge of SILAVA and half of the advisors very seldom used
information prepared by SILAVA.

LAAC is a training and advisory organization for farmers and rural entrepreneurs. More than 20,000 farmers
used their services. Their main activities were focused on agriculture but also offered advice on afforestation of
agricultural lands. 87% of the advisors at LAAC had a higher education, but none of them had a special
education in forestry. All advisors had access to computers and the Internet. The time that the advisors used for
updating their knowledge varied greatly and the same applied to the sources of their updating. Part of this may
be due to the fact that only few persons answered the questionnaire. The LAAC advisors showed very limited
knowledge about SILAVA and consequently seldom used information produced by SILAVA.

Decision-makers are, in this context, politicians and officials who hold a position in the Latvian society where
they for instance grant money for research (for example the Forest Development Fund), write forest policies
based on their knowledge of forestry or constitute an administrative, legislative unit. Most government officials
and politicians had access to the Internet and were accustomed to using the Internet as a source of information.
Furthermore they were likely to use newspapers and the media as a source of information. They may also read professional magazines. Most of them expressed limited time and interest in reading scientific articles or reports.

SILAVA could play an important role as provider of research based information that is necessary for their decisions. In this role it is vital that constant updating happens, and contacts within forest extension in other countries are established.

**Extension networking**

DFLRI has been involved in creating a strong network of communicators from the Nordic countries: “Nordic Network for Communication of Research Results”. It was therefore natural to involve SILAVA in this network.

The network is sponsored by Nordic Forest Research Co-operation Committee (SNS). The network has an objective to increase the efficiency in communication of forest research results in the Nordic countries and the Baltic countries. One of the ways to do this is to maintain a strong network among communication specialists employed in forest research organisations. Through the network the participants will improve their professional competence by exchange of ideas and know-how and advice and support to each other.

The network hosts an annual seminar where communicators from forest research organisations meet and exchange experience and gains new knowledge. In year 2003 the conference was held at SILAVA and the programme was mainly related to the situation in the Baltic countries regarding forestry extension and the forest economy. A workshop was performed with the aim of providing useful input to how the extension work could be improved at SILAVA. Approximately 20 participants from the Nordic countries, Latvia and Lithuania participated in the seminar. Furthermore an American expert in extension was invited to provide useful inspiration from The US and an expert was invited to provide insight in the Baltic economy.

In year 2004 a 2-day seminar in Norway is planned in October. The programme will include a workshop, where the participants are able to exchange experience and knowledge in their field of communication and a presentation on how to disseminate research results to decision-makers. Communication specialists from other fields will also be invited to present actual cases, e.g. Internet development, funding of extension activities.

**Conclusions**

There are promising signs in Latvia that the link between forest science and practice and policy making is on its way to be strengthened much to the benefit of the forest stakeholders as well as the state of the forest and the benefits accruing from it.

The important things, which a project of the type described in this paper, should do to help in the process of improving the communication skills are:
(1) Tangible products. Readily available information for forest advisors, managers, decision makers in the political system as well as forest owners in the form of e.g. condensed fact sheets, targeted seminars, guide field trips can help forest stakeholders to realize their needs and what is possible to get through science based knowledge.

(2) Institutional building. Strengthening the capacity of the forest science institutions to handle dissemination of knowledge beyond academia, preparing research scientists to consider the forest stakeholder’s knowledge-related needs and enter into a dialogue with forest stakeholders is a good starting point, and finally

(3) Creating awareness. By actively involving forest stakeholders, giving them a chance to give feedback on specific products and the process of improving the links between forest science and practice and policy making, and by encouraging them to articulate their needs which can be remedied (partly) by science based knowledge, an awareness about how the interface between forest science and practice and policy making can function, is raised.
Acknowledgements
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References

Figure 1. Distribution of forest holdings of private forest owners by size.
Integration of Biodiversity Conservation into Forest Management Services in Finland: Policy implications

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Abstract

In a country with a long history of policy guidance in forestry, the multiple signals from the society, markets and global forest policy pose a new set of challenges to those controlling and guiding the non-industrial private forestry (NIPF) services scene. Finland has a long record of state-funded planning and extension to support national timber production goals. This institutionalized system is now facing the diversifying expectations and an increasingly complex set of actors. To be able to design policies in this framework, the policy-makers need to understand, in addition to the prevailing institutions, the potential for change among those actors who translate the vertical and horizontal messages into management practices.

Biological diversity is an interesting new, but already stabilized, objective that all actors managing NIPF have to deal with. Their responses and strategies in interpreting the concept and managing the one forest resource for multiple purposes can vary from business-as-usual to ambition and innovation in terms of biodiversity competence development.

We have made a study with public, private and collective forest service providers in the Häme-Uusimaa region in Southern Finland. Based on the structured and semi-structured interview data, we have identified a set of strategies for dealing with biodiversity conservation pressure and analysed the service providers' self-assessment of organisation performance in biodiversity conservation and change in best management practices. The strategies differ in terms of investment in internal and external competencies. We will report on the distribution on different strategies and their relationship with biodiversity performance. Based on our findings, we discuss policy implications in terms of forestry extension guidance.

Key words: Biodiversity, service providers, competency, capability, forest policy, non-industrial private forestry.

1. Introduction

In the era of ecological modernisation and liberalisation of governance there is demand for institutional innovations that will stimulate public and private investment in public goods, such as clean air, erosion control or biological diversity. While the governance systems seek incentives to reach the socially desirable outcomes, these incentives cannot be designed without understanding of what lies between incentives and action. Formal guidance, such as laws and regulations, public organisations and budgetary allocations, are only one part of the institutional context that influences activities at the operational level. Informal practices (habits, routines) and norms, which are interconnected with the cognitive resources of the actors, have a place in the institutional framework that influences the translation of the social demands into material practices. In this paper we analyse the practices and resources that lie behind actors’ responses to the social demand for biodiversity conservation.

The demands for biodiversity conservation rise in multiple forms. Consumers refuse to buy paper from unsustainably managed forests, urban people value access and at least existence of pristine nature highly, ecologists warn against destroying last habitats of groups of species, and international and national policies

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acknowledge biodiversity as a basis for ecological integrity. The broad set of demands pose incentives for actors engaged in natural resource management to alter their practices. Some of the actors do the minimum to keep up their reputation and legitimacy while others compete with their conservation ideas and functions.

To respond to incentives, actors need capabilities; in the case of biodiversity they need conservation capabilities (Wolf and Primmer, manuscript). For us, the question of learning is central to the development of new practices. Actors will innovate and develop their practices with the structural and cognitive resources to which they have access. These resources are utilized in the context where both formal and informal constraints occur.

In this paper we extend our earlier analysis (Wolf and Primmer, manuscript) and investigate the processes through which organisations pursue natural resource conserving innovations – i.e., allocate resources to create capabilities that allow them to produce new goods and services, or produce goods and services in new ways so as to enhance environmental quality. We review the conceptual arguments made in this earlier paper in order to structure an empirical analysis of investments Finnish forest management service providers have made to address demand for biodiversity conservation. We evaluate evidence of investment in new capabilities, which we view as essential to creation of *multifunctional, working landscape*, and compare these investments with signals of change in conservation practices. Results support policy design, in the broad sense of governance.

We believe that to respond to incentives, organisations must make investments in i) people, ii) organisational routines and procedures, and/or iii) linkages with external sources of expertise to access, adapt and develop new ways of managing natural resources. To evaluate this claim, we analyse biodiversity conservation competencies of forest management organisations in south-central Finland, an area subject to recently heightened social demand for environmental and ecological services from forests. We assess the nature and intensity of actors' investments in conservation competencies as a response to demand for greening of forestry and associated formal and informal institutional changes.

We pose the following questions:
1. What is the current status of biodiversity conservation competence among Finnish forestry service providing actors, and what form do investments in competencies take?
2. How do the different investment patterns relate to development of operational biodiversity conservation?
3. How do Finnish forestry service providers view the development of their operational conservation practices?
4. What lessons can we draw for policy?

We first derive our competence-based approach to biodiversity conservation and describe the Finnish forest policy, institutions and organisations context. Then, we present the empirical case of forest service providers in Häme-Uusimaa region. Research and policy implications are discussed in the final section.

2. Competencies-based approach to practices

The translation of biodiversity objectives into practices is dependent on the shared rules, norms and strategies (Crawford and Ostrom 1995). They are reflected in mechanisms of knowledge production, communication, and innovation. Creation of new knowledge and capabilities among local actors is a process through which the operational forest management develops. The evolving skills, knowledge, and resources are accessed through coordination of a range of heterogeneous actors.

Locally adapted knowledge, practices, personnel, and routines among forestry professional organisations and individuals play a key role in biodiversity conservation. Our empirical analysis is focused on analysing patterns of investment in conservation competencies that underlie organisational capability to innovate so as to biodiversity conservation among these front-line actors, and comparing this with actually evolving practices that these actors follow.

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1 This section is based on concepts elaborated by Wolf and Primmer (manuscript).
2 We will limit our analysis here to investment in competencies and material practices, and will not elaborate on the informal practices constraining and enhancing the decisions of economic actors that have been addressed by e.g. transaction cost economists and social psychologists.
Competencies are defined as building blocks that combine in various ways to support capabilities. Having a biologist on staff to consult with foresters or adhering to an environmental management system are examples of organisational resources that can contribute to a capability to integrate biodiversity conservation and forest management. In turn, capabilities underlie shape organisations’ production behaviours. On this basis, we apply the logic of the competency based view of the firm (described by Hodgson 1999) across the organisational spectrum to investigate which actors in networks engaging biodiversity conservation in Finnish forests are investing in, and successfully applying their competencies.

We define two general types of competencies; internal competencies and external competencies. We recognize two types of internal competencies; human capital and organisational routines. The former is embodied, while the latter accrues to the organisation rather than any specific individual. External competency takes the form of status in various networks. Through linkages with external expertise and information, actors are able to access know-how other organisations thereby enhancing their own capabilities.

Before more elaborated description of our analysis of the case of forest management service providers' competencies and best management practices in Southern Finland, we describe the context where this set of actors operates.

3. Forest management in Finland

Finnish forests cover 23 million hectares, or three quarters of Finland's total land area. Almost all productive forest land is managed for commercial timber production, 61% of which is owned by 600,000 private forest (NIPF) owners, who produce almost 90% of the domestic timber (Finnish 2002, Karppinen et al. 2002). The forest sector makes a significant contribution to welfare in Finland, as forestry and forest industry count for 7.5 per cent of the country's GNP, ranging up to 30% of the regional product. The forest industry accounted for 26% of Finland's annual exports in 2001. Forestry and forest industry employ 4% out of the total labour force (Finnish 2002). In addition to the economic dependence, Finns are socially and culturally attached to the forest landscape and the varied recreational and aesthetic opportunities the forests provide (e.g. Pouta and Sievänen 2001).

While the socio-economic significance of forestry in Finland has historically been well-recognized, the role of forests in maintaining ecological integrity has gained attention recently. Forests regulate water quality and quantity, control biogeochemical processes and host over 40% of Finland's threatened and endangered species (Suomen..., 2001). Due to the very small proportion of forests being preserved as publicly owned parks and protected areas (ranging from 1,1% in Southern Finland to 17 % in Northern Finland), there is intensive interest in strategies to generate natural resource conservation benefits on privately owned forestland.

Finnish forest policy has been explicitly updated to address evolving social priorities, economic opportunities and scientific understanding related to biodiversity conservation. The Forest Act of 1996 formally elevated biodiversity conservation to a parallel status with sustainable timber production. In terms of regulation and investment, this commitment to conservation takes the form of designation, mapping and preservation of “small habitats of special ecological significance” in all commercially managed forests. Protected status, or prohibition
to change, also applies to those areas set aside according to the Nature Conservation Act (1996). The National Forest Programme 2010, issued in 1999, reinforced these commitments by stimulating the Southern Finland Forest Biodiversity Programme (Etelä-Suomen... 2002). This recent initiative introduced new policy instruments for biodiversity protection, including competitive tendering and nature values trading.

In addition to changes in laws governing forestry, establishment of markets for environmental services, and investments in community-based conservation initiatives, there has been a national commitment to update technical practices of forestry professionals. Over the last five years, almost 5000 forestry professionals have received formal biodiversity conservation training through participation in a so-called Nature Management Degree (Source: Forestry Development Centre Tapio). All NIPF management operations are subject to recommended technical guidelines produced by the Forestry Development Centre Tapio. Technical practices are also mandated by the forest certification system applied to close to 100% of Finnish NIPF forests, the Forest Certification Finland (FFCS 1999). Similarly, the technical practices recommended by the Finnish professional apparatus are roughly equivalent to those required by the environmental management systems adopted by the large industrial forest owners in Finland.

Historically, extension and planning services have been provided by the state, and also today public agencies provide technical inputs to the front-line service providers that interact directly with NIPF landowners and/or make management decisions for them. Planning and extension services are provided by Regional Forestry Centres, a network of 13 public agencies dedicated to forest management. Currently, Forestry Centres draft forest management plans for all Finnish forests. In 2002, the national budget included 16.5 million EUR for regional forestry planning and 7.4 million EUR for extension programming within Forestry Centres (Valtion... 2002). Regional Environment Centres have responsibility for providing maps to support environmental planning and conservation and conduct the monitoring to ensure compliance with environmental laws.

Coordinated more or less with the Regional Forestry Centres, Local Forest Management Associations (LFMAs) have the central role in providing forestry extension, production and marketing services to NIPF owners. These organisations have a long history and a legal status originally defined in the 1950 Act on Forest Management Associations (1998). The LFMAs receive a tax-like forest management fee collected from NIPF owners in their territory, unless a forest owner has organised management services through some other service provider and applied for an exemption. The role of these centralized organisations, the public agencies and the forest management associations, is dominant in forestry extension. In the 1990's, four out of five NIPF owners had been in direct contact (face-to-face or over phone) with Regional Forestry Centres or LFMAs (Karppinen et al. 2002). However, the Finnish model of technical assistance to rural landowners is changing. Service markets are opening up, and new technical vendors are seeking access to NIPF clients (Kärhä et al. 2000). The major wood purchasing and processing firms have increased their extension capabilities in an effort to provide forest owners with production planning and technical services. Concentration and competition in the processing industry has put pressure on procurement functions. Additionally, forest entrepreneurs, or consulting foresters, are a new, growing class of service providers (Koistinen 1999, Kärhä et al. 2000).

4. Methods

4.1. Structured interviews

To evaluate the status and development of organisational capabilities to integrate biodiversity conservation into forest management we conducted a survey of all relevant service providers in a single Forestry Centre region. We selected the Häme-Uusimaa region in southern Finland because this is an area of rich forests and intensive forest management (the area has highest timber volume and growth rate out of all forestry centre regions in Finland (Finnish 2003)). The area is ecologically diverse, and yet has low proportion of the area (0.7%) conserved (Metsien... 2000, Finnish 2003).

During the summer of 2003 we made a set of 16 structured interviews with service providers. See Table 1 for a description of forest actors and their service functions included in our study. In identifying respondents to represent these variously scaled organisations, we sought out the individuals most knowledgeable about local biodiversity conservation service capabilities of the organisation in question. In the case of smaller organisations and public agencies, we generally interviewed the owner or local manager. In the case of multi-divisional private firms, we were referred to corporate headquarters where we interviewed executives responsible for environmental management. All respondents, except one were foresters by training and three quarters were male.
Table 1. Respondent organisations.

<table>
<thead>
<tr>
<th>Respondent type</th>
<th>Service functions</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public agencies</td>
<td>Collection and analysis of data on status of forests and biodiversity; planning, extension, consultation, best management practices development, training, guidelines, policy development</td>
<td>4</td>
</tr>
<tr>
<td>Commercial firms</td>
<td>Forestry operations (harvesting, planting, tending, etc.), planning, consultation, timber purchases</td>
<td>8</td>
</tr>
<tr>
<td>LFMA(^3)</td>
<td>Forestry operations (harvesting, planting, tending, etc.), planning, consultation, training</td>
<td>3</td>
</tr>
<tr>
<td>Environmental NGO</td>
<td>Policy development, initiating and pressuring policy agenda, consultation</td>
<td>1</td>
</tr>
</tbody>
</table>

Respondents, total 16

The respondents were provided with a list of topics covered in the interview in advance of our visit. The interviews were structured through use of a questionnaire. Data reflect a combination of responses to close ended questions and narrative statements. Fourteen of the interviews were conducted face to face and, two over the telephone. Interviews lasted from one to three hours.

The interviews were organised to 1) produce an accounting of actors’ service competencies related to biodiversity conservation and 2) to identify the status of biodiversity conservation in the organisations’ developmental strategies (i.e., patterns of investment). Corresponding with our theoretical development of the concept of organisational competence, questions were aimed at producing an accounting of human capital (formal education, professional training and work experience), organisational routines and quality systems (management routines and systems as well as organisational investments in employee training), and linkages with external sources of expertise.

4.2. Analysis of competencies

Consistent with the division into 1) human capital and 2) organisational routines as internal competencies, as well as 3) status in networks, we analysed the distribution of these investments among our sample of service providers. A summary of the constructed competency scores as they demonstrated in our data set is provided in Table 2\(^i\). Under the term Human capital, we analysed the employees’ education, training and experience. We included employees most directly responsible for forest management decision-making. The number of employees included in the analysis per organisation depended on the size and scope of the respondent’s organisation. Smaller organisations engaged only one employee. In the case of large organisations we accounted for human capital resources considering the three most directly involved individuals.

Education was indicated by the employee’s formal degree; training by the number of weeks of biodiversity related training during the last 5 years; and relevant work experience was expressed in years. We captured organisational competencies through assessment of organisational routines, practices, infrastructure and commitments that support individuals’ biodiversity conservation related behaviours and intra-organisational coordination. Here, we analysed three types of organisational management procedures: 1) In-house management procedures, illustrating managerial practices that have been systematized through internal processes 2) Standardized management procedures, which have been developed externally, and are available for the entire population of organisations, and 3) Externally audited environmental management systems. Additionally, we analysed the number of weeks of collective training arranged by the organisation during the last 5 years. Again these are described in detail in Table 2\(^i\). Each of these scores was transformed to a value between zero and one. This transformation allowed each variable to potentially exercise equal weight in analysing and comparing competencies.

External scores reflect the use of external competencies by the range and depth of substantive interaction between members of the respondent organisation and external organisations contributing information, expertise and resources that support biodiversity conservation. Inter-organisational linkages that contribute to capabilities range from of one-way communication receiving letters from a ministry or reading research bulletins posted to the internet to more intensive interaction such as consultation and workforce training. Each respondent was asked to describe the extent to which their biodiversity conservation and relevant forest management activities were supported by contact with sixteen potential service providers. The addressed external service providers included input suppliers, clients, like organisations, regulatory agencies, scientific organisations, media, media, media.

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3 Local Forest Management Association
professional associations, etc. Respondents reported the frequency of external input and the value of that input. Table 2 displays the score construction.

We aggregated the scores through averaging the scores in the three groups 1) Human capital score (employee education, training and experience), 2) Organisation score (in-house management procedures, standardized management procedures, externally audited EMS, and organisational training), and 3) External score (frequency of external input use, value of external input). Finally, we combined the human capital and organisation score to assess the relationship between this internal score and the external score.

4.3. Change in biodiversity practices

As a background variable of the actors, we used biodiversity workers' proportion of all service workers. We addressed the development of biodiversity conservation best management practices that the front-line service providing actors follow, or the more centrally positioned organisations shape and monitor, through questions relating to leaving coarse woody debris, standing live trees, buffer zones, and significant habitats. All respondents did not answer these questions (the N= was 11-12), as some felt they were too distanced from the operations, or had been operating for too short a time.

The respondents were asked what they based these decisions on in their own operations, or in operations of those whom they consult or monitor, and whether they exceed a minimum law level. They also reflected on how these operations had changed, and how they would change. These questions relating to 1) practice five years in the past compared to now (more, same, less) and 2) five years in the future compared to now (less, same, more) were transformed into continuous variables $0-1$ so that 1 signified that all practices improve(d), and 0 that all practices degrade(d) during the time frame. With the help of these variables depicting trend (degree of change) we analyzed the evolution of different management practices, and further compared these with the competency scores. The variable construction is reported in Table 2.

Additionally, we reflected against the actors' self-assessment of their biodiversity conservation capabilities through a likert-scale question. We asked them to rate the degree to which the statement "Our organisation has human personnel, systems, procedures and resources through which we can effectively protect biodiversity" was true. The same question was made generally, about the entire population of service providers in Finland.

5. Results

5.1. Investment in competencies

The distribution of the various competencies we analysed, illustrated in Fig. 2., indicate the high variance in biodiversity conservation competencies across organisations engaged in forest management, captured by our accounting procedure. The employee training and education scores displayed low variance in our data-set and employee experience varied more than education and training.

The organisational scores, particularly the management procedures developed outside the respondent organisations (standardized management procedures and externally audited), demonstrated the broadest distribution between the studied organisations. It is apparent that all organisations invest in at least some self-developed managerial procedures, while only a few apply standardized and externally audited systems.

Frequency and value of external input use scored low variance. This reflects the respondent organisations' tendency to rely on some form of external input: no organisation operates isolated from the network of information and service providers. The uniformity of the value the respondents place on external information also reiterates the dependence on external information sources: the organisations generally appreciate the information they use.
5.2. Complementation and substitution

Employee training was negatively associated with employee experience (-0.497), but organisations that train their personnel invest in in-house management procedures (0.639**). These same organisations are most strongly connected to their surrounding network of professional organisations (frequency of external input use 0.641**, value of external input 0.47**). Those organisations scoring high seem to have a strategy to absorb competencies and tailor them for their own use. Organisations with trained workers value external input rather highly (0.401), and employee education correlates with frequency of external input use (0.530*). The competency score that was most associated with other competencies, was that of the in-house developed management procedures. It was strongly correlated with other organizational scores and external input use frequency and value of external input.

Aggregating the competency scores, we found strong indication that there is substitution between human capital and organisational procedures, as there is no relationship in investment in these resources (Table 3). However, both of these internal scores, particularly organisational management investments, are related to use of external resources. This re-emphasises the earlier mentioned result that all actors are dependent on external linkages and value these connections highly.

When the human capital and organisation scores were combined, and this combined ‘internal score’ was compared with external score, we found a strong relationship between these two aggregated variables (0.687**). This finding shows that those actors who have higher internal capacity to react to demands in the society, such as that of biodiversity conservation, also have higher propensity to be able to utilize their position in professional organisational networks (Wolf and Primmer manuscript).

Table 3. Aggregated competency scores’ correlations.

<table>
<thead>
<tr>
<th></th>
<th>Human capital score</th>
<th>Organisation score</th>
<th>External score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human capital score</td>
<td>1</td>
<td>0.082</td>
<td>0.423</td>
</tr>
<tr>
<td>Organisation score</td>
<td>0.082</td>
<td>1</td>
<td>0.580(*)</td>
</tr>
<tr>
<td>External score</td>
<td>0.423</td>
<td>0.580(*)</td>
<td>1</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
5.3. Change in operational practices and self-assessment

The interviewed actors considered themselves highly capable of biodiversity conservation: all 15 respondents considered to have resources to protect biodiversity (5 agreed and 10 strongly agreed when asked: "Our organisation has human personnel, systems, procedures and resources through which we can effectively protect biodiversity"), while there was slight doubt about the general biodiversity conservation capabilities among the entire population of actors (1 disagreed, 1 neither disagreed nor agreed).

The respondents emphasized the change towards taking biodiversity into account in all their activities. Thirteen out of all sixteen respondent organisations reported that hundred percent of their service employees have biodiversity conservation tasks. All respondents meet the minimum requirements set by law, and in their verbal accounts, often highlighted the need for a broad margin on the top of the minimum requirements.

The actors reported significant development in best management practices in the past and in the future in a rather uniform manner. Most practices did not score below 0.5, which would have indicated business-as-usual (Table 4.). Leaving standing trees in the past as well as leaving coarse woody debris and buffer zones in the future showed also assessment of deteriorating development. The highest variance occurred in the past development of leaving standing trees, which was the practice that had developed the least in the past. Some respondents said that this practice had reached the peak earlier, and has found more of a balance now. The most uniform change in practices could be seen in the detecting and leaving habitats of special significance.

Taking special habitats into account was the practice that had developed the most. The actors have gained more competency to base their decisions on, and this development is foreseen to continue in the future. The respondents’ verbal justifications for this dealt mostly with increase in information and growing ability to make zero mistakes. Estimates for future development in coarse woody debris and buffer zone practices differed also among the respondents.

In some verbal accounts, reference was made to demand for fire wood as the reason for leaving less decaying wood in the forest. Generally, the development towards more ambitious practices contributing to biodiversity conservation was considered to have already taken place, and the future development of improving the practices was seen to be continuing but levelling.

Table 4. Development of best management practices over the ten years: 5 years in the past and 5 years into the future.

<table>
<thead>
<tr>
<th>Development of BMP in the past</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>coarse woody debris</td>
<td>11</td>
<td>.67</td>
<td>1.00</td>
<td>.8687</td>
<td>.11986</td>
</tr>
<tr>
<td>standing trees</td>
<td>11</td>
<td>.67</td>
<td>1.00</td>
<td>.9091</td>
<td>.15570</td>
</tr>
<tr>
<td>buffer zones</td>
<td>11</td>
<td>.33</td>
<td>1.00</td>
<td>.7879</td>
<td>.26968</td>
</tr>
<tr>
<td>habitats of special significance</td>
<td>11</td>
<td>.67</td>
<td>1.00</td>
<td>.9091</td>
<td>.15570</td>
</tr>
<tr>
<td>Development of BMP in the future</td>
<td>12</td>
<td>.58</td>
<td>1.00</td>
<td>.7500</td>
<td>.11785</td>
</tr>
<tr>
<td>coarse woody debris</td>
<td>12</td>
<td>.33</td>
<td>1.00</td>
<td>.7222</td>
<td>.19245</td>
</tr>
<tr>
<td>standing trees</td>
<td>12</td>
<td>.67</td>
<td>1.00</td>
<td>.7222</td>
<td>.12975</td>
</tr>
<tr>
<td>buffer zones</td>
<td>12</td>
<td>.33</td>
<td>1.00</td>
<td>.7222</td>
<td>.19245</td>
</tr>
<tr>
<td>habitats of special significance</td>
<td>12</td>
<td>.67</td>
<td>1.00</td>
<td>.8333</td>
<td>.17408</td>
</tr>
<tr>
<td>Development of BMP over 10 years (past and future)</td>
<td>11</td>
<td>.68</td>
<td>1.00</td>
<td>.8131</td>
<td>.09570</td>
</tr>
</tbody>
</table>
Table 5. Correlation of competence scores and development of best management practices during 10 years (5 years in the past and 5 years in the future).

<table>
<thead>
<tr>
<th>Human capital score</th>
<th>Organization score</th>
<th>External score</th>
<th>Development of BMP over 10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human capital score</td>
<td>1</td>
<td>.082</td>
<td>.423</td>
</tr>
<tr>
<td>Organization score</td>
<td>.082</td>
<td>1</td>
<td>.580(*)</td>
</tr>
<tr>
<td>External score</td>
<td>.423</td>
<td>.580(*)</td>
<td>1</td>
</tr>
<tr>
<td>Development of BMP over 10 years</td>
<td>.252</td>
<td>.519</td>
<td>.189</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

5.4. Competencies and operational practices

Having detected broad variance in different competencies among forest service providers, and having also recognized interesting substitution patterns and complementarities among these, the comparison of the different competencies and the reported development in best management practices would give us an understanding of the relationship between capabilities and propensity to change practices according to social demands.

In this comparison, organization score, which disclosed the organizational management routines, correlated with development of best management practices (0.519, Table 5.) On the other hand, human capital score and external score were not associated with best management practices.

As there were interesting patterns among the competency scores, we analyzed this relationship in more detail. Here, employee training and organizational training showed to be keys for expecting future improvement in best management practices (0.704*, 0.498). As we already learned in the competency analysis, experience was negatively correlated with employee training, and this negative association was apparent also in the best management practice development expectations (-0.430).

Standardized management procedures were associated with the overall development of best management practices. These procedures are easily accessible and are services developed at a central level, and rather closely integrated to timber production extension services. The in-house developed management procedures, which were a generally explanatory within the competencies, did not show significant relationship with best management practices development (0.388).

6. Discussion

All interviewed actors recognised biodiversity protection in their portfolio of activities, and considered it an important challenge. They valued themselves as highly capable of meeting the conservation service demand. Additionally, the different service providers reported the development in best management practices in a distinctly uniform manner. Interviews and self-assessment are a limited method in assessing actual biodiversity performance, and give only a robust picture of evolution of practices. Elaborated evaluation of biodiversity performance will require monitoring data, or at least broad-based expert assessment.

The uniformity of the detected self-assessment is contrasting with the very broad distribution in investment in biodiversity skills is apparent. Competencies group in a variety of ways, markedly showing complementarity between internal competencies and use of external input. The substitution between human capital and organizational competencies tells us about the nature of development strategies. Those who invest in people, favour individual-embedded competencies, whereas others prefer to develop systems that pertain to the organization.

Employee training, is essential for up-to-date policies and other social demands. Encouraging professionals to stay in a system of continuous professional training can prove to be a key to keep organizations in the forefront of operational practices development. This both motivates the individuals, and channels the latest scientific understanding to the organizations in an absorbable form. Employee experience seems to hinder forward-thinking updating of competencies, and can be connected to attitudes and values. Reaching this group of professionals is a major challenge for governance.
Experience counteracting biodiversity conservation innovations, together with importance of organizational practices show that there is more to the process of the organizations' propensity to respond to the expectations they face in their operational environment. In addition to further studying the relationship between competencies and action, the informal constraints setting the basis for organizations' capability development requires more attention.

7. Conclusions
We detected a phenomenon of all actors doing something towards the biodiversity, and being prepared to change their practices, but the actors vary significantly in their resources. There is a subtle but very broad environmentalisation process, where incentives accumulate around public policy and are equally available to all actors. While all actors meet the minimum standards, the full integration of environmental values and biodiversity conservation remains yet the challenge for the sector as a whole. Continuous training plays an important role in meeting this challenge.

References

Variables used in score construction, trend analysis and performance analysis

1. Human capital scores (embodied in individuals)
   Employee education: 1-3 most relevant employees' formal degree
   Employee training: 1-3 most relevant employees' number of weeks of biodiversity related training during the last 5 years
   Employee experience: 1-3 most relevant employees' relevant work experience is expressed in years (not included in human capital score, due to negative correlation with employee training (-0.497))

   Scale: 1-6 transformed to 0-1
   Scale: 0-55 transformed to 0-1
   Scale 1-35 transformed to 0-1

2. Organisation scores
   In-house procedures:
   - mission statement
   - record keeping
   - research/development
   - contractor monitoring
   - specialized tools
   - continuous improvement system
   - own quality system
   - internal audit
   - other procedures

   Scale: 0=0, yes=1
   Scale: 0-9 transformed 0-1
| Standardized management procedures: | no=0, yes=1 |
| Tapio BMP guidelines                  | Scale 0-4 transformed to 0-1 |
| Tapio monitoring                      | |
| landscape ecological planning         | |
| other standardized BMP                | |
| Externally audited environmental management system | no=0, yes=1 |
| ISO                                   | Scale 0-2 transformed to 0-1 |
| EMAS                                  | |
| (Finnish Forest Certification System – not included in the analysis) | |
| Organisational training:              | Scale 1-6 transformed to 0-1 |
| Number of weeks of collective training arranged by the organisation in the last 5 years | |

3. External scores

| Frequency of external input (16 potential sources of information) | 2=regularly, 1=occasionally, 0=never |
| Value of external input (16 potential sources of information)    | 3=extremely, 2=useful, 1=not useful |

5. Assessment of change in best management practices

| Leaving coarse woody debris (5 years in the past compared to now and 5 years in the future compared to now) | Past: 1=more, 2=equal, 3=less, Future 1=less, 2=equal, 3=more 10 years mean (past, future) Transformed to 0-1 |
| Leaving standing live trees (5 years in the past compared to now and 5 years in the future compared to now) | as above |
| Leaving buffer zones (5 years in the past compared to now and 5 years in the future compared to now) | as above |
| Leaving habitats of special significance (5 years in the past compared to now and 5 years in the future compared to now) | as above |

4. Assessment of capabilities

| Own organisation's biodiversity protection capabilities | Likert 1-5 |
| General Finnish actors' biodiversity protection capabilities | Likert 1-5 |
It is all about sharing interests

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Abstract:
In most countries with a low level of social capital\(^1\), the tradition of building organisations based on non-compulsory memberships does not exist. This is despite the fact that most farmers theoretically accept joining forces through an organisation in order to make it possible to cope with e.g. bureaucracy, corruption and middlemen. Strengthening and promotion of private forest owners and farm forest organisations is a matter of building structures where the organisation shares interests with its members and vice versa.

The need and the potential for organising farmers is huge. They are facing often-insufficient offers of extension service, virtually no reliable marketing structures and in general a lack of information.

Demands expressed as farmers willingness to pay for services are in prioritised order: A marketing organisation, extension service, representation towards authorities and lobbying for interests.

Keywords:
Shared interests, social capital, wants and needs, forestry extension

Introduction

Overall subject: Strengthening and promotion of private forest owners and farm forest organisations.

A strong organisation is an organisation that is well aware of its beneficiary’s wants and needs\(^2\). An organisation that provides solutions to satisfy the needs right away and offers to fulfil wants on special requests. An organisation where the beneficiaries have a strong feeling of ownership, hence commitment towards the organisation.

In most countries with a low level of social capital, the tradition of building organisations based on non-compulsory memberships does not exist. In the case of farmers, tree growers, forest users or new landowners in developing countries and in Eastern and Central Europe there is a widespread reluctance to join any organisation. History has shown that organisation of people much too often turned out to be a (governmental or private) driven exploitation of their human and natural resources.

Materials and methods

This paper is based on the experience of the author, who within the organisation Danish forestry Extension (DFE) has been working with forest owners associations in a number of countries in Western and Eastern Europe, former Soviet Union and the third world for more than 20 years. DFE\(^3\) was founded in 1904 as the first private Danish forest owners association focusing on providing a comprehensive extension service to typically farmers who also had a small forest. The association was established to improve the output of small forests by introducing proper silviculture and better utilisation of the products. Since 1993 DFE has been engaged in establishment and development of forest owners and tree growers associations outside Denmark.

\(^1\) Social Capital is defined as the ability in the society to cooperate, trust and network
\(^2\) Wants can be wishes and things you might be willing to pay for - just not right know. Needs are things that you are willing to pay for right away.
\(^3\) Today DFE consists of 9 local units covering all of Denmark. DFE offers its members Extension Service, marketing of their forest-based products, contracting of forest related work and supply of seedlings, fencing materials etc. Approx. 1/3 of Danish forest owners has chosen to be members of DFE.
Wants and needs

Everybody experience wants and needs and try to have them fulfilled. Most farmers theoretically accept that joining forces through an organisation makes it possible to cope with e.g. bureaucracy, corruption, middlemen etc. These matters are on the other hand not basic needs and probably not important enough for the farmers to make them overcome their fear of being part of any type of organisation. Although being able to fight bureaucracy and corruption often is a precondition for improvement of income from the sale of e.g. wood based products, it is not realised immediately as such.

More specific demands of the tree growers could be: Technical advise and training on how to manage tree growing from seed to log, quality input at competitive prices of e.g. seeds and seedlings, structures to take care of political and economical interests – capable of handling bureaucracy, public authorities and negotiations (business and others) and a powerful sales organisation able to obtain real market prices for the products.

Looking at the farmer’s willingness to pay for services they are normally in prioritised order: A marketing organisation, extension service, representation towards authorities and lobbying for interests.

A very strong driving force in all societies is the improvement of livelihood - no matter from where you have your point of entry. In strict terms expressed as rise in income. Building and strengthening of private forest owners and farm forests organisation then becomes a matter initially of offering comprehensive marketing and purchase of products at better prices than are normally obtained - generation of an additional profit big enough to be shared between the organisation and the farming households.

Shared interests

Strengthening and promotion of private forest owners and farm forest organisations is about building structures where the organisation shares interests with its members and vice versa. If something is to the benefit of the organisation it should be even more beneficial to the members utilising a particular organisational service. The member’s use of their organisation and its services should benefit it e.g. economically.

The structures implemented to deal with fulfilment of the needs must operate in a transparent way making it not only obvious that the organisation and the farmer have common interests but also showing this clearly and easy.

Marketing

In the case of marketing of products the principle of selling in commission is an obvious choice. If the organisation is allowed to deduct e.g. 10% of the price it can obtain for logs at the sawmill gate, then it is clearly in the interest of the organisation to negotiate the highest possible price. The bigger the price, the more will accordingly be left for the organisation and for the forest owner. The control measures here are the freedom of the grower to contact a middleman to get an alternative offer or try to negotiate directly with the sawmill.

The organisation will often have the benefit of organising deliveries on behalf of many small producers, hence being able to optimise logistics, thus offering the sawmill a better product. The organisation staffs are professionals, knowing how to grade and measure wood based products, hence again offering a both more uniform and well-described product.

Contracting – harvesting

In the case of e.g. logging there are at least two options for the organisation: 1) Training of forest owners or users in the right techniques and instructing them how - under the present market conditions - to optimise the economical output of the logging. If the organisation handles the sales afterwards, interest are obviously shared. 2) Supply of contracting service. The organisation organises and supervises the work of a sub-contractor. By using a sub-contractor instead of staff and machinery owned by the organisation it avoids to be put in a position where non-optimal solutions will be recommended. Again, if the organisation takes care of marketing, interests are common.

The free choice of using the organisation contributes to its effort regarding competitiveness. Payment for the organisations services of contracting should not be linked to the sale of product and has to be independent of the turnover of the operations. Fixed official rates or payment per hour assures transparency and fulfil the requirements of simplicity and control options for the farmers.
**Input to production**

A correct choice of species and provenances affects the economical output of the production positively. So does the use of quality seedlings. The organisation staffs are expected to be experts in judging this and recommending the correct choice. A very common wish from tree growers is to be provided with high quality seedlings at low prices.

Again, if interests are not to be mixed up, the organisation should consider very carefully engaging itself in running nurseries. Instead seedlings can be ordered on behalf of more farmers and using the advantage of economy of scale. This will enable the nurseries to plan their production better and the way should be paved for obtaining a good price, hence creating a profit in the form of savings, these could be shared between beneficiaries and organisation. The commission principle like in the case of selling wood-based products is a transparent and simple way to regulate profit sharing. Organisational defined quality standards for seedlings should be public known and key factors like size, top/root ratio etc. easy for the farmers to check.

**Extension service**

The advice to the tree growers on how to do the silviculture, how to treat the seedlings before planting, training in volume measurement, establishment of demonstration plots is the core product of any private forest owners and farm forest organisation. It is the basis for improvement of the livelihood of the beneficiaries. It is the organisations first and prime contact with its members. Based on the discussions with the forest owners all other activities are generated. All forest owners are interested in free or cheap advice, but most households expect and accept to pay a membership fee when joining the organisation – though expecting to receive some tangible goods as part of the membership. In developed countries this will typically be a periodical pamphlet or a magazine. Including the advisory in the membership fee “allows” the organisation to charge for extension service up front. Forest owners expect to pay membership fees and feel that they get advice nearly for free. Again interests between organisation and beneficiaries can be shared.

**Constraints - a marketing example**

Unfortunately, forestry has always been subject to massive corruption supported by complicated bureaucratic rules apparently put in place to protect the forest against its private owners or users, but in fact often making it easier to impose corruption by inter alia civil servants.

A typical scenario from the third world when it comes to marketing of valuable logs grown on a privately owned farm is as follows:

First a felling permit is required from the local District Forest Office (DFO). To issue this permit a “service fee” is required by the DFO. Forest Act and bylaws says noting about service fees and the DFO is not willing do describe what kind of services one can expect for the fee nor issue an invoice. If the fee is not paid, it will typically take a long time to get the permit (a standard form), but only if it is constantly dunned for.

Secondly a transportation permit for the logs is needed - same procedure with the DFO.

Thirdly and finally a selling permit is needed – again same procedure. In other words it takes months to cut and sell a log. No farmer is willing to wait that long.

The classic solution for the farmer is to accept an offer from a middleman. He buys the trees standing at a fixed price per piece. The farmer has limited idea about the volume in terms of m³ and the quality of the logs. The middleman bribes his way through the system and the tree grower achieves a sub optimal economic output of the
production. Differences between the stumpage fee and the price at the sawmill can easily rise to 70% in disfavour of the farmer.

Playing by the rule de facto makes it impossible for the organisation in such situations to compete unless it is strong enough to “scare” the DFO.

**Strengthening of private forest owners and farm forest organisations**

The strength of an organisation depends on its size, leadership, rooting in the (local) society and economical power.

Rooting very often has to do with the feeling of ownership by the beneficiaries. This is most transparent and easily created in the form of establishment of associations. Membership-based, -controlled and -owned, led by a democratic elected body in charge of strategies, policies and together with the general assembly able to guarantee for the democratic control with the interests of the members.

Leadership in an association consists of the board and the staff. A clear share of responsibilities between these is important. Staffs have to accept and understand that they are the service providers and the board the representative of the owners, who in the end decide. Respected, independent and charismatic board members showing sincere commitment towards the association and a dedicated chairperson is together with highly skilled staff, socially and cultural well adapted to their working environment ground pillars of an association.

The more members an association has, the more successful and powerful it is considered to be.

To strengthen private forest owners and farm forest associations, it is hence necessary always to work on the basis of the wants and needs of the members. It is likewise important to be able to fulfil these to an accepted level. Recruitment of skilled staff and election of board members possessing the right qualifications is crucial. The importance of requirements to elected leadership is often overlooked. A good way of securing good candidates for recruitment is to assure that it is considered prestigious to enter the association’s board. Strong and successful associations tends to be considered prestigious to be engaged with, hence the circle is closed.

The staffs are the frontrunners of an association. The best staffs under the given circumstances are the best guarantee for an association’s possibility to gain strength.

Economic independence and power generates strength. That is why it is important that the members allow their association to earn money to build up its net capital and ability to invest. Each of the association’s fields of activities must generate an income. That goes for the extension service as well. It is often considered difficult to charge for advice, when dealing with tree growers. Staffs own attitude is often an obstacle; there is a general lack of willingness to believe that one can really charge for advice. In the case of establishing associations from scratch, it is highly recommended to charge for training and advice from day one - not necessarily at a full rate in the beginning, but some payment should be mandatory.

**Promotion of private forest owners and farm forest associations - experiences**

- Don’t expect potential members to come and look for the association at any noticeable degree. Staffs of the association have to go and look them up.
- The best promotion comes from showing results that improves livelihood of the members.
- The best ambassadors of an association are the members themselves, board members and chairperson in particular.
- Promotion work should be shared between staff and board.
- Enlistment campaigns have to be planned carefully and potential members grouped according to interests and approached differently. This also goes for the gender aspect especially in third world countries.
- The use of village motivators actually living in the villages has proved in many cases to be efficient, especially if they are recruited from the working area.
Discussion

When it comes to strengthening and promotion of private forest owners and farm forest organisations, the challenges are very much the same all over the world. In the West, in the former communist countries and in the third world. Everywhere it is a matter of creating trust. Everywhere this is best done through ensuring shared interests between association and members.

It is important to create a situation of independence for the association. A precondition for true independence is a strong economy. The association must generate an income for itself big enough to pay for all running cost and leave room for consolidation. In the old western European countries it is common with governmental subsidies to extension services in private forestry. This is not yet the case to a very high degree in former Eastern Europe and in the third world where most extension services are partly governmental operated - far from what is recommended here. In countries with a longer democratic tradition and with political stability, subsidies might from independence point-of-view be acceptable. But the ideal situation for all private forest owners and farm organisations would be the ability to run their operations without any kind of subsidies. Lobbying for the interest of the members towards authorities and politicians might be awkward if the organisation is even to a very limited degree on the public payroll.

Conclusions

The members and especially the board members are the best to do promotion of private forest owners and farm forest organisations. Promotion is best based on created results benefiting the members – an obligation of the staff.

Strong associations possess the ability to fulfil their members needs and wants along side with being economically self-reliant.

- Some form of extension service in forestry seems needed in most countries;
- The service should emphasize advice on silviculture practices as well as the more practical aspects such as selling the products;
- The state could normally not be responsible for an extension service, as farmers and forest owners in most places do not respect or trust governmental bodies;
- This problem is most important in the countries where the level of social capital is lowest (third world and some of the former communist countries);
- An extension service could preferably be organised by the stakeholders themselves as an association with the forest owners or tree growers as members;
- When constructing such an association, it is important that it functions on the basis of shared interests, and that this is visible for the members;
- In order not to give non-optimal advice, an association should in most cases refrain from owning nurseries, machinery etc.;
- Even if extension is state-supported, services from such an extension service should never be free. This to assure that the right services are offered, and that the demand for these can be measured;
In an association, a strong body of elected farmers/forest owners is necessary. These should be responsible of the strategy of the organisation and control the performance of the hired staff;

The board should reflect all groups and interests among the members; and

The association should seek economic strength and thus independence from the state and others.
Strategic Relationships: Engaging for Cooperation, Collaboration and Partnerships

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Abstract

Issues in a contemporary society such as sustainability of forests are items of widespread concern for which multiple solutions exist. Few issues in natural resources are simple enough to be understood or solved without recognition of relationships among complex causal factors and acknowledgement of multiple institutions that may be simultaneously concerned about the issue. Such relationships help to illustrate the necessity and use of appropriate others to address an issue. Relationships may be described in several distinctive ways. The Sustainable Forestry Partnership at Oregon State University serves as an illustration of a program that utilizes several types of pathways with others to address issues of sustainability.

Keywords

Cooperation, Collaboration, Partnerships, Engagement, Sustainability

Introduction

We live in an increasingly complex world of problems and issues. Industries have turned to employee involvement, team approaches and joint ventures, among other approaches to take advantage of the power of relationships in addressing items of importance. Policy issues around natural resources with multiple dimensions are often categorized as “messes” or even “wicked” problems (Shindler and Cramer, 1997) recognizing that multiple players and their respective agendas are involved. This paper diagnoses relationships among organizations and stakeholders, including engagement with community members, who are concerned about the same or similar issues and who establish mutual agreements to acknowledge and accommodate each other.

Universities and other institutions attempt to address those items that relate to their missions, and increasingly must recognize the myriad of others also involved. A better understanding of the reasons for a partnership approach and significant differences among relationship typologies may allow for improved working relationships among providers of relevant services and products. A concluding example of one such partnership begun at Oregon State University provides insights about its approach.

Why Involve Others?

There are several reasons why a partnership approach makes sense. First, by virtue of involvement of multiple people and organizations, visibility of the issue is increased. This may help lead to involvement of needed others. Second, partnerships by their nature express commitments that can help lead to organizational action that, in their absence, may be only rhetoric. Third, the base of skills and resources available to address a problem are often increased. Fourth, by involving a variety of others, the diversity of perspectives, and thus creative potential of a group is enhanced. Fifth, risk of failure is distributed over a greater number of players, thus decreasing the chances that any one must shoulder any negative consequences associated with tackling an issue.

What’s the Relationship?
It is useful to distinguish among several types of partnerships. This helps to understand the nature of the relationship and what each partner contributes, as well as what can be expected from a partner.

**Cooperation**—A cooperative relationship typically includes organizational sharing of an activity, campaign or event as a result of an invitation from one organization to another. The request is seen as consistent with the asked organization’s mission, values and goals. Cooperative relationships are important, useful, and common.

**Collaboration**—In this type of relationship, the missions of participating organizations partially overlap, and partners accomplish the mutual portion of their missions through joint planning. Ownership and credit for the activities is shared equally. This type of relationship is probably less common than simple cooperation because of perceived or real relinquishment of unique identities. Collaboration is best made operational through pre-negotiation and written understandings.

**True Partnership**—In this relationship, a new entity is created from which emerges a joint mission to which partners ascribe. Decisions are made collectively. The effective identity of individual organizations is merged into the new one. True partnerships are trust-based; partners would never disadvantage each other. Even though a new organization is effectively created, the history and culture of participants is valued such that unique strengths are allowed to flourish. True partnerships are relatively rare.

**Stakeholder and Client Relationships: A Special Case**

Effective extension education rests upon framing programs to express real needs of those we serve to enable the accomplishment of public good. A hallmark of land-grant university programs is the covenant they have with society. Through a special commission funded by the W. K. Kellogg Foundation, the National Association of State Universities and Land Grant Colleges (NASULGC), developed several reports that elaborate the following principles, among others (Kellogg Commission 2000):

- Accessible education is provided equally without regard to race, ethnicity, age, occupation or economic background.
- Learning environments meet civic needs by preparing learners participate in a democratic society.
- Conscious efforts bring resources and expertise to bear on community, state, national and international problems in a coherent way.

Extension forestry organizations can learn to apply these characteristics as a gauge of progress towards effectively addressing critical problems facing their clients. Through such systematic analysis, extension foresters may see opportunities to recommend changes in methodologies or other enhancements that may increase organizational effectiveness.

**What is Meant by Engagement?**

As defined by the Kellogg Commission, “engagement“ includes involving students, including citizens, as a part of their learning experience. The Commission was motivated by recognition of growing public frustration with what is seen as university unresponsiveness. The Commission believes that engagement can enrich the learning experience and change campus cultures by enlarging opportunities for faculty and providing access to research and new knowledge through active relationships with our clients.

Involvement takes several forms, including seeking active expression of issues and/or problems and interaction with the educational process that enhances simple technology transfer to establish an environment of co-learning where both institution and client benefit. The report goes on to argue the benefits of “sympathetic and productive” involvement with those whom we serve.

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1 A special group of US universities, generally one per state, dedicated to practical and useful information for all citizens, regardless of their interest in a university degree.
To illustrate and gauge the extent of institutional engagement, seven characteristics are extracted from the Kellogg report:

1. **Responsiveness.** We need to ask ourselves periodically if we are listening to the communities, regions, and states we serve. Are we asking the right questions? Do we offer our services in the right way at the right time? Are our communications clear? Do we provide space and, if need be, resources for preliminary community-university discussions of the public problem to be addressed. Above all, do we really understand that in reaching out, we are also obtaining valuable information for our own purposes?

2. **Respect for partners.** Throughout this report we have tried to emphasize that the purpose of engagement is not to provide the university’s superior expertise to the community but to encourage joint academic-community definitions of problems, solutions, and definitions of success. Here we need to ask ourselves if our institutions genuinely respect the skills and capacities of our partners in collaborative projects. In a sense we are asking that we recognize fully that we have almost as much to learn in these efforts as we have to offer.

3. **Academic neutrality.** Of necessity, some of our engagement activities will involve contentious issues—whether they draw on our science and technology, social science expertise, or strengths in the visual and performing arts. Do pesticides contribute to fish kills? If so, how? How does access to high quality public schools relate to economic development in minority communities? Is student guerrilla theater” justified in local landlord-tenant disputes. These questions often have profound social, economic, and political consequences. The question we need to ask ourselves here is whether outreach maintains the university in the role of neutral facilitator and source of information when public policy issues, particularly contentious ones, are at stake.

4. **Accessibility.** Our institutions are confusing to outsiders. We need to find ways to help inexperienced potential partners negotiate this complex structure so that what we have to offer is more readily available. Do we properly publicize our activities and resources? Have we made a concentrated effort to increase community awareness of the resources and programs available from us that might be useful? Above all, can we honestly say that our expertise is equally accessible to all the constituencies of concern within our states and communities, including minority constituents?

5. **Integration.** Our institutions need to find way to integrate their service mission with their responsibilities for developing intellectual capital and trained intelligence. Engagement offers new opportunities for integrating institutional scholarship with the service and teaching missions of the university. Here we need to worry about whether the institutional climate fosters outreach, service, and engagement. A commitment to interdisciplinary work is probably indispensable to an integrated approach. In particular we need to examine what kinds of incentives are useful in encouraging faculty and student commitment to engagement. Will respected faculty and student leaders not only participate but also serve as advocates for the program?

6. **Coordination.** A corollary to integration, the coordination issue involves making sure the left hand knows what the right hand is doing. The task of coordinating service activities—whether through a senior advisor to the president, faculty councils, or thematic structures such as the Great Cities Project or “capstone” courses—clearly requires a lot of attention. Are academic units dealing with each other productively? Do the communications and government relations offices understand the engagement agenda? Do faculty, staff, and students need help in developing the skills of translating expert knowledge into something the public can appreciate.

7. **Resource partnerships.** The final test asks whether the resources committed to the task are sufficient. Engagement is not free: it costs. The most obvious costs are those associated with the time and effort of staff, faculty, and students. But they also include curriculum and program costs, and possible limitations on institutional choices. All of these have to be considered. Where will these funds be found? In special state allocations? Corporate sponsorship and investment? Alliances and strategic partnerships of various kinds with government and industry? Or from new fee structures for services delivered? The most successful engagement efforts appear to be those associated with strong and healthy relationships with partners in government, business, and the non-profit world.

**Nurturing Relationships: Essential Ingredients**

- Leadership
- Meaningful work
- Receptive internal and external collaborators
• Resources
• Supportive administrative environment
• Integration of the university missions – teaching, research, and outreach
• Recognized and accepted university expertise of sustainability issues
• Collaborative model – the whole is greater than the sum of its parts

Relationship Rewards Challenges and Threats

• Maintaining momentum and focus
• Lack of key projects
• Stakeholder support for priority issues
• Institutional support
• Professional legitimacy
• Resources and funding for continuity
• Necessity to build capacity
• Overcoming traditional recognition models

Expected Outcomes of Engagement


1. To prepare students to be good citizens by providing them ways to help the institution itself be a good citizen
2. To foster and renew bonds of trust in the community, i.e. “social capital” and to use the neutrality of the campus to provide a common ground where
   o Differences of opinion and advocacy for points of view can be addressed in an open and constructive way
   o Where people with similar goals can come together and create ways to work together
3. To create leadership development opportunities for students and foster a commitment to social and civic responsibility
4. To enhance the employability of graduates by providing opportunities to build a strong resume and to explore career goals
5. The promotion of learning both for students and for community members
6. To play a role in creating capacity in the community to work on complex societal problems
7. To design a more effective way for the campus to contribute to economic and community development
8. As a means to accomplish a campus mission of service
9. As a path to transformational change

Example: The Sustainable Forestry Partnership

The Sustainable Forestry Partnership (SFP) is a nationally-linked network of individuals and organizations implementing a vision of regional institutional leadership combined with integrated national programming. Its mission is to support and document innovation in sustainable forestry and to integrate innovation broadly in both policy and practice. Currently, regional hubs exist at Oregon State University, The Pennsylvania State University and Auburn University that utilize faculty and others to advance the scholarship of sustainable forestry.

Sustainable forestry represents an emerging area of scholarly work involving all mission areas of the United States’ Land Grant universities. A recent inter-university forum on sustaining forest ecosystems involved more than 20 institutions and identified numerous needed research and education topics.
This growing national initiative contributes to the concept of a sustainable development extension network proposed by the President’s Council on Sustainable Development. Programs of the Sustainable Forestry Partnership include education and training, a demonstration network, publications, and innovator assistance.

The SFP offers an evolving example of how a true partnership can utilize the strengths of multiple organizations to address emerging issues with unique products and services. The following overview describes the mission clients and selected programs of the SFP as an illustration of how this program is developing.

Mission--The SFP’s stated mission is to support and document innovation in sustainable forestry and to integrate this innovation broadly in both policy and practice.

Client Partners—The SFP’s clients cover a broad spectrum of the forestry community. Major emphasis is upon those who have demonstrated innovation in, or are ready to consider alternative approaches to forestry that support long-term sustainability. Innovators in turn play a role within their communities of influence.

Executive Partners—Strategic and policy direction is provided by a group of recognized leaders from private industry, land grant universities, environmental and other non-governmental organizations and foundations. Executive partners additionally provide selected support to staff in administering programs.

Institutional Working Partners—As SFP programs grow in number and complexity, expanding its operational base will become increasingly important. Formal and informal agreements will be used to replicate the SEP’s philosophy to other locations throughout important regions. Delivery of products and services will thus be available closer to local clients and take advantage of respective institutional strengths.

While still a relatively young organization, the SFP has experimented with multiple products and services. All programs are initially designed as pilots for subsequent expansion consideration. Case studies have proven to be a useful approach to documenting and stimulating innovations in sustainable forestry. Such cases provide a basis for involving client, executive and institutional partners in their development and application. Cases often become the subject of classroom teaching, extension outreach programming, and expansion into larger scale application.

Lessons Learned Through the Sustainable Forestry Partnership

- Beware of perceived competition with other similar programs
- Seek opportunities to complement other related work
- Administration of institutional processes demands time taken from active programming
- Growth happens through active projects and involvement of others
- Modest investments leverage faculty energy
- Blurring the distinction among institutional missions of teaching, research and extension inspires creative thinking
- Finding progressive faculty to partner with can be challenging
- Funded projects create interest
- Projects lead to new relationships (inter- and intra-institutions)
- When you have meaningful work you can find people to partner with

Toward Togetherness: Leadership Principles

Wondolleck and Yafee (2000) identify five principles that may be practiced by organizational leaders, especially for public agencies. Together or separately, they can provide an institutional culture that encourages and rewards innovations around the creation, use and evaluation of strategic relationships.
1. Encourage the consideration of collaborative relationships by helping people to imagine the possibilities in carrying out important work. This is done by sharing stories, and experiences through newsletters and staff meetings. Providing opportunities for information exchange by sharing reports, and encouraging participation at meetings and conferences where relationships can be established.

2. Provide resources and a flexible environment that stimulates those who are already motivated to collaborate. This can be done through formal training and cutting the organizational red tape that can constrain innovation though rigid procedures and narrowly defined fiscal policies.

3. Encourage experimentation through incentives and rewards. Consider making such expectations explicit in position descriptions, then evaluate the performance of individuals accordingly.

4. Evaluate and adjust organizational experiences. A systematic approach to understanding successes and failures will prepare for more of the former.

5. Commit to the process and products of collaboration. Organizational commitment over time emphasizes supporting individuals who have embraced such behavior and maintain continuity, even in the face of less control over work products.

Accountability: Evaluating Effective Programs

Most current thinking about scholarly work springs from Boyer (1990) within which significant expansion of simple research (scholarship of discovery) was argued. At Oregon State University, scholarship is required from faculty members who wish to establish tenure and be promoted to higher faculty ranks (Oregon State University, 2002). According to revised standards for promotion and tenure at the institution, “All Oregon State University faculty in the professorial ranks have a responsibility to engage in scholarship and creative activity. Scholarship and creative activity are understood to be intellectual work whose significance is validated by peers and which is communicated.”

Numerous models of evaluating extension program effectiveness exist. Most rely upon measuring the extent to which knowledge and/or behaviors have changed. Bennett (1975) is widely known for creation of a hierarchy of evaluation evidence that scales the utility of impact data. More recently, University of Wisconsin has transformed hierarchical thinking into an applied approach known as the Logic Model (2001).

A specific application of accountability is based upon the use of appreciative inquiry. (Bowling and Brahm, 2002) describe the approach as sensing information on the social arrangements that "work" for the community. By "work" they mean community activities that excite, energize, and inspire members. After engaging in these activities, community members describe themselves as feeling more alive and more positive about their life and their community. Adopting Oregon State University’s definition, the role assigned to community members takes on a peer role, and their behavior effectively communicates the nature and success of such scholarly work.

Conclusions

True partnerships challenge participating institutions and individuals to change their identities regarding their participation in the relationship. The Sustainable Forestry Partnership attempts to involve appropriate others in addressing growing concern over issues of sustainability in a way that takes advantage of partner strengths. Such an effort will be successful to the extent that the forestry community embraces this approach to working together.

References


Abstract

In this paper, we present results of a 12-year participatory research and extension project in the Brazilian Amazon. We describe how this local research initiative intersected with national programmes to reform forestry extension and how three different partners have expanded user groups beyond conventional audiences in the forestry sector. Demand-driven, workshops are underway with forestry training institutes, adult literacy programs and botanical gardens. A synthesis of the research and learning process, a manual entitled, *Fruit Trees and Useful Plants in the Lives of Amazonians*, integrates traditional knowledge with scientific results of over 100 Brazilian and international ecologists, nutritionists, economists and anthropologists, as well as farmers, women’s leaders, musicians and artisans. First, results indicate that additional steps are needed to extend the research cycle to include meaningful sharing of research results with communities. Second, development of innovative tools and materials can magnify the impact of forestry research both within and outside of the forestry sector. Third, a broader, livelihood focus that includes the health and cultural benefits of forests can enhance multi-sectoral involvement in forestry issues. Finally, research organizations need to assume greater responsibility for taking steps to transform research into a range of useful products and/or in seeking unique partners in the design and dissemination of results.

Key words
Forestry extension, non-timber forest products, Amazonia, social forestry, multi-use forest management
Introduction

In the Brazilian Amazon, tens of thousands of disenfranchised small holders living in remote forested areas receive little to no forestry extension during their lifetimes. Possessing long-held local knowledge, small holders have created innovative management systems without support from outside actors. Rapid growth of the timber, ranching, agricultural and mining industries, during the last three decades, however, has brought rural families face to face with powerful new neighbors that drastically alter forest composition and structure. Farmers are confronted by a choice -- to adapt to or resist these powerful forces. In such dynamic scenarios, local knowledge systems offer an inadequate basis on which to make informed decisions. Lacking information regarding the value of their timber, semi-literate, cash-poor villagers daily trade trees for meager sums. In Brazil, new, pro-poor, pro-forest governance and efforts to overhaul the National Program on Forests offers an historic opportunity to transform forestry extension and empower forest communities to meet the new challenges involved in forest management.

Organizations with the capacity to transfer forest and market-related research results to rural stakeholders in Brazil, however, often do not exist. When they do exist, forestry extension tends to emphasize timber as the only forest resource worth managing. Locally valued species which are valuable to health and nutrition are often overlooked. As industries transform forests throughout the Brazilian Amazon, how can smallholders with little knowledge of the potential benefits and detriments of land use change to their livelihoods decide on how best to manage their forests?

The historically reductionist approach to forestry extension concentrating on purely technical and biophysical issues creates significant obstacles to reforming the discipline and making it relevant to a broader group of stakeholders. A focus on quantification, a limited range of products, and the exclusion of divergent interests are common in most forestry training institutions (Buchy 2000). To meet new demands created by participatory models of forest management, the professional skills and conceptual frameworks of foresters will need to be realigned, a process requiring major changes in educational curriculum. This can take considerable time, as curriculum reform is generally an incremental process, with social sciences gradually being introduced into biophysically oriented disciplines (Bawden 2000).

Some methodological progress is being made in the form of participatory curriculum development approach (PCD) (Taylor 2000). Innovations in curriculum can also be functions of specific contexts in place and time (Bawden 2000). The current Brazilian context could offer an opportunity to accelerate change, as a diverse set of stakeholders is working simultaneously to transform the forestry discipline. These include national and state governmental institutions, donors (DFID) and Universities, as well as select industries and forest communities.

In this paper, we present results of a 12-year participatory research and extension project in eastern Amazonia. Demand-driven, the learning process was iterative, involving farmers, health workers, women’s associations, scientists and teachers. First we describe the ecological and market research and one of the principal learning tools resulting from the research and extension. Next, we demonstrate how this local level initiative intersected with national initiatives to reform forestry extension, describing how three different partners, a state-wide adult literacy programme, National Forestry Institute and Belém’s Botanical Garden, have adapted and used the research results and extension materials. In closing we offer recommendations to improve uptake and impact from research and extension.

Methods - Participatory Research and Extension

The forest extension work described in this paper was built on a long-term research project responding to questions posed by remote forest communities along a tributary of the Amazon. The communities asked, “is what we lose from logging more valuable to us than the cash we get from selling trees?” To compile relevant information to respond to this question, participatory research included an ethnobotanical inventory of locally used species, long-term studies of the production/yield of regionally valued fruit and medicinal oil species, daily diaries of forest product consumption and market studies. After compiling the data, community members who had taken part in data collection, shared results with their own and
neighboring communities in the form of participatory workshops. Posters, songs, skits and discussions focused on the value of forests to families and the direct and indirect impact of logging and fire on local livelihoods. Over time, requests for workshops to share research results came from NGOs, Rural Worker’s Unions, Women’s Associations and forest communities throughout the eastern Amazonian state of Pará.

Scoping visits and participatory workshops conducted in other communities indicated that the socioeconomic and environmental impacts of logging on livelihoods documented in the study area were prevalent throughout the region. Sales are generally based on informal agreements, involving paternalistic relationships between communities and loggers. Extraction is unaccompanied by community members, allowing loggers the opportunity to extract whatever they choose. Beyond the first payment, communities are frequently not compensated for their timber, and yet they repeatedly enter into subsequent timber sales (Medina and Shanley in press). In the 3,000 hectare community forest studied, between 1990 and 2002, ten timber sales occurred. Twelve years of data and observations indicate that logging and conservation of valuable non-timber forest products (NTFPs) can be compatible until a threshold, when the direct and indirect impacts of extraction degrade the resource base, including species that are used and highly valued by the community (Shanley et al. 2002). Through research and extension that raises awareness of the possibility of compatible use, communities and small holders could potentially negotiate more effectively with loggers, avoiding direct and collateral damage to locally used and valued species.

Empowerment of small holders will depend, in part, on not only changing the learning systems (Pretty et al. 1995), but also on the availability of a base of scientific information that integrates biological, cultural and socioeconomic values of a forest and its management. Research has generally been biased towards timber species of international commercial importance, neglecting locally and regionally important species that are vital to rural livelihoods. Directed by agents external to the communities, research questions often poorly reflect local knowledge, conditions and concerns (Chambers 1997, Vermeulen 2004). Driven by requests from a variety of institutions and communities, scientists from the Center for International Forestry Research (CIFOR) began to explore the questions -- what type of information is most needed to empower small holders in logging frontiers? And how, and under what conditions, can information improve small holder forest management?

**Tool to promote the learning process - the “Fruit” book**

Smallholders, urban citizens and loggers need information to make informed decisions regarding forest management. Some critical pieces of information, such as the density and production of tropical forest fruit trees, do not yet exist due to inadequate research. Other pieces of information, embodied in local knowledge, may not be available due to dynamically changing conditions that can contribute to erosion of knowledge bases. Finally, a large portion of potentially useful research and local know-how is unavailable simply because it has never been synthesized or made available to farmers and others who might use it.

One of the principal tools used with the three audiences described above is a book that grew out of the research and extension process, *Fruitíferas e Plantas Úteis na Vida Amazônica* (Fruit Trees and Useful Plants in the Lives of Amazonians) (Shanley and Medina 2004). As part of the learning cycle, farmers, ecologists, women’s groups, musicians and economists contributed their findings, adapting content and presentation to enrich the workshops. When demand for workshops exceeded the team’s ability to meet them, a small group of the farmers, hunters and scientists involved in the project decided to place the posters, skits and songs used in workshops in book form. As an illustrated manual, the group envisioned that their research findings, and those of others that they had synthesized, could reach a broader audience.

The manual was constructed over a period of five years, through a cyclical process balancing scientific theory and the ground experience of forest-based communities. The resulting manual synthesizes ecology, market data, nutrition, processing techniques, management practices and traditional knowledge regarding 30 widely distributed tree and palm species. Species used for fruit, fiber, medicines and timber are represented. Sections entitled “Conflicting Use” and “Multiple Use Forestry,” include negotiation and management tips from forest communities – some who have lost forest, and others who have conserved forest.
Due to high rates of illiteracy in remote forest communities, the project team strove to convey complex ecological and market concepts in the form of simple illustrations. Jokes, cartoons, recipes and music add color and play on cultural preferences and rifts. Notably, the highly illustrated, lively format designed for semi-literate audiences is also being sought after by students, city residents, loggers, researchers, and policy makers. The iterative process of developing the Frutíferas Manual with a wide diversity of stakeholders yielded a product which has spawned interest from an unexpectedly broad range of users (Pye-Smith 2003, Shanley and Gaia 2002).

Results: Partnerships for scaling up

In Amazonia, there exists demand among communities, industries and training programs for technical and cultural information regarding management of forests for both timber and non-timber forest products. Current efforts to transform forestry training and curriculum need educational materials that reflect an inclusive and multi-use vision of forests and people. In this article, four user groups of CIFOR’s research synthesis are briefly described. First, to reach forest-reliant communities, one principal partner is the adult literacy program supported by the National Institute for Colonization and Land Reform (INCRA) and the Federal University of Pará (UFPA). This network has the goal of raising not only the level of literacy among rural adults but to empower them to manage their forest resources sustainably.

Second, to effect systemic change in forest training and management, profound changes in curriculum are needed. As part of a nation-wide effort to reform forestry training, national and state leaders are recognizing the multiple values of forests and seeking to transform educational institutes to reflect a holistic view of forest management. This is a challenging undertaking, as conventional curriculum focus on the technical aspects of agribusiness (logging and ranching) and lack an interdisciplinary perspective.

A third audience interested in a multi-use perspective on forest value, are urban stakeholders such as the Ministries of Education and Culture and Botanical Gardens. In the states of Pará, Amazonas, Acre and Amapá, governmental and non-governmental organizations are interested in regionally relevant science which reflect the local value of biodiversity to Amazonians.

Adult literacy training empowers communities for multiple use management

_Educação Cidadã_ (Citizen’s Education), an adult education training programme, promotes education in areas of agrarian reform in the state of Pará, Brazil. Financial support is offered by the National Institute for Land Reform (INCRA) and pedagogical expertise from the Center of Education of the Federal University of Pará (UFPA). The mission of the group is to prepare settlements for improved management of their resources. They accomplish this mission using innovative educational methods based on the philosophy of Paulo Freire (1972). The educational process involves themes derived from the daily life of students, including agriculture, social organization, and forest management. Each six months a training workshop is conducted for approximately 20 rural professors, who in turn hold smaller meetings to train teachers in each of 13 municipalities. Along the Transamazonica Highway in Pará, the program has trained 240 professors in 37 settlements, annually reaching approximately 4,000 adults.

In 2004, the primary educational theme was forest management. Along the Transamazonica highway, many households are seeking to evaluate the production potential of their forest, to negotiate more effectively with loggers, and to avoid conflicts between timber and non-timber forest resources (see box below). However, the director of the programme, Dr. Salomão Hage stated that, *we have the ideas, methods and a huge demand. What we do not have are the didactic materials to meet our needs.* Perceived as immediately useful, the Frutíferas Manual has been adopted as central to the programme’s curriculum. Interest by INCRA/UFPA to scale up the current programme offers the possibility of reaching substantial numbers of smallholders throughout Amazonia.

**BOX - Opportunity for improving negotiations between loggers and communities**

In the summer of 2003, IBAMA (National Institute of the Environment) apprehended loggers operating illegally (without management plans) along the TransAmazonica highway. IBAMA demanded that logging...
activities cease and levied fines against the logging companies involved. Interested to guarantee legal sources of timber in 2004, the loggers convened a meeting of members of social movement, rural workers unions, the Federation of Agricultural Workers (FETAGRI), and government officials. The objective was to elaborate a plan for the coming year to obtain legal sources of wood. One principal difficulty facing loggers is that large expanses of land in the region do not possess legal title (given by INCRA or ITERPA – Instituto de Terras do Para) and consequently cannot have management plans approved by IBAMA and the legal right to transport forest products (Authorization for Transport of Forest Products - ATFPs).

As an emergency plan, the loggers proposed an alternative – to extract timber in areas of agrarian reform, which have land title. In recent settlement areas, fairly large volumes of timber still exist. According to Brazilian legislation, settlement families can annually deforest three hectares comprising 20% of their lot. When farmers ask IBAMA for authorization to cut, they automatically gain access to ATFPs and can sell timber (60 cubic meters per ha) from the area. In subsequent years, there would also be the possibility to negotiate timber extraction from the legal reserve (the remaining 80% of the area). Next steps will include mapping the potential areas to be logged and facilitating negotiations between loggers and farmers. INCRA made an accord with IBAMA to support and to facilitate the process.

At a recent meeting between the loggers, community leaders and representatives from the government and the social movement, participants agreed that there is an urgent need to prepare communities to adequately map and negotiate sales of their timber resource. To accomplish this, training is required to:

1) Identify locally important tree species (consumption, sale and prices);
2) Calculate the production potential of timber and NTFPs;
3) Select and mark individuals that should not be extracted;
4) Understand and discuss extraction techniques (types of machinery, inventories, roads, directional felling);
5) Define areas to be conserved as reserves or corridors;
6) Develop fair and equitable contracts.

### Summary of 3-day workshop

<table>
<thead>
<tr>
<th>Days 1-3</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Inventory timber volume and estimate NTFP production on 1-ha demonstration plot</td>
<td>Estimated value of forest for multiple use based on community perspective of forest value</td>
</tr>
<tr>
<td>2) Calculate results of forest inventory. Using available market data calculate potential values of timber and NTFPs. Discuss local knowledge and management practices of each settlement.</td>
<td>Affirmation of local knowledge of forest value, comparison of timber values in local markets, presentation of rising NTFP values and rank of locally valued NTFPs and tips for negotiation with loggers.</td>
</tr>
<tr>
<td>3) Round table with INCRA, IBAMA, relevant members of the social movement, government officials and settlement farmers</td>
<td>Plan of action for loggers to begin negotiations with settlements for timber extraction in 2005. Workshop dates set to strengthen target communities with forest valuation workshops.</td>
</tr>
</tbody>
</table>

In 2004, Citizens’ Education began a partnership with CIFOR to help prepare communities for timber sales. Using the Frutíferas Manual, the first two days of the workshop involved practical field training to inventory timber and NTFPs, calculate the volume and production potential of timber and NTFPs and document relevant local knowledge and customary management practices. On the third day, a round table was convened with the three principal organizations involved in forest management along the Transamazonica. The director of INCRA presented the legal accord with IBAMA, laying the groundwork for later negotiations between communities and industry, to be mediated by the social movement. In 2005, workshops will be repeated in target communities and impact on socioeconomic and environmental outcomes measured.
National and state training programs for forest management

In October 2003, the Brazilian Government created the Centro Nacional de Apoio ao Manejo Florestal (Cenaflor), a national forestry training institute, within the Brazilian Ministry of the Environment, IBA MA. The objective of Cenaflor is to promote the adoption of sustainable forest management techniques and reduced impact logging. Through a network of existing and future training centers throughout the country, Cenaflor’s training will be directed principally at large industrial interests. Cenaflor is founded on the belief that forest management is an economic activity with capacity to create jobs, promote social inclusion, and economic growth as well as creating conservation incentives.

The largest forestry training organization working with Cenaflor in the Brazilian Amazon is Instituto Floresta Tropical (IFT). Since 1995, IFT has offered courses in forest management and reduced impact logging to an ample public including forestry students and the functionaries of logging companies working to adopt sustainable management practices. A principal goal of FFT is to meet the demand of the timber sector by building technical capacity throughout the region. IFT offers intensive two-week courses about practical activities related to extraction of timber, reaching approximately 500 students annually. Until 2003, the focus was solely on the extraction of wood. As a result of a partnership with CIFOR, IFT has begun developing and integrating a non-timber forest product component into its courses.

This new component responds to the interests of communities and farmers who manage forests for multiple products. CIFOR and IFT are jointly implementing a demonstration plot of 50 hectares for multiple use and management. The ecological and market information synthesized in the Frutíferas Manual serves as a basis to calculate production potential of timber and NTFPs. The revised curriculum also responds to demand by industry to investigate extraction of valuable non-wood resources such as copaiba oil during the 25-year cycle necessary for the second rotation of timber extraction. Industries interested to manage and extract diverse NTFPs, could potentially provide employment for rural labor force during rotation intervals, as well as during the five-month rainy season when field workers are unemployed.

Technical forestry schools incorporate a livelihoods perspective

Some technical schools and agricultural universities in Amazonia are integrating the non-timber benefits of forests into their curriculum. One of the foremost training institutes in the Brazilian Amazon, The Technical School of Manaus, has been a pioneer in incorporating a NTFP and livelihoods component into their courses. As part of a modeling exercise, students are given 50-hectare plots to manage for both timber and non-timber products. Using information on the density, production, economic value, management and cultural importance of trees and palms of regional value synthesized in the Frutíferas Manual, students elaborate management plans for compatible extraction of timber and NTFPs.

To ensure understanding of the local perspective on forest value, farmers have been invited by the school to give workshops on the harvest, processing and value of NTFPs. Through these sessions, foresters became acquainted with the complex process of extracting oil from the seeds of Carapa guianensis, techniques to extract medicinal bark from native trees, and the nutritional value of forest fruits. Rural students are particularly receptive to a more integrated approach to forestry as local knowledge is affirmed in a scientific setting. Annually, the Technical School of Manaus trains thirty foresters who move on to work with timber companies, non-governmental organizations and rural communities.

Belém’s Botanical Garden

During the last three decades, Amazonia has been characterized by rapid urbanization (Browder and Godfrey 1997). Small holders from remote villages, rural farmers and indigenous people as well as industrialists from São Paulo reside in Amazonian cities. Maintaining support for the current “pro-forest,” government, will depend, in part, on urban and rural citizens understanding of the role of forests in Brazil’s

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1 In October 2001, FFT (Tropical Forestry Foundation) completed a proposal and business plan to establish the Instituto Floresta Tropical (IFT) that would absorb FFT’s current program and evolve into a more sustainable long term forest management training program.
household, national and global economy. In Belém, The National Botanical Garden is designing educational programmes to illustrate the importance of forests to the health, welfare and culture of city residents.

The *Bosque Rodrigues Alves – Jardim Botanico da Amazonia*, is a 14-hectare fragment of original forest conserved in the center of Belém, population 1.7 million. It is used by 100,000 people per year, including families, students and teachers. Besides its primary function as a park, the Bosque has a strong educational focus to inform adults and children about the value of forests in their daily lives. School and weekend programs featuring theatre, songs, movies and craft activities are used to raise environmental awareness of the urban public.

To foster greater appreciation for widely used plants, the garden broke from tradition. Instead of placing only Latin and common names on plaques of trees throughout the garden, the educational staff used CIFOR’s research synthesis to design plaques presenting the most compelling information on uses, history, health care, cultural values and legends. In 2003, at a National Conference of Botanical Gardens held in Belém, the plaques were featured to 60 Directors of other Botanical Gardens who expressed interest to replicate the idea in other Botanicals Gardens throughout the country. The Bosque is currently expanding its educational programme to include a component on the local value of biodiversity which will be implemented with each of the school groups that visit.

**Conclusion: Lessons learned**

The three examples cited above represent only slight fissures in the conventional, reductionist approach to forestry. For example, in spite of stated government commitment to multiple use forestry, Brazil’s recently created National Forestry Training Institute, *Cenaflor*, has been founded with training for large-scale industrial timber interests as its core mission. Furthermore, well designed, donor supported efforts to transform University curriculum in Brazil, have yet to make significant changes in the classes of agricultural and forestry students. Without a new generation of foresters, equitable and sustainable forestry will merely echo proclamations rendered at the Earth Summit. If community forestry and non-timber forest products are to be adequately represented in governmental programmes and forestry curriculum, innovative initiatives need to be well prepared with methods, materials and practices that reflect a new vision of forestry and which can be practically applied by small holders.

Research that respects and documents the knowledge base of forest communities, can help to generate materials and methods that may be useful to a new generation of extensionists promoting multiple-use forestry. The list below includes some lessons learned during the challenging research and extension process described in this paper.

**Choose key questions and generate relevant results with and for multiple stakeholders**

By strategically choosing key research questions, it is possible to generate findings of interest not only to local communities but to governments, donors, forest managers, scientists and NGOs. For example, forest research in Amazonia typically concentrates on timber species, neglecting valuable non-timber species that are widely used in trade and for subsistence. Research studies which include locally valued species with ample distribution offer an opportunity to make results useful across a broader geographical range as well as potential for scaling up.

**Close the cycle of ‘participatory’ research by returning results**

Villagers may participate in framing questions and collecting data, but all too often, “participation” ends there, before the research cycle is complete. Project time-frames come to a close, funding terminates, and a new round of “participation” in other unknowing villages begin. Lack of commitment to return results to communities where data has been collected not only results in loss of impact in that particular community, but loss of potential replication in others. Links need to be made between researchers, extension agencies and NGOs to promote “translation”, packaging and uptake of results.

**Package information for impact**
Hard-won scientific findings routinely receive less than adequate attention due to publication in books or journals with little to no follow up, targeting or timing of message, and distillation of main points for particular audiences. To encourage multiple partner involvement in forest extension, packaging messages for diverse audiences is needed. A wide range of research outputs can be developed and refined through meetings with stakeholders and articulation of their needs. It is important to not underestimate the interest of civil society in forestry issues. Widespread interest in forestry concerns can be tapped by appropriate translation and packaging of results.

**New perspectives lead to new curriculum – and long term change**

Traditional forest and agricultural school curriculum focusing solely on agribusiness, addressed the needs of private, large-scale industries. With substantial forest cover, an estimated 74.5 million hectares owned and managed by communities in Brazil, (White and Martin 2002), it is critical that new generations of foresters are trained to manage the forest for a range of users and to implement a new vision of multiple-use forestry. Participation has been a critical factor of success in the design of new curriculum (Taylor 2000). Participation of a wide range of stakeholders, including farmers, forest residents and women’s associations ensure that local perspectives are represented.

**Multi-sectoral involvement**

Multi-sectoral involvement (i.e. education, health, agriculture, trade) is enhanced through communication strategies that promote trees as part of society’s cultural heritage, underpinning the health and welfare of forests as linked to that of civil society. As forestry recedes from the frontline of donor interest, it is more important to make clear the linkages between urban and rural livelihoods and forest resources.

**Unique partners**

To achieve greater impact, scientists and research organizations need to take greater responsibility for partnering with extensionists and agencies that can help them to bridge their scientific results to diverse audiences.

**Institutional incentives**

A broader range of innovative products of research need to be encouraged by research, academic and donor agencies. Design and implementation of personal and institutional incentives can help to catalyze systemic change needed to improve uptake and impact.
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Collaboration Framework: Building and Sustaining Positive Change

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Abstract

Successful collaborations bring members of communities, agencies and organizations together in an atmosphere of support, to systematically solve existing and emerging problems that can not be solved by one group alone. Understanding the complexities of collaboration and applying its key elements increases the likelihood of achieving shared goals and outcomes.

The Collaboration Framework is designed to help individuals and practitioners who are either starting collaborations, or need help in strengthening existing ones. Specifically, the Framework assists people, groups and organizations to achieve clearly defined outcomes. Drawing from a diversity of people and opinions, the Framework is based on a Core Foundation of shared vision, mission, principles and values. It clarifies the Process and Contextual Factors which can either promote or inhibit the effectiveness of a collaboration which, in turn, affect its desired Outcomes.

Since its introduction in 1995, the Collaboration Framework has been used extensively in the arenas of natural resources, social justice and community capacity building in the USA.

Keywords

Collaboration, working together, partnership, coalition, linking communities

Introduction

In 1994, the National Network for Collaboration (an initiative of the Cooperative State Research, Education, and Extension Service (CSREES)) created the Collaboration Framework, a process tool designed to help individuals and practitioners form new collaborations, enhance existing collaborative efforts, and evaluate group progress. Since its inception, the Framework has been used extensively in the USA. Besides being useful in natural resources arenas, it has also been extensively used in social justice and community capacity building.

In this paper, the author will describe the Collaboration Framework concept, highlight its key elements, describe several projects that effectively used this process, and identify typical pitfalls encountered.

The Framework Concept

“All the easy questions have been solved. Now, we have to find workable solutions to impossible situations” (Faast 1996).

Collaboration brings together people from communities, agencies and organizations to systematically solve problems that cannot be solved by one group alone. Collaborations vary from formal structures with shared funding and written memoranda of understanding to informal networks and alliances, where for the common good, people share information and resources (Bergstrom et al 1996). Collaborations are not limited by geography; communities of interests also build good collaborations.

Collaborations work when people, their interests and their values are closely tied; when people feel safe to express their views and ideas; and when the members are clear about the desired outcomes (Hogue and
Miller 2000). The Collaboration Framework is a **process** which enables these groups to achieve their desired outcomes.

**The Framework Elements**

The Collaboration Framework is a tool for forming and maintaining collaborations. It has five key elements: Grounding, Outcomes, Core Foundation, and Process and Contextual Factors.

**Grounding**

Grounding is encompassed in all elements of the collaboration, and is the single component which determines its ultimate success or failure. Grounding in this case, means diversity: A diversity of values, viewpoints, and ideas about the issue being examined. Diversity in a collaboration brings about a synergy which is missing in homogenous groups. It also encourages the examination of underlying stereotypes, increases the capacity for change, and shifts attitudes and beliefs about what is possible (Bergstrom et al 1996). A key point is that if there are people whose lives will be affected by the group’s decisions, then they must be fully engaged in the collaborative process; to do less is to fail.

**Outcomes**

Groups working together often build an entire structure of meetings, rules, bylaws, etc, before discussing what it is they really want to accomplish. In the Collaboration Framework, groups “begin at the end” (Bergstrom et al 1996). They determine in the very beginning, the desired condition they wish to create. They ask themselves, “What will change as a result of our efforts?” In the United States, the most common outcomes affect these six areas: Public safety, education, economic well-being, family support, health, and the environment.

To better understand the outcomes concept, here is an example from the public safety arena. One community was plagued by youth gangs and violence. Their desired outcome was “a safe and secure community for youth and families.” After the people in the collaboration decided on this particular outcome, they then developed short term measures of achievement called “indicators.” Two of their indicators were: a lower crime index, and increased youth participation in out-of-school activities. They also identified important areas the collaboration wished to impact. These “impact measures” included real people impacts, and the development of new policies, systems, and resources (Bergstrom et al 1996).

**Core Foundation**

The Core Foundation represents the common ground of a collaboration. The group members express their shared vision and mission and guiding principles. The vision is their image of an ideal future. The mission defines the purpose of the collaboration. It is a statement of what they will do to accomplish the vision and achieve the desired outcome. It represents the fundamental reason for their existence. The group also develops the guiding principles for working together. These are the beliefs the group has in common. They describe how the group intends to operate on a day-to-day basis (Bergstrom et al 1996). These guiding principles provide rules of acceptable behavior and do much to defuse contentious situations.

**Process and Contextual Factors**

The Process and Contextual Factors are the elements which enhance or inhibit a collaboration. Process factors assess the internal skill sets of the group, and the capacity of the group to effect change. They generally are approached as questions.

Does the group understand the community?

How can the community be mobilized to address the situation?

What leadership skills does the group have? Who can impact change?
How well does the group communicate, internally and with its publics, informally and formally?

How will the group collect the data it needs? How will it evaluate its progress?

How will the group sustain itself?

By answering these types of questions, the group can determine the collaboration’s potential for success. Often at this juncture, members realize they need to increase the diversity of the group in order to have the necessary skill sets.

While the Process Factors analyze the internal strengths of the collaboration, the Contextual Factors examine external influences. Many projects flounder because no one considered what was happening outside their particular endeavor. Like the Process Factors, Contextual Factors work well in a question format.

What are the connections within the community that will aid or hinder the collaboration?

How well does the community work together? Does it have a positive or a negative history?

What is the political climate? Is this the appropriate time to launch the project?

What policies, laws and regulations impact the collaboration?

What resources – in-kind, financial, human and natural – are available to support the project?

Who, or what will be a catalyst for launching the project?

Results

The time and energy expended in building and maintaining a collaboration pays dividends. Here are three examples of groups that successfully used the Collaboration Framework.

The LaPine School Collaboration is an example of a short-term endeavor to solve a specific problem. The situation: Parents, concerned about their children’s safety in a large middle school, were circulating a petition to move them back to the elementary school. This seemingly small situation had deteriorated to the point that police were called in to control the irate parents. Using an experienced facilitator, the school district convened a public forum. Two hundred thirty parents, administrators, community members and the students who would be affected by the decision, worked together to remedy the situation. After one three-hour meeting, the group overwhelmingly voted to retain the existing system; to use hall monitors to increase security; and to develop a “buddy” system where older students teamed up with younger ones. The volatility was defused. Citizens actively and positively voiced their opinions. Youth and their opinions were valued (Sea Grant 2002).

The South Santiam Watershed Council is an example of a long-term collaboration among federal and state agencies, community schools, private landowners, not-for-profit youth organizations, and social service commissions. This group decided to focus their first efforts on restoring Ames Creek, a semi-urban, historic steelhead stream. In a four-year multi-phased process, over thirty different groups dedicated their time, energy and funding to removing non-native vegetation, rebuilding stream banks, planting trees and shrubs, re-channeling the stream to flow around a dam, propagating steelhead and creating a public park. Over 1200 people participated, in an area with a population base of 8,300 (Sea Grant 2002).

The Oregon Seafood Industry Coalition was created to enable disparate groups which comprise the seafood industry in Oregon, to join forces to create a vision for the future, develop strategies to sustain harvests for all Oregon fisheries, and strengthen and expand partnerships. One hundred fifty trawlers, fishermen, processors, advocacy groups, regulatory agencies, and Extension professionals, have been represented through the use of a governing council. In its nine-year existence, this group has successfully lobbied for
changes in state regulations, and developed a series of cooperatives along the Pacific Coast to accept, process and sell Brand Oregon seafood (Sea Grant 2002).

**Pitfalls**

Collaborations are not easy. Every group struggles and flounders in its lifetime. These setbacks do not have to become the group’s downfall. As a facilitator, the author is frequently asked to help a group through tough spots. Here are a few typical difficulties in working together.

The very diversity required for a successful collaboration can also be its problem. With many differing and diverging opinions, it may seem that the group will never move forward. Often group members suggest a streamlining process in which the people with different ideas are marginalized. Instead, what is really needed are strong guiding principles for the group; these principles enable all members to state their viewpoints, to be listened to, and to have their input valued.

Collaborations take time. Sometimes, it appears easier to do it alone, without input from all sides. Unfortunately, people don’t take ownership of projects they are not involved in. The real issue is not how long the process takes, but that people are working together to make a positive difference. It is worth the effort.

To create harmony, some collaborations avoid conflict and controversy; these groups rarely accomplish anything. Conflict is inherent in groups; it is the natural tension that arises from differences (Sea Grant 2002). It can be managed safely with clear guiding principles, a focused mission and goals, and a thorough examination of the disagreements. Bringing in a skilled facilitator for a few sessions, can neutralize the situation and move the group forward.

Burnout is probably the biggest problem in long-term collaborations. Dedicated, committed community members are often asked to serve on many committees. Actively recruiting new people to participate, increases diversity and community ownership, and reduces burnout. Also, many groups miss opportunities to make their working environments more pleasant. Groups should celebrate small successes and weave these small steps into the whole process.

**Conclusion**

Communities and organizations face complex issues, constant change, scarce resources and growing populations. In this dynamic environment, people need tools that enable them to achieve their goals. The Collaboration Framework provides a structure for effectively working together.

“Coming together is a beginning, talking together is a process, and working together is a success.”

(Henry Ford, American automaker)

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A Collaborative Approach to Wildfire Threat Reduction in Nevada

by

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Abstract

The Nevada Fire Safe Council (NFSC) is a nonprofit organization created in 1999 to help Nevada communities reduce the wildfire threat. Objectives of the NFSC are to acquire wildfire threat reduction funds for Nevada’s high fire hazard communities; provide a support organization for private property owners threatened by wildfire; and to improve communication between property owners, fire fighting agencies, the insurance industry, and others. In 2002, NFSC hired an executive director to carry out the organization’s mission. Since then, the NFSC has acquired over $3 million dollars in grant funds, established 21 community chapters, and has over 1000 paid members. In addition, private property owners have contributed over $300,000 of in-kind matching contributions towards NFSC projects. As a result, the NFSC has completed wildfire threat reduction plans for fifteen communities, removed thousands of tons of wildfire fuel, initiated a statewide analysis and prioritization of community wildfire threat reduction projects, and developed a private-public biomass utilization project. Keywords: wildfire, collaboration, nonprofit, fuel management.

Introduction

Nevada, a state located in the western United States, is consistently among the nation’s leaders in terms of total acres burned annually by wildfire. This, coupled with Nevada’s rapid population growth, means that the potential for wildfire to destroy property and take human life is significant. The following four factors contribute to this hazard.

- Fire Environment: Much of Nevada is considered a fire environment. Many areas of the state possess the appropriate vegetation, weather, and topography to support wildfire.

- Habitation of Fire Environments: The number of people living in Nevada’s high fire hazard environments has increased considerably during the past several decades. Unfortunately, many of these homes are being built and maintained without regard to the wildfire threat.

- High Intensity Wildfires: Firefighting agencies possess the manpower, knowledge, equipment, and technology to effectively control and suppress 97% of the wildfires started each year in the western United States. Three percent of the time, however, wildfires burn so intensely that they cannot be controlled by firefighting agencies. Experts predict an increase in the percentage of uncontrollable, high intensity wildfires in the future.

- Increased Ignitions: With more people living in and using high fire hazard areas, there is an increased risk of ignition.

These factors strongly suggest that the wildfire threat to Nevada communities is substantial and growing. If this is the case, then what should be done?

Materials and Methods

In 1998, the University of Nevada Cooperative Extension (UNCE) assembled an interagency committee to plan a conference that would deliberate the issue of Nevadans living in high fire hazard areas. Entitled the “Living With Fire Forum,” the objectives of the conference were to: 1) assemble the issue stakeholders, 2) improve stakeholder understanding of the issue through presentations by leading authorities, 3) identify solutions, and 4) create a communications network between the stakeholders. Issue stakeholders were defined “as any entity that would be impacted by a wildfire threatening or burning a home in Nevada” and included homeowners, firefighters, county...
commissioners, private forest and rangeland owners, land developers, public land managers, insurance company representatives, and others. The conference was held in Carson City during the summer of 1999, chaired by United States Senator Richard Bryan, and attended by 120 participants.

After attending two days of presentations given by wildfire threat reduction experts, the participants were randomly assigned to one of eight groups. The groups were asked to respond to the question “What should be done to reduce the wildfire threat to Nevada communities?” Each group was assigned a trained facilitator to assist in the discussions. The eight small group responses were then blended to create a single conference resolution. The resolution, which was unanimously adopted by the participants, was as follows:

“On June 3 and 4, 1999, a statewide conference was held to discuss the issue of wildland fire in Nevada’s communities. A resolution from this conference was to establish an independent statewide fire safe council that would provide support throughout Nevada to help make homes, neighborhoods, and communities fire safe.

The purpose of the council is to assemble diverse interests in a unified coalition that will work on solutions to reduce the loss of lives and property from the threat of wildland fire in Nevada’s communities.

The Conference Action Plan is to establish a fire safe council that will be multi-jurisdictional and led by a diverse group of committed members. The council will be open and inclusive, composed of various interests concerned about the wildfire. Members may include and not be limited to: agriculturists, builders, citizens, contractors, developers, educators, fire service personnel, homeowners, insurance companies, planners, real estate agents, tribes, and federal, state, and local government officials.”

During the conference closing remarks, all of the participants were invited to attend a follow-up meeting to implement the conference resolution. Twenty-four people attended this first meeting. It was decided that the statewide organization identified in the conference resolution would be called the “Nevada Fire Safe Council” and that it would be a 501(c)(3) nonprofit organization. During 15 subsequent meetings, organizational bylaws, Articles of Incorporation, Internal Revenue Service forms, and other documents were deliberated, completed and filed. On March 28, 2002, the Nevada Fire Safe Council (NFSC) held its first membership meeting and elected its first Board of Directors.

While the organization had existed “on-paper,” it was not yet functional due to a lack of operating funds. During this interim period, the UNCE provided leadership, clerical support and submitted numerous grant proposals to fund the organization. A change occurred during the fall of 2001, when the Bureau of Land Management and Nevada Division of Forestry agreed to provide operating funds for the NFSC on a trial basis. Soon after, NFSC hired a full time executive director. From this point on, the NFSC operated as an independent entity.

The NFSC is governed by a 13 member board of directors who are elected by its members. Although there are no designated positions on the board, the election process has been effective in selecting a board of directors that is representative of the issue stakeholders. In addition to the executive director, there is a full-time project manager and a Certified Public Accountant hired on an hourly basis. The board of directors and staff formally meet once a month, with several subcommittee meetings typically occurring between board meetings. A general membership meeting is held each spring. Replacement board members are elected at this time.

For the most part, the NFSC accomplishes its mission through community based chapters. Homeowners interested in becoming a chapter submit a simple application to the board of directors. The application identifies the chapter’s contact person, the geographic extent of the chapter, how the chapter will make decisions, and three goals the chapter wishes to accomplish during the next three years. The board then commits to assisting the chapter by obtaining funds for wildfire threat reduction plans and projects, providing technical expertise, serving as a communication link between property owners and government agencies, and providing administrative support.
Results

The NFSC has obtained the following results:

- **Membership:** There are over 1000 members of the NFSC. The majority of these members are homeowners living in high fire hazard areas.

- **Chapters:** There are twenty-one fire safe council chapters in Nevada. These chapters represent Nevada’s wide range of socioeconomic and environmental conditions.

- **Grant Funds:** Over $3 million in grants have been acquired by the NFSC on behalf of Nevada communities. While the majority of these funds are federal grants via the National Fire Plan, a growing source of monetary support is from the insurance industry.

- **Community Contributions:** Over $300,000 of in-kind contributions from homeowners involved in NFSC chapters have been documented.

- **Fire Plans:** Comprehensive wildfire mitigation plans have been prepared for fifteen communities.

- **Wildfire Threat Reduction Projects:** Sixteen wildfire fuel reduction projects are underway or have been completed. As a result, thousands of tons of wildfire fuel have been removed from high fire hazard areas.

- **Educational Programs:** Working closely with UNCE, the NFSC has conducted over 50 educational programs with homeowners concerning wildfire threat reduction, fire ecology, and other related topics.

- **Biomass Utilization:** With funding from the Nevada Commission on Economic Development, the NFSC conducted an inventory of biomass sources and formed a partnership with local government to develop a biomass utilization industry. It is hoped that the creation of such an industry will assist in the disposal of unwanted flammable vegetation.

- **Statewide Community Wildfire Risk Assessment:** The NFSC was asked by Nevada fire fighting agencies to lead an effort to assess and prioritize the wildfire threat to each of Nevada’s communities. Since future National Fire Plan funds will be tied to this assessment, it was important that the project be completed quickly and had the support of communities throughout the state. The NFSC accepted this task and the project is scheduled for completion December 31, 2004.

Discussion

The concept for a statewide organization identified during the 1999 Living With Fire Forum has become a reality. While many new, independent organizations fail, the NFSC has managed to surpass all original expectations. It is now a focal point for wildfire threat reduction in Nevada. The major reasons for this success are presented below.

- **Nature of the Issue:** The threat of wildfire to people and their homes is widespread in Nevada, significant, and growing worse. This issue, however, is one that homeowners can mitigate if organized, trained, and provided resources. The NFSC enables people to take responsibility for an issue critical to their community.

- **Need:** While there are many agencies in Nevada whose mission is to fight fires, there was not an entity specifically devoted to pre-fire wildfire threat reduction activities. In addition, no forum existed in which all the stakeholders in the issue could communicate on a regular basis and share resources. The NFSC responds to these needs.

- **Tenacity of the Founding Members:** During the two years following the Living With Fire Forum, the enthusiasm for the NFSC often waned. Without funding, the organization could not accomplish its mission. Fortunately, a dozen individuals continued to work on bringing the NFSC concept to reality.
Timing: In 2001, the National Fire Plan was initiated. For the first time significant funding was available for wildfire threat reduction projects for communities. The plan emphasized the need for collaboration between property owners, fire fighting agencies, the insurance industry, and others. While many states were not prepared to work through a collaborative process, Nevada had functional approach in place due to NFSC efforts. Consequently, Nevada was quick to put National Fire Plan grant funds to work.

Independence: The NFSC is not affiliated with any government agency. Decisions are made by a board of directors who are elected by the members. The majority of the members are homeowners living in high fire hazard communities. Consequently, the primary target audience for this issue (i.e., at-risk homeowners) is in control. This helps ensure that the organization remains focused on its mission.

Communication: Prior to the creation of the NFSC, there was no organized method of sharing information and resources between stakeholders. The NFSC is now an important vehicle for discussion, deliberation, and resource allocation for wildfire threat reduction.

Accomplishments: An important part of the council’s success can be attributed to its ability to complete projects in a timely and effective manner.

Conclusion

The NFSC is an excellent example of what a diverse group of stakeholders can accomplish in response to a critical issue. Through perseverance, timing, stakeholder involvement, effective communication, and collaborative effort, the NFSC has quickly become a key entity in Nevada’s efforts to reduce the wildfire threat to its citizens. Although there is still much to be done, NFSC has made a substantial contribution to the reduction of the wildfire threat to Nevada’s communities.
Increasing fire education for youths and adults: The BLM-PLT fire education initiative in North Carolina

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Abstract

Project Learning Tree is a national experiential environmental education curriculum that uses trees to help increase students’ understanding of complex environmental issues. In 2001, the Bureau of Land Management (BLM) partnered with Project Learning Tree (PLT) to provide increased opportunities to teach students about wildland fire, its important role in ecosystems, and fire-wise safety practices for homes and schools. The opportunity and challenge of creating locally driven programs to engage teachers, students, and other community members was given to individual state PLT programs.

The North Carolina PLT program has partnered with the North Carolina Division of Forest Resources, Weyerhaeuser’s Cool Springs Environmental Education Center, and North Carolina State Parks to present hands-on workshops for educators, natural resource professionals, and the general public. Participants are actively engaged throughout the workshops while learning about fire behavior, the science behind prescribed fires, fire ecology, and how to protect property from wildfires. Impact assessment of the North Carolina PLT Fire Education Workshops reveal participants did leave with increased knowledge about fire and fire as a management tool, and positive attitudes towards prescribed fires. Evaluations and post-workshop follow-up are summarized here, with recommendations for future fire education programming.

Keywords

fire education, experiential learning, educator training

Introduction

Fire has been a part of the landscape since before humans arrived in America. Lightning sparked fires, forced species to adapt, and created a natural mosaic of vegetation types. American Indians cleared the woods for fuel and fields, to the extent that early European settlers easily found open areas for settlement. Hunting and gathering societies used fire to encourage the growth of berries, wild grains and nuts, which in turn attracted small game populations. Large game animals like deer, elk, and bison were attracted to grasslands with tender herbaceous material. The fire practices of new world settlers mimicked the Indian tribes they had displaced (Pyne, 1982; Moorman and Sharpe, 2002)

The Bureau of Land Management (BLM) and Project Learning Tree (PLT) partnership arose out of a need for increased education regarding fire as a forest management tool. In the year 2000, there were 122,827 reported wildfires in the United States. These fires burned over 3.4 million hectares and destroyed 861 structures. During 2002, the danger of wildfires to urban areas became increasingly apparent. Wildfires destroyed 835 homes and 46 commercial buildings (NIFC, 2001). The media showed snapshots of homes being burned and forests blackened. The public had the perception that all fires in forested areas would lead to towering flames and destruction of homes and resources. Few were aware of the use of fire as a forest management practice. Fewer still knew how to protect themselves, and their property, from wildfire.

Following is a brief history of the nationwide BLM-PLT partnership, a description of the program in North Carolina, a discussion of workshop evaluations, and the future of fire education in the state.

The Bureau of Land Management

Part of the United States federal government, the BLM is responsible for managing 106 million hectares of land. The BLM’s mission is to sustain the health, diversity and productivity of public lands for use and enjoyment by present and future generations. Resources and uses include energy and minerals; timber; forage; wild horse and
burro populations; fish and wildlife habitat; wilderness areas; archaeological, paleontological, and historical sites; and other natural heritage sites (BLM, 2003).

The BLM also has wildfire management and suppression responsibilities for 157 million hectares of public and state land. The majority of BLM land is located throughout the western United States. These lands are large expanses of forest, grassland, and desert ecosystems. During 2000, there were 6,076 reported fires that burned over 650,000 hectares of BLM managed land (BLM, undated). The boundaries of these managed lands are now being encroached upon by human development and urbanization. Ten of the 12 western states with large BLM holdings are among those with the fastest growth rates in the United States. Obviously, the chances of the human population being affected by wildfires on BLM land increases yearly as the population grows and urbanization expands towards areas that were once only for recreation and natural resource management.

A partnership between the BLM, United States Forest Service, and National Weather Service created the National Interagency Fire Center (NIFC). With common fire management needs and goals, the NIFC complex hosts representatives of the BLM, United States Forest Service, National Weather Service, National Park Service, Bureau of Indian Affairs, US Fish and Wildlife Service and Office of Aircraft Services. Now, federal wildland firefighting agencies share and coordinate firefighting and emergency resources across the nation, and around the world. NIFC also serves as a focal point for wildland fire information, research, and technology.

**Project Learning Tree**

PLT is an environmental education curriculum that began in 1976. The goal was to develop a factual, non-biased curriculum with educators and resource professionals working together. The outcome was an activity guide that uses the forest as a “window” to increase understanding of our complex environment, to stimulate critical thinking, develop the ability to make informed decisions, and take responsible action on behalf of the environment (AFF, 2002).

The goals of the PLT program include:

1. Providing students with the awareness, appreciation, understanding, skills, and commitment to address environmental issues.
2. Enabling students to apply scientific processes and higher order thinking skills to resolve environmental problems.
3. Helping students acquire an appreciation and tolerance of diverse viewpoints, and evaluate all available information before developing attitudes and actions.
4. Encouraging creativity, originality, and flexibility to resolve environmental issues, therefore empowering youths to become responsible and participatory members of society.

Educators must attend workshops led by trained facilitators to obtain the PLT Activity Guide. Educators may be formal, working in a school classroom setting, or non-formal. Non-formal educators include, but are not limited to: state and local park rangers, forest service rangers, scouting leaders, natural resource professionals, and parent volunteers. PLT facilitators lead participants through activities, introducing them to the learning concepts and models found in the curriculum. Workshop participants take the materials back to their communities and present activities to local audiences in an effort to increase knowledge of the surrounding natural world. Brief teacher training in an informal science setting can have a positive effect on the instructional practices of teachers and the educational outcomes of students, if the activities are aligned with school curriculum (Smith et al., 1998). Informal environmental education training is also a boost to the comfort level of natural resource professionals as they prepare themselves for new roles as non-formal educators (Bainer et al., 2000).

The activity guide, though a wonderful resource, does not stand alone. The strength of the PLT program lies in the national network of educators, resource professionals, state and federal agencies, businesses, industries, and state coordinators that work together to deliver proven educational resources. This network provides technical assistance, field research information and reviews of the PLT information. New information is filtered down through the network, to the educators in local communities, and onto youths.
The BLM-PLT Partnership

Through environmental education, the BLM strives to realize healthier and more productive public lands through informed citizens. Informed citizens will hopefully take new knowledge back to their communities and feel empowered to participate and assist in solving local environmental problems. In an area plagued by wildfires, the BLM has a 106 million hectare classroom laboratory to teach about wildfires and how to protect human life and property (BLM, undated).

In 2001 PLT, the BLM, and NIFC entered into a partnership to provide increased opportunities to teach students about wildland fire, its important role in ecosystems, and fire-wise safety practices for homes and schools. These groups all have similar missions and goals for environmental education, yet each group brings an integral piece to the partnership. The BLM and NIFC provide funding, materials, and training for the Fire Education Initiative. PLT provides a network of state PLT Coordinators and local facilitators to lead fire education workshops. The use of state PLT facilitators as the avenue to spread the information is advantageous for the BLM. PLT facilitators are already embedded within the natural resource agencies of each state and have already built relationships with the formal and non-formal educators within local communities. PLT is known for providing well-rounded environmental education programs to be used with all ages. The BLM is well known in the western United States, but their land holdings are very small in the east and southeastern US. All the states in these key target areas have strong PLT programs.

The outcome of the BLM-PLT partnership has stimulated interactive, hands-on, and locally driven programs engaging teachers, students and other community members in wildland fire education and activities. Nationwide, BLM-PLT Fire Education workshops highlight PLT activities that focus on fire. Activities include Forest for the Trees, Living with Fire, Nothing Succeeds like Succession, Understanding Fire, Fire Management, and Decision Making: Managing Wildfire Risk. These activities offer hands-on explorations of fire-dependent ecosystems, investigating the effects of a prescribed burn, fire behavior, and how to protect property in the wildland-urban interface.

The other main component of PLT fire workshops is the Burning Issues CD-ROM, created by the BLM and Florida State University’s Media Science Project. Using cutting edge technology, students learn about the role of fire in ecosystems, prescribed fire as a management tool, wildfire suppression techniques, and Firewise™ homes and communities. These topics are covered through four separate eco-ventures, chosen by the user. Each ecoventure also introduces the user to fire-prone areas of the United States, and the fire adaptations of the flora and fauna.

Overall, the Fire Education Initiative has been very successful. The program grew from nine initial states in 2001, to 25 states in the third year of the program. The targeted goal for the first three years was 4650 participants. Since the beginning of the program in 2001, 5335 educators have been trained nationwide through the program (PLT, unpublished).

The BLM-PLT Fire Education Initiative in North Carolina

North Carolina became a part of the BLM-PLT Fire Education group in 2002, during the second year of the program. Because they are small and quickly contained, wildfires in North Carolina do not become national media stories. During 2000, there were 4,949 wildfires in the state that burned a little over 10,000 hectares. Of the reported number of fires, lightning caused only 57. An astonishing 2,049 wildfires were caused by property owners burning debris, and 358 by cigarettes (NCDFR, 2002, 2004).

North Carolina’s main objective for joining the BLM-PLT Fire Education Initiative was to educate the public about the need for prescribed fires. Through PLT workshops and other events, common misconceptions about fire became obvious; fire destroyed the forest, killed animals, and ruined the landscape (Van Lear and Harlow, 2000). Educators did not know the history of fire in North Carolina, how some of our valued ecosystems require fire, or that prescribed fire can be used to prevent large catastrophic wildfires that present potential hazards to human developments.

North Carolina, and much of the southeast, contains ecosystems that are fire-dependant. These systems include the longleaf pine-wiregrass and piedmont prairie ecosystems. Both of these ecosystems are comprised of flora and
fauna species adapted to fire disturbances, which are in decline due to years of fire suppression. (Engstrom et al. 2001, Moorman and Sharpe 2002, Daves and Seriff 2003). State agencies and private landowners wishing to restore these ecosystems use prescribed fire as part of a management plan. Silviculture practices that include prescribed fire see benefits through the release of nutrients into the soil, a decrease of competing species, and the reduction of leaf litter which allows sunlight to reach the forest floor (Moorman and Sharpe, 2002). Prescribed fire is often used by state agencies and private landowners to reduce fuel loads that can create hazardous fire situations (Bardon and Carter, 2003).

The North Carolina Project Learning Tree (NC PLT) program historically has worked with the North Carolina Division of Forest Resources (NC DFR), state parks, and environmental education centers. From the beginning of the state's involvement with the BLM-PLT Fire Education Initiative, the NC PLT State Coordinator worked closely with these organizations to plan and implement the program. Key locations, within the three main geographical areas of the state, were chosen for the PLT Fire Focus workshops (Figure 1). Weyerhaeuser’s Cool Springs Environmental Education Center (coastal plain) Clemmons Educational State Forest (piedmont), and Crowders Mountain State Park (mountain) all previously incorporated prescribed fires in their management plans and educated visitors about the use of fire as a management tool for forest resources and wildlife habitat.

North Carolina’s involvement in the BLM-PLT partnership was well timed with another national program, Firewise™. NC DFR was beginning to promote the national Firewise™ program, which teaches communities how to protect property through wise development and building practices. The use of prescribed burning is also encouraged for fuel load reduction. The PLT Fire Focus workshops promote the Firewise™ message, and along with the activity Decision Making: Managing Wildfire Risk, participants learn how to evaluate a community or home and its risk regarding wildfire. Participants then practice making recommendations to minimize the risk of wildfire damage. However, Firewise™ does not stress how these measures can be beneficial to ecosystems and wildlife habitats.

Prescribed burning, for fuel reduction and as a management tool, is discussed during Fire Focus workshops. Participants learn about the tools required for a prescribed fire, including drip torches, wind meters, fire shelters, and Nomex® clothing. Fire lines, natural fire breaks, weather conditions, air quality issues, obtaining the proper permits, and state agencies to contact for assistance are other topics discussed and demonstrated. Participants also compare the ecological diversity between areas that have been burned at different intervals with areas that have not been burned. In some workshop locations, participants use what they have learned and participate in professionally monitored on-site prescribed burns.
Another component of NC PLT Fire Focus workshops is fire behavior. Fire behavior includes learning the basic fire triangle, and how the various sides of the triangle can be manipulated for a desired outcome, or the potential danger, of a fire. The fire triangle is the basis for several PLT activities including *Living with Fire* and *Understanding Fire*. Other activities incorporated when discussing fire behavior include forest fuel demonstrations, and discerning the flammability of different plants common in forests or community landscaping. Another demonstration, *The Matchstick Forest*, illustrates how fire travels quickly up slopes and can jump from one area to another, leaving a mosaic pattern across a landscape. All of these activities are hands-on, require few materials, and can leave a lasting impression.

As required through the BLM-PLT grant, the *Burning Issues* CD-ROM is introduced during PLT Fire Focus workshops. One of four ecoventures is demonstrated following an introduction to the CD-ROM components. This allows participants to understand how the CD-ROM works (much like a video game) and how to incorporate the supplemental Student Field Guide to reinforce concepts. Workshop participants are encouraged to share the CD-ROM with others, and are given ideas on how to utilize the material in a non-formal classroom setting. In North Carolina, extensive time is not allocated for this aspect of the workshop. The CD-ROM is best used in a classroom setting, and most participants that attend the NC PLT Fire Focus workshops are non-formal educators. Computer access in classrooms is another limiting factor for extensive use of *Burning Issues*.

Lastly, workshop participants are introduced to the Fire Education Trunks. The trunks can be borrowed from the NC PLT program and contain resources to facilitate fire activities and lessons with groups. One trunk contains games, research resources, videos, books for all age levels, posters, and additional activity guides. The second trunk holds materials for hands-on activities with fire and safety equipment including Nomex® jump suits, goggles, hard hats, practice fire shelters, and fire resistant gloves. The BLM-PLT grant provided funds to establish these two education trunks.

**NC PLT Fire Focus Workshop Results**

Workshop evaluation consisted of a standard form used for all BLM-PLT fire workshops nationwide. The evaluations ask for written responses, therefore providing qualitative results, not quantitative. This format is well suited for participants and their variety of backgrounds and interests. Four questions were used to determine the effectiveness of the workshops (Tables 1-4).

Since 2001, there have been 128 participants at PLT Fire Focus Workshops. Participant backgrounds include forest service personnel, state park rangers, timber industry personnel, landowners, and formal and non-formal educators. All participants were given the evaluation form at the end of their workshop. Eighty-eight evaluations have been returned to the NC PLT coordinator. Evaluations could be anonymous, and participants were not required to answer all questions.

According to workshop evaluations, Firewise™ practices and wildland/urban interface risks were one of the primary topics participants learned about at the workshops (Table 1). Knowledge of Firewise™ practices was increased by attending the workshops (Table 2). One participant stated, “This has definitely made me rethink the plans of the new home we are building and how we can make it fire-wise”.

Fire behavior was listed 34 times as being new information learned during the workshops (Table 1). Fire behavior is very important when discussing protection of homes and communities from wildfires, and therefore is closely linked with building safer communities. One participant wrote “I will not build my house on a ridge since fire spreads 16-times faster uphill”. The fire triangle, which creates a strong foundation for understanding fire behavior, was listed 31 times. Comments listed that did not fit into a category were put into an “other” category. Some of these comments included the number of popular songs that allude to fire, learning fire vocabulary, North Carolina fire statistics, and the important role of firefighters.
The goal of the fire education program in North Carolina was to increase the awareness of the need for prescribed fires to reduce fuel loads and to manage ecosystems. Most of the evaluation responses show positive changes in regards to attitude (Table 2). One participant stated that their view of wild and prescribed fires had completely changed and become more positive due to attendance at the workshop. Another participant said they would personally change their behavior by never throwing a cigarette butt out the car window again.

Table 1. List three things you learned about fire as a result of attending this workshop

<table>
<thead>
<tr>
<th>Response Categories</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Historical Uses/Frequency</td>
<td></td>
</tr>
<tr>
<td>Nothing</td>
<td></td>
</tr>
<tr>
<td>Good Fire/Bad Fire</td>
<td></td>
</tr>
<tr>
<td>Fire Activities</td>
<td></td>
</tr>
<tr>
<td>Burning Issues CD-ROM</td>
<td></td>
</tr>
<tr>
<td>Fire Behavior</td>
<td></td>
</tr>
<tr>
<td>Role/Management/Benefits</td>
<td></td>
</tr>
<tr>
<td>Prescribe Burning</td>
<td></td>
</tr>
<tr>
<td>Firewise™/WUI</td>
<td></td>
</tr>
<tr>
<td>Fire Triangle</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. How might you change your attitudes/actions regarding fire as a result of attending this workshop?

<table>
<thead>
<tr>
<th>Response Categories</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Change/Personal Behavior</td>
<td></td>
</tr>
<tr>
<td>Appreciate Firefighters</td>
<td></td>
</tr>
<tr>
<td>Historical Uses</td>
<td></td>
</tr>
<tr>
<td>Multiple Issues/Perspectives</td>
<td></td>
</tr>
<tr>
<td>Good Fire/Bad Fire</td>
<td></td>
</tr>
<tr>
<td>No Change/No Answer</td>
<td></td>
</tr>
<tr>
<td>Educate Others</td>
<td></td>
</tr>
<tr>
<td>Firewise™ Building</td>
<td></td>
</tr>
<tr>
<td>Potential Hazards/Safety</td>
<td></td>
</tr>
<tr>
<td>Fire Behavior/Management Value</td>
<td></td>
</tr>
</tbody>
</table>
Workshop participants were actively engaged during PLT Fire Focus workshops and learned information and activities that they could share with others. Through the BLM-PLT grant, participants were provided multiple educational resources. Overall, participants responded that the provided materials and the activities presented in the workshops were appropriate for their needs (Table 3). Some participants did not think that they would be utilizing the fire information specifically for their programs, but thought the PLT Activity guides would be useful (Table 3, Table 4). Other materials included posters, general background information, and fire related vocabulary. Four participants stated the educational materials would not be of any use to them because their position does not provide opportunities for educating others, or they currently are not educators.

According to the evaluations, participants planned on sharing the information they learned at the workshops through activities and lessons, either in a formal or non-formal setting (Table 4). The general information participants learned during the workshops was also considered valuable to incorporate into current programs. A few participants planned on sharing the information they learned with local fire departments as part of a training program.

### Table 3. Which materials from this workshop seem most appropriate to your needs?

<table>
<thead>
<tr>
<th>Response Categories</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Fire Benefits</td>
<td></td>
</tr>
<tr>
<td>Wildland/Urban Interface</td>
<td></td>
</tr>
<tr>
<td>Fire Behavior</td>
<td></td>
</tr>
<tr>
<td>PLT Activity Guides</td>
<td></td>
</tr>
<tr>
<td>Burning Issues CD-ROM</td>
<td></td>
</tr>
<tr>
<td>Issues/Current Events</td>
<td></td>
</tr>
<tr>
<td>All Materials</td>
<td>25</td>
</tr>
<tr>
<td>Activities</td>
<td>21</td>
</tr>
<tr>
<td>Suppression</td>
<td>16</td>
</tr>
<tr>
<td>Suppression</td>
<td>11</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
</tr>
<tr>
<td>Fire Benefits</td>
<td>5</td>
</tr>
<tr>
<td>Wildland/Urban Interface</td>
<td>5</td>
</tr>
<tr>
<td>Fire Behavior</td>
<td>4</td>
</tr>
<tr>
<td>PLT Activity Guides</td>
<td>3</td>
</tr>
<tr>
<td>Burning Issues CD-ROM</td>
<td>3</td>
</tr>
<tr>
<td>Issues/Current Events</td>
<td>3</td>
</tr>
<tr>
<td>All Materials</td>
<td>2</td>
</tr>
<tr>
<td>Activities</td>
<td>2</td>
</tr>
<tr>
<td>Suppression</td>
<td>1</td>
</tr>
</tbody>
</table>

### Table 4. How will you incorporate the information and materials from this workshop into your education programs?

<table>
<thead>
<tr>
<th>Response Categories</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wildland/Urban Interface</td>
<td></td>
</tr>
<tr>
<td>Wildlife Management</td>
<td></td>
</tr>
<tr>
<td>Don't Do Education/Don't Know</td>
<td></td>
</tr>
<tr>
<td>Good Fire/Bad Fire</td>
<td></td>
</tr>
<tr>
<td>Trainings (fire department)</td>
<td></td>
</tr>
<tr>
<td>Use PLT, Not Fire Materials</td>
<td></td>
</tr>
<tr>
<td>Tour Groups Fire Information</td>
<td></td>
</tr>
<tr>
<td>General Information</td>
<td>37</td>
</tr>
<tr>
<td>Activities/Lessons</td>
<td>35</td>
</tr>
<tr>
<td>Shelters/Displays</td>
<td>29</td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
</tr>
<tr>
<td>All Materials</td>
<td>17</td>
</tr>
<tr>
<td>Activities/Lessons</td>
<td>16</td>
</tr>
<tr>
<td>Suppression</td>
<td>9</td>
</tr>
<tr>
<td>General Information</td>
<td>8</td>
</tr>
<tr>
<td>Activities/Lessons</td>
<td>7</td>
</tr>
<tr>
<td>Shelters/Displays</td>
<td>6</td>
</tr>
</tbody>
</table>

7
Follow-up evaluations were conducted with some participants. Of those that answered a brief questionnaire, all stated they had used the information learned at their workshop to educate others. Educational experiences ranged from informing neighbors about Firewise™ practices for their homes to fire activities with youths. All respondents stated they were planning fire activities and lessons for groups in the future. Through responses to the follow-up questionnaire, participants have already shared the information they learned with over 400 adults and youths. One response stated the information would be shared with over 1000 people through booth visits at conferences. Another response, from a fourth grade teacher, stated all the information was very valuable and shared with 45 students in a discussion about lightning. This teacher plans to incorporate the Burning Issues CD-ROM and other lessons into the classroom during the upcoming school year. One participant responded that his job duties do not allow him to lead educational programs, and he took the workshop because of personal interest.

As North Carolina continues with the BLM-PLT Fire Education Initiative, more locations for the workshops will hopefully be added. Target areas include urban areas near state forests, state parks, and other natural areas that use prescribed burning as part of a management plan. Short introductory sessions to introduce individuals to the materials can also be increased statewide. The relationship between the NC DFR Firewise™ team and the NC PLT program will continue to grow as materials and expertise are shared between the two groups. Continued development of the Fire Trunks, as well as increasing their access statewide, will permit more groups to use the materials.

**Conclusion**

The main objective for entering into the BLM-PLT Fire Education Initiative was to educate the public about the need for prescribed fires through hands-on and engaging activities. According to evaluations, this program has been successful. Participants at NC PLT Fire Focus workshops left with information that changed their perspectives of prescribed fire use. The changes were positive, including understanding the use of prescribed fires for fuel reduction and forest management. Participants also left the workshops with knowledge about fire behavior, and how the fire triangle can be manipulated for desired effects. Even more importantly, the information learned is being shared with others, as evident through the follow-up evaluations.

Partnerships with NC DFR, state parks, and environmental education centers are key in the success of this program. By working together to present PLT Fire Focus workshops, participants leave with information that is balanced. Participants are challenged to grasp the complicated issues of prescribed fire use and wildfire dangers, rather than echo the policy of one agency. The groups involved now have the opportunity to create stronger, more in-depth programs for youths, landowners, and the general public.

Fire, as a human threat and an ecosystem shaper, is here to stay. Planned prescribed fires should be seen as a positive management tool for wildlife and forest management, for silviculture practices, and to protect communities. BLM-PLT Fire Focus workshops are educational opportunities that can help the public distinguish between good fire and bad fire. As seen in North Carolina so far, educating adults and youths about the benefits of planned prescribed fires, and the prevention of destructive wildfires, has positive outcomes.
Literature Cited


The University of California Integrated Hardwood Range Management Program: Addressing Oak Woodland Conservation Through Research and Education

By

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Abstract

California's oak woodlands, also known as hardwood rangelands, cover approximately 3 million hectares of the state. These lands provide a wide range of critical values and services including forage for livestock, important wildlife habitat, recreation, beautiful scenery, and watershed protection. Since European settlement, these lands have been managed primarily for livestock production and today approximately 80% of them are privately owned. However, human-caused impacts have reduced the original woodland cover, and for nearly two decades there has been concern that oak woodlands are at risk, both because of tree removal, and because some oak species are having difficulty naturally regenerating. Because of these concerns, the University of California Integrated Hardwood Range Management Program (IHRMP) was established in 1986 to promote the conservation of oak woodlands and associated resources. After nearly two decades, the IHRMP has accomplished a great deal and threats to oak woodland resources have declined. However, woodland losses – mainly resulting from a growing population and urbanization pressures – continue and there are efforts to regulate oak harvesting through legislation. The effectiveness of education and research as tools for natural resource conservation is discussed.

Key words: Quercus, hardwood rangelands, SOD, regeneration

Background

The Integrated Hardwood Range Management Program (IHRMP) was established in California in 1986. At that time there was concern that oaks and oak woodlands in the state weren’t being managed properly and that the critical ecological values associated with these systems could be irretrievably lost if nothing was done. However, there was not uniform agreement about what to do or the best approach to take. Some favored establishing statewide regulations that would prevent oak harvesting except under certain
conditions. Others pointed out that the problems and concerns facing oaks and oak woodlands were different in different parts of the state and therefore should be addressed at the local level. And still others expressed the opinion that nothing was wrong with the way these resources were being managed and there was no need for intervention.

In the end the State Board of Forestry and the California State Legislature decided that the best approach was one of research and education and the IHRMP was founded. This Program brought together several state institutions including the University of California, the California Department of Forestry (CDF), and the California Department of Fish and Game (CDFG). It was essential that all of these organizations be part of the solution because the issues facing hardwood range management were complex and multidisciplinary and the different partner organizations had different strengths and personnel to help address and solve these problems. The University had the Cooperative Extension system that contained a well-established outreach network. By working with existing farm advisors that already had good working relationships with many hardwood range owners and managers, new management information could be disseminated rapidly and efficiently and new strategies quickly put into practice. The University also had the personnel and resources to address many of the research questions that needed answering.

The California Department of Forestry – now called the California Department of Forestry and Fire Protection or CDF – had other strengths. They had a network of service foresters familiar with local forestry issues and concerns who could help identify where the greatest threats to hardwoods were occurring. They also had a unit (the Forest Resources Assessment Program) that regularly assessed wildland resources and could help monitor the condition of hardwoods and detect changes and trends. The California Department of Fish and Game (DFG) was also an important player because hardwoods are so critical to wildlife. The Department contained expertise that could help identify the effects of various hardwood management practices on wildlife and help predict what types of management would enhance wildlife habitat.

When the IHRMP was established its mission was, and continues to be, to maintain, and where possible, increase acreage of California’s hardwood range resources to provide wildlife habitat, recreational opportunities, wood and livestock products, high quality water supply, and aesthetic value. To carry out this mission, specific objectives were also identified:

- Develop methods to sustain hardwood ecosystems and landscapes;
- Maintain wildlife habitat on hardwood rangelands;
- Restore degraded hardwood rangelands;
- Ensure land-use planning utilizes available information to conserve hardwood range ecosystems;
- Maintain economically viable private hardwood rangeland enterprises;
- Maintain statewide information on trend, condition, and extent of hardwood rangelands;
- Help focus public awareness on the importance of hardwood rangeland habitats.
In 1986, the primary threats facing hardwoods were firewood harvesting in the Northern Sacramento Valley, poor natural regeneration of blue and valley oak, and threats to sensitive watersheds in various regions of the state. By 2004 the picture has changed. Most firewood operations today leave many more trees and there is recognition that wholesale clear-cutting not only has negative ecological consequences, but reduces land values as well. Poor natural regeneration is also less of a concern today because there is less tree removal and practices to successfully artificially regenerate oaks have been developed. And there are now rules in most locales to limit agricultural conversions in steep watersheds where water quality could be impacted.

But concerns about hardwoods and their management remain. In the last several years there has been an increase in conversions of hardwood rangelands to vineyards as the price of premium quality wine grapes has gone up. Wooded hillsides that were previously thought too expensive to convert have been cleared and turned into vineyards in the primary wine growing regions of the state. Urban encroachment also continues to take a heavy toll on woodlands, as people move out of densely populated urban areas and seek the beauty and solitude that oak woodlands provide. And a new disease called Sudden Oak Death threatens several oak species, as well as other hardwoods, in coastal forests.

The IHRMP has responded to these, and other, emerging threats by changing the direction and emphasis of its research and outreach efforts over time. As described later in this paper, considerable effort has been focused on addressing the impacts of vineyard conversions and numerous educational materials have been produced, and educational programs conducted. We have also taken an active role in promoting planning tools, such as conservation easements and multiple habitat conservation plans, which are designed to conserve hardwood rangelands into the future. Finally, the IHRMP has taken an active role in addressing Sudden Oak Death by funding initial research efforts and taking the lead in educating the public about the potential consequences of this disease and how to help minimize its spread.

We feel that we have accomplished a great deal in our efforts to conserve hardwood rangelands and the myriad values associated with them, but there is still much more to be done. While some of the threats to woodlands have lessened, others have increased. And as long as the population of the state continues to expand, there will continue to be resource conflicts. It is our hope that the efforts of the IHRMP will make a difference and that future generations will look back and be grateful that hardwood rangelands are still an integral part of California’s natural landscape.

**Emerging Issues Being Addressed by the IHRMP**

*Sudden Oak Death*

Sudden Oak Death is a new type of mortality in oaks that was first observed killing tanoak (*Lithocarpus densiflorus*) trees in California in 1995. Because affected trees often changed rapidly from a healthy looking green color to brown as leaves dried up and died, the name Sudden Oak Death, or SOD, was used to describe it. In the late 1990’s, SOD began to kill true oaks including coast live oak (*Quercus agrifolia*) and California black
oak (*Q. kelloggii*). Because these species often occur at the wildland-urban fringe and are highly valued for their appearance and distinctive character they lend to the landscape, mortality in these species greatly heightened the level of public concern, and stories about the threat of SOD were reported widely in the mass media. In 1999 the University of California Division of Agriculture and Natural Resources provided special emergency funds to the IHRMP for initial coordinated research and extension activities directed at Sudden Oak Death. These funds, together with additional internal IHRMP funds, were used for preliminary research focused on identifying factors associated with tree mortality. They also helped fund a SOD Coordinator to educate the public and help answer questions posed by alarmed and concerned local residents.

In August 2000, the California Oak Mortality Task Force (COMTF) was established to coordinate a comprehensive and unified statewide program of research, management, monitoring, education and public policy aimed at reducing the impacts of elevated levels of oak mortality. Almost all members of the IHRMP are actively working with the Task Force: Specialist Richard Standiford is co-chair of the Research Committee; Specialist Bill Tietje is part of a research team evaluating potential impacts of SOD on wildlife; and IHRMP Program Manager Doug McCreary is on the COMTF Board of Directors and has served as co-chair of the Education Committee. The Task Force is working with researchers to try to determine where SOD occurs, how the pathogen is spread, and how it can be contained. It is also working with educators to make sure that the latest scientific information on management strategies to limit the spread of SOD is disseminated to appropriate clientele. The University of California IHRMP has been, and will continue to be, integral to these efforts. More information about Sudden Oak Death can be found on the COMTF web site: ([http://www.suddenoakdeath.org](http://www.suddenoakdeath.org)).

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**Land-Use Change and Monitoring the Status of Oak Woodlands**

Oak woodlands support the richest native flora and fauna in the state, but they also have more people than any other habitat type. The oak landscape is therefore continually changing due to increased population density and changing agricultural market forces. One of the IHRMP’s charges is to monitor the habitat loss, degradation, and fragmentation that result from these changes. To better assess the significance of change to the overall resource, monitoring is primarily done on a landscape scale, both on a statewide basis and in specific regions of concern. Several research efforts have produced significant results and information from these studies is being extended to state and local governments, as well as to the general public.

A joint venture between the U.S. Forest Service and CDF was developed to detect forest change by identifying differences in plant cover over time using satellite imagery. The IHRMP has been working to enhance the utility of this program by first attributing the causes of detected forest loss in oak woodlands, and second, by extending the information from this program at the local level – where land-use planning decisions may help prevent further oak losses. Determining the cause of forest loss across private land is difficult because of multiple ownerships and the small scale at which change often occurs. The IHRMP is working with UC Cooperative Extension farm advisors, local resource professionals, and land-owners to improve our ability to document small, yet
potentially widespread, changes to oak woodlands in order to better understand the extent of this type of change.

An important and relatively recent source of land-use change, particularly in coastal counties, has been vineyard expansion into areas that were not previously under intensive agriculture. The IHRMP has conducted research on the extent of this type of conversion in Sonoma County where it has been particularly dramatic over the last 10 years. We have also provided assistance to local policy efforts aimed at minimizing the impacts to watersheds from this type of conversion and have worked with grape growers to develop land management practices that minimize impacts to wildlife. The IHRMP has extended information on this subject through articles in widely distributed agricultural magazines (California Agriculture and Practical Winery and Vineyard), as well as in a specifically targeted brochure (Vineyards in an Oak Landscape), and frequently presents this information directly to grower associations through talks and short courses. In addition to these extensive monitoring and education efforts, we are conducting field studies on wildlife in the vineyard-oak landscape in order to better understand the impacts of this type of agriculture on oak-woodland-dependent species.

**Oak Woodland Planning**

As noted, some of the greatest impacts to oak woodlands result from urban encroachment into previously rural areas. California’s population exceeds 36 million and is expected to reach 50 million by 2020. New construction of homes and businesses often results in the direct loss of woodlands. Even when trees are preserved, the landscape can become fragmented, threatening wildlife habitat and other natural resource values. The IHRMP has sought to lessen the impacts of residential and commercial construction in oak woodlands by promoting planning strategies that minimize the impacts of development. The clustering of houses, while retaining large areas of open space, is an example of a planning approach that causes less fragmentation and habitat loss. In 1993 the IHRMP published *A Planner’s Guide to Oak Woodlands*. This document outlined ‘conservation-friendly’ planning approaches. It is currently being revised and will be republished because there has been a great expansion in knowledge in this area, and new planning approaches, such as Multiple Species Habitat Plans, and Conservation Easements have been developed and implemented in certain parts of the state. The revised version incorporates this new information.

**Wildfires in Oak Woodlands**

Everyone who lives in California is aware that fires regularly occur in our state and can have devastating consequences. In 2003 residents were again reminded by the fall fire storms in Southern California that despite long-standing efforts to suppress and control fires, we are still at the mercy of the Mother Nature and during extreme fire weather, there is little that can be done to prevent, or even contain, fires that do start. In the aftermath of these devastating fires, the IHRMP decided it was important to prepare a White Paper to provide information to landowners, resource managers, and policy makers about fire in oak woodlands. This White Paper was meant to provide a broad overview and address several limited, but important, subject areas including historical fire patterns, prescribed fire, the effects of fire on oaks and ecological processes in oak woodlands,
what can be done to help prevent future fires, and what landowners can do following fire to help the land and associated resources recover. The IHRMP has conducted research on the consequences of wildfires to residual trees and acorn production and studied the impacts of prescribed fire on wildlife habitat and wildlife populations.

**Other Current IHRMP Activities**

*Oak Woodland Research Symposium*

The IHRMP coordinated and hosted the Fifth Symposium on Oak Woodlands in the fall of 2001. Previous symposia on hardwood rangelands, held in 1979, 1986, 1990, and 1996, provided an opportunity for researchers on oak woodlands to come together and share information. The published proceedings have also served as rich sources of information about a wide range of subjects on oak ecology, management, uses, planning and conservation. The 2001 symposium, titled, “Oaks in California’s Changing Landscape,” included 75 formal presentations and 12 poster presentations on the latest information on the ecology, sustainable management, uses, monitoring, policy and products from California’s oak woodlands. Over 250 researchers, natural resource managers, policy makers, landowners, and representatives from various organizations attended the symposium, held in San Diego, California. This conference featured a plenary session on Sudden Oak Death – the first such session ever held. In it, almost all of the researchers addressing this problem reported their research findings, and the Proceedings of the Symposium greatly enhanced the published record of this new threat to California’s oaks.

The Proceedings of the symposium were jointly produced by the IHRMP and the USDA Forest Service Pacific Southwest Research Station, and included peer-reviewed papers from the 75 formal presentations, as well as abstracts from the poster presentations. The Proceedings were produced as a hard copy and also on a CD-ROM. All papers can be viewed and downloaded directly from the IHRMP web site at: [http://danr.ucop.edu/ihrmp/proceedings.html](http://danr.ucop.edu/ihrmp/proceedings.html).

*Research Funded by the IHRMP*

From its inception in 1986, the IHRMP has included a small but effective competitive research grants program. The program does not charge overhead and is open to any investigator, and successful proposals have been funded from a wide array of public and private organizations and from individuals. Requests for Proposals (RFPs) have been issued periodically asking for scientists to address high priority research areas, often in emerging areas unlikely to secure initial funding from other sources. The IHRMP’s research grant program has produced hundreds of published research articles and contributed directly to the knowledge base needed for developing effective policy and management. A list of these publications is available on the IHRMP web site ([http://danr.ucop.edu/ihrmp/](http://danr.ucop.edu/ihrmp/)). Crucial work funded by the IHRMP has been important for developing effective policies and management strategies related to oak regeneration, wildlife habitat requirements, biodiversity, and water quality. Since the start of the IHRMP grant program, over 50 research projects have been funded. All of the funded projects reflect timely, thoroughly evaluated, and highly significant subject areas.
IHRMP Workshops

As noted above, the IHRMP is a program of research and education. One of its primary outreach tools has been to conduct workshops and field days. Some of these have been broad in focus, addressing a number of subjects, such as the *Living Among the Oaks* workshops that were held up and down the state in the mid-1990s. Others have addressed a narrower subject, such as the *Oak Regeneration Field Days*, held at the Sierra Foothill Research and Extension Center every other year. New and emerging subject areas are often targeted in these meetings. That is why IHRMP personnel have participated in numerous Sudden Oak Death trainings in the last few years. And we are currently planning to hold a series of meetings for local planners to share with them the revised *A Planner’s Guide for Oak Woodlands* and discuss new conservation strategies for planners. One of the primary goals of all of these workshops is to put information in a form that can be readily applied in the field or woodland.

IHRMP Publications

Another critical aspect of outreach is the preparation and distribution of publications targeted to the wide array of clientele that we serve. Three major new IHRMP Extension booklets that were published in the last 5 years are the following:

*Regenerating Rangeland Oaks in California* – This document was designed to provide easy-to-understand instructions on how to successfully grow and plant oaks. It outlines how to collect acorns, how to propagate seedlings, and how to plant and maintain seedlings in the field.

*Oak Woodland Invertebrates: The Little Things Count* – This full-color publication provides an introductory guide to a widely unnoticed universe – the minute animals called invertebrates that live in the California oak woodlands.

*Vineyards in an Oak Landscape* – This manual is designed for grape growers with vineyards next to woodlands, landowners considering vineyard development, and, in general, those interested in agriculture and natural resource issues. It emphasizes the unique values of oak woodlands in California, the threats facing oak woodlands from agricultural expansion, and how to conserve natural resources in and around vineyards.

Other IHRMP Publications Available

The IHRMP also has produced a number of different educational publications on various aspects of managing and conserving California’s oak woodland resources. These are listed below and on the IHRMP web site (http://danr.ucop.edu/ihrmp/). Free publications can be ordered via e-mail.

- *Oaks ‘n Folks Newsletter*
- *Guidelines for Managing California’s Hardwood Rangelands*
- *Landscape Conservation Planning: Preserving Ecosystems in Open Space Networks*
• Living Among the Oaks
• Wildlife Among the Oaks
• How to Grow California Oaks

Conclusions

During the 18 years that the IHRMP has been in existence, there have been many changes in woodland conservation and how oak woodland resources are managed. Some of the major threats to oak woodland resources identified in the early 80s have abated. This Program has been effective is greatly expanding the information base about oak woodland biology and management and educating the public about management approaches that foster long-term conservation.

But threats to oak woodlands remain, and in some cases have increased. Principal among these are the impacts associated with an ever-expanding population. It is unreasonable to expect that impacts from population increases will decline soon because it is universally agreed that the population of the state will continue to increase. However, thoughtful planning and education of the public can help temper the adverse impacts and promote conservation. That is the continuing goal of the University of California Integrated Hardwood Range Management Program.
Extension Strategies in the Sloping Land Conversion Program in China: An Analysis of their Strengths and Limitations

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Abstract
The Sloping Land Conversion Program (SLCP) is one of the biggest ecological rehabilitation efforts in China covering an area of 15.04 million hectares and involving 20.19 million rural households and 97.53 million farmers. Forestry extension plays a crucial role in the process of SLCP implementation as the program seeks to promote planting and conservation of soils even in the face of economic losses in the short run. This paper summarizes the extension schemes and methodologies adopted, lessons learnt and specific case analysis is presented. The analysis shows that there is a need to combine the traditional, top-down approach with down-top, “problem solving” approach and strengthen the involvement and bi-directional communications of multiple stakeholders and sectors. This has significant implications for extension strategies to promote the participation of rural masses in ecological rehabilitation efforts that demand some sacrifices from them in the short run.

Key Words: forestry extension; the Sloping Land Conversion Program; extension strategy

1. Introduction
Forests and Forestry are being paid more and more attention in the historical transformation from timber production to ecosystem management in China. The investment in forestry has been observably increasing, especially with an all-time scale of investment in forest ecological construction over recent years. There are six large forestry programs in China of which five are direct ecological rehabilitation efforts. Besides other approaches such as technical assistance, financial subsidies and regulation of forest management, forestry extension plays a significant role in the process of their implementations. In this section, a brief introduction on the Sloping Land Conversion Program (SLCP) and forestry extension system of China is made.

1.1 The Sloping Land Conservation Program
The Sloping Land Conservation Program (SLCP) began to experiment in 1999 in Sichuan, Shaanxi and Gansu Provinces and in March 2000 this pilot implementation phase was extended to 174 counties in Yunnan, Guizhou, Sichuan, Hubei, Shanxi, Henan, Shaanxi, Gansu, Ningxia, Qinghai, and Xinjiang Provinces and Inner Mongolia Autonomous Region, as well as Chongqing Municipality. In June 2000, another 14 counties in Hunan, Hebei, Jilin and Heilongjiang were added to the program. In 2002, the SLCP was launched formally. By 2003 the program had expanded to include a total of 1800 counties in 25 provinces and Autonomous Regions and covered an area of 15.04 million hectares involving 20.19 rural households and 97.53 million farmers; the area of converted cropland and afforested barren land is 0.72 million hectares and 0.78 million hectares respectively (Zhi, 2004). The main objectives of the SLCP are to reduce erosion by converting private cropland on steep slopes and degraded lands/barren lands to grasses and tree-cover, adjust agricultural structures and alleviate poverty. The incentive mechanism adopted is to provide the farmers who convert their lands with cash, grain, and saplings. In
In terms of economics, the SLCP is essentially a public payment scheme for environmental service from private farmlands. It subsidizes the conversion of degraded and vulnerable agricultural lands to trees or grassland cover.

1.2 Forestry Extension System in China

*Agricultural Technical Extension Law of 1993 of the People’s Republic of China,* and the *Circular on Stabilizing Forestry Extension System* issued jointly by six central agencies, provide an enabling legal environment for forestry extension work. This is supported by financial input and capacity building by the authorities.

1.2.1 Forestry Extension Agencies

China has its own unique system of forestry extension that has developed under and is suitable to its particular situation and the strong chain leadership from the central to the local-level.

The task of forestry extension is carried out by extension bureau that form part of the forestry departments at different level. At the national level, the Central Government has its State Forestry Administration (SFA), which is responsible for laying down policies and guidelines for afforestation, forest management, forest industry and other forestry development activities. The SFA has a specialized bureau responsible for extension work and the Forest Departments at provincial, prefecture and county levels have similar forestry extension divisions. The forestry departments at county level are the lowest-level forestry authorities. Township government has forestry stations normally with one to three extension technicians, who are responsible not only for forestry extension but other administrative tasks as required by Township government. The main role of the Township government is to promote social and economic development (Wu et al, 1996). Forestry stations at township level are the grassroots units that organize and manage forestry production and protect forest resources. At present, there are 30,175 units at township level with 151,101 employees, 87% of whom are trained. Under the Township, there are village communities. Farmer households are the basic production units. As a consequence, centralized management is integrated with decentralized management in the system (Figure 1).

Extension personnel at the lowest level often serve the dual function of promoter (e.g. demonstrating planting techniques) as well as implementer (e.g. managing block plantations). In recent years, extension agencies or centers have been set up within research organizations for the purpose of extending their specific technologies. So far, there are no NGOs or private extension agencies. However, informally, stakeholders often undertake extension functions as well.

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1 The ownerships of these farmlands are collective or individual. For the former, the ownership of the farmland lies with the local government, but farmers have its use right for 30 years at least.
1.2.2 Forestry Extension Approaches and Methods

The objects of the extension program and the availability of resources largely dictate the extension approaches and methodologies. Within this overall constraint there are many approaches and numerous methods of extension that can broadly be categorized as “top-down” (dictated from the outside) versus “down-top” (planned and managed by local people) (Falconer, 1987). Overall, the extension approach in China is a “top-down” model. But in many cases, there have been some changes in extension approaches and methodologies along the lines of participatory development. Main extension methods are as follows.

**Mass Media**

Public education and publicity are carried out through all known methods of mass media, such as radio, television, loudspeaker and public speeches, posters and booklets. The most common, effective and cheap way of public education in the countryside are the posters, which is simple message in slogan form posted or painted on the walls of the houses, on the terraces, on the river banks and hung up on lamp posts or trees along the roadside (Wu et al, 1996). The main slogans are “Plant trees! Green the Motherland!” , “Plant trees! Green the Barren Mountains!” , “Want to be rich? Plant more Trees!” , “Preventing Forest Fires is Everyone's Responsibility”, “Plant Trees for the benefit of Future Generations!”, and “Sloping Land Conversion for the benefit of Future Generation!” and so on. Slogans, posters and loud speakers on tree-planting and family planning control are the most common and wide spread public propaganda contents across China. Loudspeakers are useful for education messages in rural areas, especially where many people are illiterate. All these mass media enable people being aware of the importance of tree planting all the time.

All kinds of books and teaching materials and various periodicals have also been playing an important role in forestry public education to people in all levels. This general awareness had only been possible through the
integrated nature of the training programs and public education, but also through the interdependent nature of agriculture, forestry and animal husbandry which, in fact, forms the basis of the Chinese economy and the way of life (Wu et al, 1996).

**Group Media**

Some methods with local color such as plays, films, puppet shows, mimes and entertainments are often used at local level. Using locally known comedians and popular language, the play presents a parody of local situations. These methods have proved popular and effective, introducing or convincing people of the relevance of a particular subject.

**Training and Field Visit**

Apart from the above formal training or education, training by demonstration is also important. Once a technique, as for instance a new tree clone or a new cultivation method, shows promise, then the local leadership, scientists and extension officers collaborate on the publicity of the new knowledge by all possible means such as publications, TV, radio and posters. One of the most effective and widely used ways is field visits. The candidates for field visits are usually cadres, extension officers, technicians and representatives of farmers or farm workers, who are selected by local government. Then these people set up their own demonstration sites for training local people.

**Individual Contact**

When necessary, extension personnel and local resource users establish individual contacts to deal with the specific issues and problems through consultation and technical instruction.

The roles of enabling policies, scientific research, various public education methods, field demonstration and professional and short term training have become more and more important in extension. What method to be chosen is usually dependent on the human and financial resources of a program or project as well as its goals. Generally, a combination of methods is used.

**2. Extension Strategies in the SLCP Implementation**

**2.1 Implementation Process of the SLCP**

The planning and implementation process for the SLCP is complex because its target is millions of smallholders. It includes a broad set of government agencies and a great diversity of land-use types and technologies. Generally the SLCP implementation has the following steps.

- The program design is centralized. The central government first defines the overall area and scale of the program;
- The relevant provinces then formulate provincial SLCP plans, and submit them to relevant central government bodies including the SFA;
- The SFA examines and balances the plans of various provinces, and then formulates the national SLCP plan, which is then submitted to the State Council for approval;
- Once the national plan is ratified, the SFA jointly with other central agencies such as the State Development and Reform Commission assigns tasks to the provinces and autonomous regions according to this plan and requires them to formulate annual implementation plans accordingly;
- The provinces then assign program tasks lower-level governments, which in turn assign tasks to

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governments at even lower levels;
- Local level governments, normally county forestry departments in cooperation with township governments, conduct field surveys and delineate tasks by farmer household;
- These grassroots level implementation annual plans are then reported up level-by-level to the SFA;
- The SFA then examines and approves the plans, and sends them back down level-by-level governments and forestry departments;
- Actual implementation takes place mainly at the local level. County-level governments send technical teams down to the townships; with the assistance of these teams, township governments organize farmers in the villages to implement the SLCP;
- The contract on conversion of cropland is signed with the farmer household who are required to plant trees on their own retired croplands and the matching degraded lands (or barren lands). To the extent that the task of afforestation of the degraded lands involved in the planning of the SLCP remains unfinished the same is contracted out to the neighboring farmers or communities who volunteer for the work;
- Inspections are conducted by authorities at various levels, including village, township, county, and provincial governments. The SFA also organizes random inspections;
- Farmers whose conversion work passes the inspections then receive grain and cash compensation;
- The governments at every level prepare work reports at the end of the year; at the same time, work plan for the following year is prepared.

The above steps can be summarized as three stages: planning and technical design, implementation, and inspection and evaluation. Figure 2 depicts briefly the core process for the SLCP implementation. One of the most difficult steps in implementation design is that of technical design. Not only must technical design focus on achieving the program objective of reducing soil erosion, it must also consider the farmers’ resources and efficiency. Land surveying has a direct impact on the grain and cash compensation, so this difficult work has to be carefully done. The selection of the most appropriate types of trees to be planted is also often difficult.

Figure 2 the core process for the SLCP implementation

\[3\] For example, efficiency will be higher if converted lands are contiguous to one another.
2.2 Extension Strategies

As used elsewhere in the world, extension sometimes describes implementation of government policy or advisory services of the type offered by the private sector through forestry consultants (Reed, 1999). In a broad sense, the above implementation process for the SLCP is just an extension program, through which the target population are provided with information, contacts and services necessary in order to understand and participate in implementing the SLCP. The extension in the SLCP implementation has five main strategies:

- Raise the awareness of the public on the significance of the SLCP
- Increase the understanding and participation willingness of farmers
- Establish cooperation with those who influence the participation of farmers
- Include the farmers into implementation process of the SLCP
- Technical transfer

**Strategy 1: Raise the awareness of the public on the significance of the SLCP**

Strategy 1 targets the public whose participation is sought, raising their awareness through informing them about the consequences of soil losses and environmental degradation, the usefulness of the ecological service functions of forests to the rural society, the objective and significance of the SLCP, and the experiences and results of the pilot work carried out elsewhere. This not only creates an enabling environment in the society but also helps produce new ideas.

All available tools of communication are used including both electronic media based instruments such as television, videos, radios, films, and filmstrips etc. and print media based instruments such as posters, brochures, books, teaching materials, journals, newspapers and so on. Disseminating the achievements and educating the young people in school and college is also helpful in achieving the objective.

**Strategy 2: Increase the understanding and participation willingness of farmers**

Farmers are the true implementers of the SLCP and the real risk-takers of the program policies who undertake the task in the hope of being the beneficiaries in the near future. They are impacted directly by the SLCP. Strategy 2 focuses on village communities and farmers, especially the eligible farmers, increasing their understanding and willingness to participate in the SLCP, through intensive education on the program policies, their assigned tasks, and ownership issues of forest and forestland, services offered by the government and compensation that they can expect for their contribution to the program.

Besides the slogans, posters and loud speakers, group media and field visit and training by extension personnel at local level are used widely in program areas. Some specific activities are also taken. For example, from 10 May to 25 June 2002, the Heshun County government in Shanxi Province, together with relevant townships and villages, organized a propaganda team to go into the various townships and village communities. They printed and distributing over 30,000 leaflets, organized about 20 seminars, and trained over 2,400 persons/times. Through various methods, they explained the policies to local people and got feedback from farmers (Xu et al, 2003). A full understanding about the SLCP lays a good basis for farmers’ participation in the program.

**Strategy 3: Establish cooperation with those who influence the participation of farmers**

Strategy 3 focuses on those who influence the participation of farmers. They are mainly the government agencies at all levels. It is important that they are aware of the SLCP and what they can do to further the program.
At the central level, the key players are the State Development and Reform Commission, the Office of the State Council’s Western Development Leading Group, the Ministry of Finance, the State Grain Bureau, and the SFA. The State Development and Reform Commission and the State Council’s Office of Western Development are responsible for overall planning and coordination. The Ministry of Finance is responsible for fund appropriation, management and supervision, while the State Grain Bureau responsible for providing grain compensation for the farmers. The SFA is responsible for implementation of the SLCP, who has established a SLCP management office, responsible for overall planning and annual plans and management and supervision of implementation. In addition, the SFA carries out field investigation and surveys in order to provide the state Council with advice for related decision-making.

Governments at provincial and county levels are answerable to the higher levels of government for the implementation of the SLCP within their jurisdiction. They are responsible for identifying priority areas for cropland conversion, creating necessary conditions for implementation such as timely provision of matching funds, setting up lead groups to direct the work of relevant agencies, and examining and approving the proposed plans of relevant agencies. Provincial lead groups are typically made up of heads of planning, finance, grain, forestry, animal husbandry, agricultural, and land bureaus. The county’s lead group is usually composed of leaders from the county’s planning department, agricultural bureau, finance bureau, and townships. The county-level forestry departments typically set up a SLCP management office to be responsible for formulation of relevant plans, implementation, monitoring and evaluation, management of program funds, formulation of specific management rules, and provision of technical support and saplings.

The township-level governments are responsible for mobilizing and organizing farmers to implement the SLCP on the ground, including formulating plans, assigning tasks to villages, conducting inspection and supervision, providing guidance to villages and farmers, evaluation, distribution of compensation, and coordination among various departments. The township leading group for the program includes the heads of local villages.

The cooperation among the above stakeholders is established through a responsibility program targeting government leaders at all levels and a number of regulations guiding implementation. The forestry extension departments at various levels play an important role for the coordination. A communication networking with vertical and horizontal contacts is formed.

**Strategy 4: Include the farmers into implementation process of the SLCP**

Strategy 4 focuses on the eligible farmers. Millions of farmers are the implementers of the SLCP on the ground. They are typically encouraged to participate in the planning and design of the SLCP at the local level. The participatory planning and design of the SLCP begins with awareness-raising about the policy and regulations in eligible village communities and farmers, who submit applications for joining the program. The planning team, consisting of technical experts from the forestry bureau, township officials, and local technical personnel, go to the villages to introduce the program and participatory planning process to farmers. They conduct field surveys regarding current land use and prepare maps accordingly. The farmers then decide which pieces of land they would like to convert and fill out planning forms. The planning team then decides on land use plans and the types of trees for planting together with farmers. A plan regarding the land area to be converted and the density of trees to be planted is formulated. The planning results are publicized and discussed with farmers until unanimity is reached. Then the township government signs contracts with village communities or farmer households and the plans are submitted to the county forestry bureau.

At the stage of implementation, besides the regulations formulated by central and local governments, some
specific measures are taken to ensure the SLCP implemented. Gansu Province, for example, adopted a “SLCP management card” system. For each of these cards, seven copies are made; one is to be kept by the farmer households, one by the village community, one by the township government, the county forestry bureau, the county animal husbandry bureau, the county grain bureau, and the county land management bureau. Through such a management card, a communication chain is established among the different stakeholders.

In order to increase transparency, a publicity system is set up in the townships and villages involved in the SLCP. The relevant information such as the name of participator, the area of cropland converted, types of trees planted, the area of land afforested, survival rates of trees planted, and disbursement of cash and grain compensation and so on are publicized. In this way, farmers have more knowledge of the SLCP implementation.

**Strategy 5: Technical transfer**

Strategy 5 focuses on delivering techniques and services necessary to farmers, which involves mainly researchers, extension and technical personnel, and farmers. Major approach is informal education, including using appropriate methods such as posters, publications, demonstrations or short training course on relevant knowledge and technique, and individual problem-solving on-site.

Much research has already been conducted in various places on the technical aspects of vegetation restoration. Based on substantive field investigation and survey by the teams of researcher and technical personnel, the technical standard for the SLCP in light of different geographical and climatic conditions are formulated and different cropland conversion models are designed. The SFA presents 113 typical technical models of cropland conversion targeting various program areas in 20 provinces and Autonomous Regions (SFA, 2001). All the applied technique and knowledge are transferred firstly to the local extension and technical personnel through publication and training course imparted by researchers and technical experts, and then to the farmers through group demonstration or training at local communities, or individual instruction on-site conducted by the local extension and technical personnel.

In addition, the local governments, extension and technical personnel conduct field investigations in village or township communities on the appropriate types of trees, the demands and sources of sapling in order to provide the service of supplying sapling to farmers on a voluntary basis.

3. **Effect Analysis of the Extension Strategies**

3.1 **Strengths**

*High enthusiasm for participation in the SLCP*

According to a case study by CCICEO Task Force on Forests and Grasslands (Xu et al, 2001), farmers who were interviewed said they generally welcomed the SLCP. About 90% of the farmers in 5 of the 7 case-study counties in 7 provinces were willing to participate in the program. In the other two counties, the ratios were 88% and 69%. The reasons were both their satisfaction with the financial subsidies given to them as well as their conviction about the usefulness of the program. Framers were found to be knowing the program objectives and strategies well and their ecological awareness had been raised to a degree that they were willing to forego immediate gains for higher productivity in the near future. This resulted in their enhanced enthusiasm in participation and general support for the objectives of the program.
Communication network with vertical and horizontal contacts

The cooperation among different government sectors at various levels forms a communication network with vertical and horizontal contacts in the SLCP implementation. It facilitates the exchange of information and knowledge and coordinates actions, thus reducing greatly the chance of policy failure and shortens the time of learning and exchanging. The system usually acts rapidly, and it allows detailed planning to make the best use of the staff, time, and resources available over the program areas.

Farmers’ participation in the planning for the SLCP

The SLCP includes farmers into planning and design and implementation on a voluntary participatory basis, which contributes to program effectiveness and efficiency. Reforestation, forest rehabilitation and conservation cannot be done by government alone. Rural people live in the targeted areas and possess intimate knowledge of the local requirements as it is they who suffer the consequences of environmental degradation in their neighborhood. Only they can reverse the present trends of soil resources degradation. Their participation in the planning along with local technical and extension personnel is a key to the effectiveness of the plans.

Relevant technical spread in rural areas

The knowledge of silviculture and other relevant technologies were found to spread rapidly even beyond the targeted areas under the program by word of mouth and this has a multiplier effect. The farmers’ technological awareness is raised significantly contributing to the application of new techniques in forestry production enhancing economic and ecological returns to the individuals and the society.

3.2 Limitations

Centralized nature of management limiting program effectiveness and efficiency

The current SLCP follows the traditional approach, i.e., the central government makes the decision and provides funds, and local governments take responsibility for implementation through a program. Such a “project” approach, while bringing new resources and resolve to the extension agencies, has a tendency to promote “intervention-oriented” approach to the challenges of natural resources degradation. In a rush to plant trees and thereby address soil erosion, it tends to overlook the fact that degradation is the result of inappropriate land-use sometimes caused by inappropriate institutional environment, and that there is a need to manage the use and its environment and not just treat the cropland affected. By treating the symptoms and not the causes, the inevitable crash of subsistence farming systems may be postponed, but with greater negative and difficult to reverse ecological and socio-economic consequences in the long term.

In addition, the central government is stringent on quality and timing of the SLCP implementation making the implementing agencies at various levels very sensitive to the program. Government officials regard the work associated with the SLCP as political tasks. According to the responsibility system targeting government leaders, the leaders in charge at township and county level are dismissed from office if a county or township can not complete the tasks assigned to it by higher level of government. In the eyes of many township/county government officials, the program is above all a “Do-It-or-Get Dismissed-from-Office Program” (Xu et al, 2001). The negative effect of this is that many problems emerging in implementation are hidden by local governments and extension agencies, and that the principles of voluntarism and the due benefit for farmers are not always taken into consideration. This places severe restrictions on the “down-top” possibilities in the extension activities and implementation process for the SLCP in this context.
Rushed implementation and overburdening of local agencies

Rushed implementation of the program has led to less than ideal results. The reason is that local governments have not time enough to establish effective extension and implementation system. In addition, the burden on local governments especially for the local forestry departments in terms of existing personnel is quite high. Generally, once a township is involved in the program, most of its own government staff will have to be involved for a period of more than two months annually. In some areas, local governments who are short of staff organize special teams to complete assigned tasks as quickly as possible. The extension and technical personnel are so short that many farmers’ requirements on forestry techniques cannot be met. The quality of the SLCP is thus impacted directly.

Problems related to tending of planted trees

In the extension activities and program implementation, the issue of tending of planted trees is not given adequate consideration. In many areas, cropland retiring and tree planting are two separate processes of cropland conversion. It is clear that retired cropland should be managed by the landowner or renter. However, it is not clear, who should tend the trees planted on degraded land and to whom those trees belong. In addition, in some places, trees planted need watering and should be guarded from rabbit and rat damage. The agreement signed between the government and farmers, however, do not address issues related to water sources and rabbit and rat prevention techniques. The reason of this is both lack of bi-communication between governments and farmers and the fact that the extension work places emphasis on the immediate benefits of allowances or assistance in any form being offered to start the program, not the final benefits that can be derived from the program activities.

Insufficient communication with other sectors in society

The existing extension and implementation for the SLCP pay attention to the communication between the governments especially forestry departments at various levels. However, the communication with other sectors such as research institutions and media units is far from sufficient although it is also important. The lessons learned domestic and abroad show that the whole society’s participation is an important impetus.

4. Conclusions

The SLCP is one of the largest programs of its kind involving a number of public agencies at all levels and millions of farmers in the whole country. A number of extension strategies have been adopted to promote its implementation. The focus is on raising the public awareness and understanding of the long term economic significance of the SLCP and thereby motivates the farmers to willingly participate in the planning, implementation, monitoring and evaluation of the program.

The strengths of the extension strategies adopted are: 1) Framers know the program well and are motivated to participate enthusiastically for achieving the objectives of the program; 2) The vertical and horizontal communication network in the SLCP implementation makes an efficient use of the staff, time, and resources available over the program areas; 3) Farmers are included into planning and design and implementation on a voluntary participatory basis in most areas; 4) The knowledge of silviculture and other relevant technologies were found to spread rapidly in rural areas. However, some limitations exist as follows: 1) Centralized nature of management limits program effectiveness and efficiency; 2) Rushed implementation of the program overburdens the local agencies especial for the local forestry departments leading to lower quality; 3) The communication with other sectors such as research institutions and media units is far from sufficient although it is recognized as important; 4) The issue of tending of planted trees is not given adequate consideration as the extension work
places emphasis on the immediate benefits offered to start the program.

An enabling legal and policy environment has been created to obtain the cooperation of those who influence the participation of farmers targeting government and other public leaders at all levels and enhance their sense of responsibility towards the success of the program. Conceptually the program seeks to bring large-scale changes in the usage of lands vulnerable to loss of productivity through an infusion of technology and finances from the center and detailed micro planning, implementation, monitoring, and innovation in both the content and approaches, coming from the grassroots. But, overall, it is still more veered towards a top-down model and more efforts are needed to steer it towards participatory development.

The analysis result shows that, under the system of governance in China, a strong content of traditional top-down extension approach is needed for the success of a large-scale ecological rehabilitation effort as it brings in its wake closer co-operation among politicians, scientists, extension officers and farmers and collaboration among institutions. The success, however, would be still limited as the real implementer of the program, the farmer, also needs to feel that his role is crucial before he can be motivate to participate enthusiastically. There is a need to combine the top-down command efforts with down-top, “problem solving” approach and strengthen the involvement and bi-directional communications of multiple stakeholders and sectors to improve the program effectiveness and efficiency. This has significant implications for extension strategies to promote the participation of rural masses in ecological rehabilitation efforts that demand some sacrifices from them in the short run.

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Reference


A Case Study on Extension Experience of the ITTO Demonstration Project of Sustainable Management of Tropical Forest in Hainan Island of China

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Abstract

This paper is a case report on forestry extension, summarizing and analyzing the experience and effect of demonstration and extension of ITTO project “Demonstration of Classified Management and Sustainable Utilization of Tropical Forest in Hainan Island, China” (ITTO PD 14/92Rev.2) implemented by China from 1993 to 2003. ITTO has provided 3.28 million US dollars with financial supports for the project. During the implementation period, the project has produced significant benefits. The demonstration project has almost entirely altered the forestry development model of Hainan Province and has had deep impacts on other provinces and even some circumbjacent countries. The project has created an Integrated Development Model under which national objectives are combined with the local objectives, the central and local policies are linked up at local level and the national and local research resources are gathered together for concrete action at the local management level. The changes brought out in this model over the existing forest development models in practice in China are so deep and far reaching that it needs special efforts to convince all involved actors to arouse the enthusiasm of forest owners, managers and farmers and enhance their technical and managerial skills. In this paper, the extension model of the demonstration project is presented and the demonstration effectiveness analyzed.

Keywords: Forestry Extension, Demonstration Project, Sustainable Forest Management

1. A brief introduction to the ITTO demonstration project

The project was intended to explore ways of realizing sustainable management of tropical forests by taking Hainan Island as an example. The project consists of six subprojects as listed below:

Subproject 1: Demonstration area for tropical plantation;
Subproject 2: Demonstration area for sustainable management of tropical natural forest;
Subproject 3: Demonstration area for artificial agriculture-forestry-pasture ecological system;
Subproject 4: Demonstration area for protection of tropical primary forest;
Subproject 5: Investigation on information;
Subproject 6: Human resource development, extension and demonstration

The project was implemented in 3 phases, lasting for 8 years. The total project duration was actually 10 years by adding the pre-project period and the project summarization period. The six subprojects in 3 phases have produced 68 outcomes by carrying out 300 activities. The total investment was 40 million RMB including US$3.28 million from ITTO. In addition, the fund for the pre-project was US$0.025 million from WWF. The key project members were...
40 full-time experts and project leaders. The project also involved about 200 external experts and 1,500 workers.

During the 10 years of project implementation, the project has made significant progress of 2 important fundamental sciences, 3 conceptual innovations, 27 technical achievements, 16 formal academic publications (9.03 million characters and 21,200 copies), 60 research reports submitted and 62 formally published papers (11 papers were written in English). The project has significantly developed the ideas of classified forest management in China and of “substitution” of ITTO. Based on these ideas, the Integrated Development Model of sustainable tropical forestry management has been further proposed, providing a successful demonstration for sustainable forest management. The economic benefit of the demonstration itself is up to 0.19 billion RMB. The indirect economic benefit of plantation technology extension is up to 5.42 billion RMB. Part of the directly measured ecological benefit is up to 4.39 billion RMB per year.

2. Results of the ITTO project

The results of the ITTO project reflect on its values on demonstration, science, economy, ecology, social benefits and the effects on both inside and outside.

2.1 Demonstration value

(1) “Classified management” has been proved to be a scientific way and core strategy of achieving sustainable management of tropical forest.

How can sustainable management of tropical forests be realized?

The project, through its very effective demonstration system, proves with evidences a scientific way of achieving sustainable management of tropical forest, and illustrates the theory of classified management.

Classified management of forest resources is the best strategy and arm that can be used to respond the continually expanding and increasingly subdivided requirements to forestry by modern economy and society. Only in this way, can the deadlock of traditional forest management model with economic and ecological goals be unlocked, and unlimited space for releasing economic and environmental potentials of forest be provided.

Through its exploration, the project has developed ITTO recognition on developing plantations as substitute of natural forest, making this idea very clear, specific and more exercisable.

(2) The project has further developed an integrated development model, reaching a new theoretic height.

Based on proving above mentioned classified management theory and development of ITTO “substitute” idea, the project has further developed an “Integrated Development Model” to achieve sustainable management of tropical forest.

Through ten years’ of practice and exploration, an “Integrated Development Model” has been shaped, which goes beyond technology and forestry and tries to solve problems from the a larger socio-economic context and get to the root of problems.
It has proved that no single method can be used to reach the objective of sustainable management of tropical forest. We pay much attention to the roles of technology, but we are also clearly aware that there will be no way out to solve the problem of sustainable forest management if our sights are limited only on technology.

2.2 Scientific values

The project has produced new knowledge in a few fields related to tropical forest ecology and developed several important modern concepts in tropical silviculture and tropical forest management.

(1) Forest ecosystem

The complex inter-population relationship in tropical forest has been further revealed. It has revealed some functions of tropical forest ecosystem. Through construction of carbon sequestration curve model of tropical forest population, it has proved that only when the tropical forest resources are rationally used, tropical forest becoming the atmosphere carbon sequestration can then be secured, meanwhile, parameters of rational use have obtained (When the extent of tropical forest utilization is 20-30%, the ecologic benefit is the best.). It has further enriched the ecological theories of tropical forest by proposing new formula of “edge effect” and new concept of “unusual forest withered materials. It has also revealed the “morning rain” mechanism of tropical rainforest and regular pattern of long-term climate change in forest region.

(2) Species biodiversity

The situation of various biological species in Hainan Island has been made clear, and its position in biodiversity in China and in the world has been also determined. The tropical characteristics of the biota in Hainan Island have been summarized.

(3) Conservation biology of tropical forest

The project has evaluated the abundance degree of rare and endangered plant species, determinated the ecological footprint of the natural reserve, and obtained new experience in ex situ conservation of rare and endangered species.

(4) Tropical forest management

A modern management concept of tropical natural forest has been proposed. 13 strategic measures have been taken as follows: to implement weak disturbance logging; to develop and implement criteria and indicators of sustainable tropical forest management; to implement eco-certification; to develop less-known tree species; to develop non-timber forest products and non-timber forest industries; to pay close attention to management of tropical secondary forest; to preserve bio-diversity; to establish balanced development of agriculture, forestry and pasture; to develop substitution industry for forest logging; to develop modern forestry industrial zone; to encourage the participation by local communities and residents; and to value ecological benefits of tropical forest and promote the internalization of forest environmental benefits. The concept of “forest naturalness” has been proposed for the first time. The method of integrated selective harvesting has been initiated, which includes a number of new ideas, such as the concept of conservation first and harvest second; the concept of maintaining sustainability of food chain of forest ecosystem; the concept of short cycle, weak disturbance and integrated benefit maximization; the concept of
sustainable forest management at compartment level; the concept of artificial regeneration of large open area and log collection paths in forest; the conception of post-harvesting tending of elimination harvesting and liberating harvesting and so on.

(5) Forest plantation and management

the concept of modern management for tropical plantation has been put forward, which includes four aspects: the concept of modern development of forestry industries which is the core of the management concept; the concept of modern breeding of combining sexual and non sexual breeding; the concept of modern propagation and nursery production by “tissue culture and cutting propagation” including rejuvenation treatment and rooting-balanced container-raised plant stock raising; the modern concept of tree-planting with appropriate wide spacing and proper conservation of natural vegetation in afforestation area, which has been particularly stressed.

2.3 Economic benefits

2.3.1 The assets valued at 190 million RMB have been directly formed by the project

The detailed assets items are listed below:

<table>
<thead>
<tr>
<th>Items</th>
<th>Assets Value (Million yuan RMB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration nursery</td>
<td>1.77</td>
</tr>
<tr>
<td>Demonstration plantation</td>
<td>70.00</td>
</tr>
<tr>
<td>Demonstration agro-forestry-pasture</td>
<td></td>
</tr>
<tr>
<td>fruit orchard</td>
<td>5.00</td>
</tr>
<tr>
<td>forest</td>
<td>1.00</td>
</tr>
<tr>
<td>Pasture</td>
<td>0.50</td>
</tr>
<tr>
<td>Bamboo stand</td>
<td>0.20</td>
</tr>
<tr>
<td>Others</td>
<td>0.30</td>
</tr>
<tr>
<td>Total</td>
<td>7.00</td>
</tr>
<tr>
<td>Bawangling demonstration area</td>
<td>50.00</td>
</tr>
<tr>
<td>Jianfengling demonstration area</td>
<td>50.00</td>
</tr>
<tr>
<td>Formal publications</td>
<td>1.43</td>
</tr>
<tr>
<td>Established literature center</td>
<td>2.00</td>
</tr>
<tr>
<td>Established training center</td>
<td>1.50</td>
</tr>
<tr>
<td>Intellectual property rights</td>
<td>5.00</td>
</tr>
<tr>
<td>(New varieties, new technologies etc. formed by the project)</td>
<td></td>
</tr>
<tr>
<td>Other fixed assets</td>
<td>5.00</td>
</tr>
<tr>
<td>(Vehicles, equipments, exhibition room and products, watch tower and accessories, constructed roads etc.)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>190.00</td>
</tr>
</tbody>
</table>

2.3.2 The value of 542.304 million RMB of economic benefit per year from the demonstration plantations

There was about 1.13 million ha plantation in Hainan Island with average annual volume growth of 12 m$^3$/ha/year and rotation age usually of 12 years. If annual harvesting area were
94,000 ha, with an output rate of 80% of industrial fiber timber, the total annual timber production would be about 10.8288 million m$^3$. With a price of 200 RMB/m$^3$ for the industrial fiber timber, the total annual production value would be 2,156.76 million RMB.

The growth of Eucalypt demonstration plantation established by the project whose rotation period is 6 years has reached 22.5-37.5 m$^3$/ha/year, and some small test plantations even have reached 45 m$^3$/ha/year. With an average increment of 30 m$^3$/year, the annual increment per ha is now 2.5 times of the traditional plantation and rotation is shortened to half. This indicates that within 1 ha of forestland and 12 years, it would produce timber 5 times as the traditional plantation, or that the 1 ha of current demonstration plantation equals to 5 ha of traditional plantation. For the 1.13 million ha of plantation of Hainan Island, the total timber production would be 2711.52 m$^3$/year, and the annual production value would be 5,423.04 million RMB if 180,830 ha (rotation of 6 years) of are harvested annually (Table 1).

Table 2 Comparison of economic benefits of demonstration and traditional plantations (for eucalyptus)

<table>
<thead>
<tr>
<th></th>
<th>Annual Increment</th>
<th>Rotation period/annual harvesting area</th>
<th>Total annual Increment</th>
<th>Total annual timber production</th>
<th>Total annual production value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>12 m$^3$/ha/yr</td>
<td>12 yr/94,000 ha</td>
<td>1353.6 m$^3$/ha/yr</td>
<td>1082.88 m$^3$/ha/yr</td>
<td>2,156.27 million RMB</td>
</tr>
<tr>
<td>Demonstration</td>
<td>30 m$^3$/ha/yr</td>
<td>6 yr/188,300 ha</td>
<td>3389.4 m$^3$/ha/yr</td>
<td>2711.52 m$^3$/ha/yr</td>
<td>5,423.04 million RMB</td>
</tr>
<tr>
<td>Ratio</td>
<td>2.5:1</td>
<td>0.5:1</td>
<td>2.5:1</td>
<td>2.5:1</td>
<td>2.5:1</td>
</tr>
</tbody>
</table>

Preconditions:
1) Total area of traditional plantations of Hainan Island was 1.13 million ha;
2) Output rate of industrial fiber timber was 80%;
3) Unit price of industrial eucalypt timber was 200 RMB/m$^3$.

Currently, Hainan Island’s eucalypt plantation is rapidly towards this goal. What have already been realized are as follows: all planting materials in the whole province have been renewed, and the varieties produced by the project are widely demanded; Nursery technologies have been improved throughout the province, and many modern industrial plantations are emerging one after the other. The potential values of the above that have already been gained include: Currently 53,000 ha of modern industrial plantations already established, realizing a value added of 190 million RMB compared to the traditional plantation.

2.3.3 Economic effect of sustainable natural forest management, primary forest protection and agro-forestry-pasture system demonstration

The demonstration protection area of tropical primary forest (Jianfengling area)

The annual income of forest harvesting of Jianfengling forestry bureau in the past was 14.66 million RMB, average income per capita was 4,433 RMB. After the shift of production model, the non-harvesting income reaches 14 million RMB, and the average annual income per capita is 5,193 RMB. The demonstration households have a higher income. For example,
some households obtained income from inter-cropping medicinal plants with Gmelina plantations with an annual production value of 10,000-30,000 RMB; The demonstration household Li generated a total income of 24,000 RMB by planting Kuding Tea in 2000; The demonstration household Fan’s total annual income was over 20,000 RMB from garden economic activities; Many households in Jianfengling forest region are planting *Prunus salicina*, generating income of 1,000-3,000 RMB per year for each household; The annual income of some demonstration households supported by the project have reached several tens of thousand RMB, far more than the income from traditional forest harvesting.

**The demonstration area of sustainable natural forest management (Bawangling area):**

After logging ban of natural forest, the income form established new industries has accounted for 70% of the previous income from harvesting. The project has offered various supports for this in many aspects. The Bawangling Forestry Bureau generated an income of 10 million RMB from forest tourism in 2001, and 20 million RMB from small hydropower, 20 million RMB from processing of small-scale timber. The total value of these together has been far beyond the previous income of 30 million RMB from traditional timber harvesting. The staff of the forest industries geared to growing areca, average annual income per household from which was 20,000-30,000 RMB.

**Artificial tropical “Agro-forestry-pasture” ecosystem test area (Dan County):**

Total area of the test area was 503 ha. During project period the total input in production was 0.99 million RMB, and total income was 1.89 million RMB. The total production value of in-production and finished product was 1.19 million RMB and 3.07 million RMB respectively. The input/output ratio reached 1:3.1. During the past several years, the project team successfully grew 29 ha introduced tropical pasture grass. By rough estimation the carrying capacity of the demonstration pasture was increased by 10 times compared to natural pasture or traditional free grazing.

2.4 Ecological benefits

In terms of direct ecological value, in the Bawangling area it is estimated that if intensive harvesting is avoided and forest is scientifically managed the natural rainforest of 36,000 ha would conserve 3.74 million tons of water, and 27.40 million tons of soil and 1.818 million tons of nutritional organic matter. In the Jianfengling area, where the rainforest is about 16,300 ha, the value of adjusting water for only 3 typhoons in 1996 reached 6.97 million RMB, the benefit of soil fixation was 969,180 RMB and the benefit of conserving fertility was 9.34 million RMB. Influenced by the ITTO project, harvesting in the entire natural forests in Hainan has been stopped since 1994. Based on the above, the partial ecological values of the existing primary forests of 246,300 ha and secondary natural forests of 380,000 ha (626,300 ha in total) is counted as follows:

- Fixation of CO$_2$: 0.901 billion RMB/year;
- Emission of O$_2$: 1.002 billion RMB/year;
- Residues as fertilizer: 0.283 billion RMB/year;
- Soil fixation: 0.036 billion RMB/year;
- Fertility conservation: 0.184 billion RMB/year;
- Water conservation: 0.592 billion RMB/year;
- Water adjustment: 1.084 billion RMB/year;
- Improvement of tourism condition (such as adjustment of temperature and humidity, increase of negative ions and essences): 0.308 billion RMB/year

The total value of these items: 4.39 billion RMB/year.
2.5 Social benefits and the impacts on both inside and outside

2.5.1 Impacts on forestry development in Hainan

(1) The project has contributed to the formulation and development of modern plantation and economic forest industries in the whole province, and created new ideas and a new phase of forestry development in the province. The integrated sustainable tropical forest management model developed by the project has been taken as the strategic conception for the 10th 5-year plan of forestry development in Hainan. For example, the Singaporean Asian Pulp and Paper (APP) is implementing an afforestation plan of 0.23 million ha in Hainan, which has mainly made use of species and technologies developed by the ITTO project.

(2) It has promoted economic development in project area and its surrounding areas. The integrated agro-forestry-pasture demonstration area has set up an economic development model for about one third of low mountains and hilly areas in Hainan.

(3) A new situation of thriving international cooperation in forestry emerged in Hainan, which refers to on one hand the frequent contacts and exchanges between Hainan and international forestry, and on the other hand the approved new international projects. Of these projects, there are two new ITTO projects (total budget of US$0.7 million) and one German aid project (6 million German Marks).

(4) The ITTO project has significantly strengthened capacity building in forestry sector throughout the province. Since the implementation of the project, the forestry cadres at various levels in Hainan have mastered not only new technologies and new varieties, but more importantly the new ideas and new sights. Accompanying with this process, the key project members in Hainan have become the forestry elites in Hainan, and they are operating Hainan’s forestry development from a new visual angle.

2.5.2 Impacts on forestry development in China and abroad

(1) The ITTO project in Hainan has been taken as a model by World Bank “Sustainable Chinese Forestry Development Project”. The phase 4 of its loan-project has decided to provide support to China’s natural forest protection program in 4 aspects: the first is to support plantation development to solve the problem of shortage of timber supply due to the stopped and reduced logging of natural forests; the second is to support the use of technologies of sustainable natural forests management; the third is to support the protection of natural forests in key sites of significant importance of ecological protection and biodiversity conservation; the fourth is to support the transition of harvesting industries after the logging ban of natural forest, and life security of the laidoff staffs and harvesting dependant people in the forest region. These conceptions are just from the integrated development model created by the project.

(2) ITTO project in Hainan has provided models and accumulated experiences for the natural forest protection program implemented later in China. The significance of the ITTO project as reference for China’s natural forest protection and sustainable forest management is reflected mainly in following aspects:

Firstly, the project has successfully demonstrated that the high quality and efficient timber plantation could alleviate the pressure on natural forest for timber production. It can be seen from the above analyses that in Hainan the intensively managed plantation could produce several times of timber as produced by the traditional plantations, making it possible to bring along a group of timber processing industries. From afforestation to processing, it could
create many employment opportunities and produce higher economic benefit.

Secondly, through establishing artificial agriculture-forestry-pasture ecosystem in the surrounding areas of the major forest region, it has developed the economy in the surrounding areas. This conception is of great practical significance.

Thirdly, since the ban or limit of natural forest logging, the financial income of previous forest harvesting enterprises and local government has been significantly affected. How to develop alternative industries or establish economic self-sufficient system is an acute practical problem. ITTO project in Hainan has fully envisaged this problem and conducted experiments and demonstrations. Currently, the development of alternative industries in Hainan forest regions has overcome the difficulties. This should be regarded as the third important experience of the ITTO project in Hainan.

Fourthly, scientific management of natural forest itself. Not only to cultivate and harvest medium to large precious timber but also to maintain biodiversity of the forest ecosystem and functions of sustainable development is a problem that must be solved. The project has taken this as the main goal for breakthrough and carried out integrated systematic researches. A set of scientific solution has been formulated.

Fifthly, effective protection of public forest is also a practical problem. The project has demonstrated mainly in aspects of establishment of patrolling system (fire prevention, transportation, communication, patrolling team and so on), development of self-sufficient economy (cropping, tourism et al) and conservation of endangered species. The significant effects have been achieved.

Sixthly, the information work and personnel training of the project is of great significance. The information subproject has systematically investigated overseas tropical forestry information, systematically and completely reviewed literature of tropical forestry. Meanwhile, the training subproject has conducted wide range of training at various levels with different contents in different forms for the project members and persons from the society. In terms of the whole Hainan province, the training has fully improved the qualification of foresters, and extended the technologies produced by the project.

Finally, also the most important, the experiences in natural forest protection created by this demonstration project are as follows: the productivity development to alleviate pressure on natural forest through specialized dividing of labor; the independent management of classified forest resources; and going beyond the pure technology and beyond the pure forestry sector to take effective measures in social, economic and technical aspects. This type of protection is not only from a systematic starting point but also has clear focuses. The theoretical basis of the protection is to achieve the integration through division of labor and its philosophic background is to control by dividing and eventually reach the unification. This is a new theoretical context.

This demonstration project, 5-6 years before the implementation of the national natural forest protection program, took tropical natural forest as an example to carry out systematic studies on natural forest protection and established demonstration. Hainan province firmly and completely stopped harvesting of natural forest as early as in 1994. With a forward looking vision and creative work 5-6 years in advance and at the most urgent needs by the country, the ITTO project in Hainan has contributed a demonstration system of natural forest protection.

(3) The infrastructure construction and development of information on China’s tropical forestry has filled up the gap in this aspect in China. The project established a number of databases of China’s tropical forestry. Currently, users can conveniently make searches via
the Internet for all tropical forestry literature (Title, part of the full-text Chinese literature and foreign literature) of Chinese literature sources since 1980.

(4) The successful implementation of the project has gradually attracted attention in China. About 270 persons from the central and some provinces and autonomous regions governments have visited the project area, including several leaders of the Ministry of Forestry. Several media such as CCTV, Hainan TV and the globally distributed multi-lingual “Beijing Weekly” have visited and reported the project.

(5) The project itself produced wide and enthusiastic responses from foreign countries. More than 130 persons from 12 countries such as the US, France, Germany, Japan, Switzerland, Malaysia and Indonesia and so on have visited the project area in Hainan.

(6) The demonstration project is one the few extremely large ITTO projects. Therefore, the international position of the project is self-evident. At the biannual ITTC meetings, the project has been always paid attention. At the 16 meetings in total, representatives of various countries always hear the voice of this project, or get the nicely designed and printed project newsletter in English, or watch a short English video movie, or hear the project progress report. In the impression of the representatives of various countries, it is a project with novel conceptions, in-depth consideration, large-scale and significant effects. In *ITTO progress report on sustainable tropical forest management objective 2000*, the project and its impacts were particularly mentioned. After brief description of China’s efforts, it particularly pointed out that, the ITTO supported project “Demonstration of classified management and sustainable use of tropical forest in Hainan, China” rapidly improved the traditional forest silvicultural methods to a new level, and the production of demonstration plantation was also greatly increased. The report recited Mr. Dunkin Poore’s words: “In all these later developments, China has played an important part--intellectually, in developing the component ideas of sustainable forest management and, here in Hainan, in setting up a practical model of which, from what I have read, the country should justly be proud. I hope to be able to hear more about it and see it for myself in the next few days”.

3. Extension model

3.1 Project Demonstration as a good forestry extension method

Through demonstration projects, it is very helpful to find out existing technology and experience both at home and abroad. After careful selection and recombination, a new demonstration project can be carried out, which contains elements people intend to extend, such as new technology, new concepts and new models for forestry development. What’s more, it can be further developed and improved.

3.2 Demonstration project including information work and personnel training

A demonstration project should include information work and personnel training, otherwise it cannot have an extension mechanism. At this aspect, the ITTO project has conducted the following work.

3.2.1 A foundation established for China’s tropical forestry information system

An integrated achievement has been made in information work, including resources constuction on tropical forestry information, the development of tropical forestry information
services means, basic research on tropical forestry information, training materials for tropical
forestry, and dissemination and service of tropical forestry information and so on.

There are two main objectives of this subproject of information work: one is to provide direct
services for all subprojects, and the other is to lay an information foundation for the
development of China’s tropical forestry. Establishment of the huge tropical forestry
literature resources has been completed, mainly including that domestic and overseas tropical
forestry literature since 1980 have been collected systematically and fully, manual searching
cards have been made, 4 books of searching tools have been printed, searching databases and
full text databases have been established, and 16,000 literature originals have been stored in
Hainan for use. Means of tropical forestry information service have been developed. Now
users can visit the websites at http://www.lknet.ac.cn or http://www.caf.ac.cn to search for
various types of tropical forestry information. Systematic news reporting and dissemination
on tropical forestry and the project information have been carried out, mainly through
publishing the journal “Tropical Forestry Information”, issuing project information in
English, and making videos and slides and lots of propaganda in other journals and public
medias, such as newspaper, radio broadcasting and TV, especially disseminating the new
“Newsletter” at the biannual ITTO meetings. Various monographs and academic papers have
been formally published.

3.2.2 Development of human resource and extension of achievement on tropical forestry

There is no specialized forestry school in Hainan, and professional training could not be
carried out, resulting in serious lack of forestry technicians. It is the ITTO project in Hainan
that has filled up this gap. The project has strengthened the capacity building for human
resource development for forestry in Hainan Province, and qualifications of forestry
professionals have been improved throughout the province by a series of training activities.

A tropical forestry training center has been established. Human resource has been developed
in an irregular way, i.e., the project has driven the development of technology and the
technology has then contributed to the personnel development. In total, the project has
trained 2382 person/times for local forestry officers and technicians from Hainan and other
provinces, 20 person/times of foreign foresters, 1000 person/times for workers and forest
farmers, and 62 person/times overseas study tours have been organised. So the forestry
technicians have increased from 1150 persons before the implementation of the project to
2500 persons in Hainan Province. Of them senior personnel increased from 9 persons to 30
persons and intermediate personnel increased from 54 to 260. And 13 persons involved in
foreign language have been trained, 5 persons have obtained doctoral degree, 7 persons
obtained master degree, 15 project officers have been promoted to high positions, and 3
persons have won the title of excellent expert at state or provincial level. The training
activities in long, medium and short term have been conducted at high, middle and basic
levels in a way of combining on-site training and off-job training. A set of training materials
has been formed, such as “Tropical forestry---fundamental knowledge and modern concepts ”,
“Techniques for cultivation of major tree species of tropical economic forest in China”,
“Tropical forestry nursery and silviculture techniques”, “Techniques for Eucalyptus cutting
propagation”, “Techniques for management of agriculture-forestry-pasture ecosystem”,
“Database technology application of tropical forestry” and “Training materials on nature
explication for tropical forestry”.

3.3 Propaganda as an important link of extension.
The project has formally published in total 16 monographs with 21,200 copies and 9.03 million words and 62 academic papers. 12 issues of newsletter in English with 12,000 copies have been published and internationally disseminated, while 25 issues of newsletter in Chinese with 20,000 copies have been published and disseminated in China.

3.4 There would be no extension if there is no demonstration in developing countries

Limited by poverty, education level and “time advantage”, many residents in developing countries cannot afford and are not willing to take any risk. They must see for themselves the benefits of a new measure before they follow it. Hence demonstration projects are of great importance in developing countries. Only through demonstration, can they be guided to make progress.

In ITTO Hainan Project, 20 per cent of the entire resources (capital and personnel) have been spent on extension, which has contributed to the demonstration effects of this project to the largest degree.

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Enhancing the Acceptance and Adoption of „New“ Wood Harvesting Technology through Multiple Partner Involvement. A Case Study from Bavaria, Germany

by

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Abstract

Traditional utilization behaviour and ongoing structural changes in small scale private forest ownership in Bavaria, Germany has led to an underutilization of forest stands with negative consequences for stability and forest health especially in region with highly fragmented ownership and generally lower growth conditions. The introduction of harvester operations there as a technological solution solely doesn’t show wide effects, as the adoption of innovation in harvesting technology is often hindered by traditional attitudes, prejudices but also knowledge deficits and perceived structural restrictions. In a pilot study on village basis, an integrated attempt to mobilise timber from highly fragmented small ownerships was started by using a combination of informational, organisational and technical approaches, involving the partners “science” (communication strategy), “local extensionist” (co-ordination, information input), “local stakeholder” (multiplier, backstopping), “forest owner association” (wood marketing, multiplier), “village” (forest demonstration stands) and “regional entrepreneur” (demonstration, harvesting, marketing). Based on research results achieved in other areas a communication strategy was developed: Activity limited to village boundary, focus on fairly active forest owners (farmers and owners from agricultural background). A combination of direct mailing, field presentation of new harvesting techniques, example calculation of possible economical revenues as well as additional person to person consultations was implemented to raise attention and interest. The project succeeded in involving in a first phase (winter 2003/2004) 9 owners owning 36 ha on 32 parcels and mobilized 4.016 cubic meters timber, reaching a net revenue of 25.000 EURO. Crucial for the success appeared to be: Highly motivated and well trusted local extensionist, interested and actively involved local stakeholder, regional based highly skilled entrepreneur, an active forest owner association and a well designed communication strategy in terms of addressees, media and timeframe. The common focal interest- “mobilization of timber”- and generated form a basis for further co-operation of all partners. Follow – up activities are already on the way.

Keywords: communication strategy, mobilization of timber, harvester operations, small scale ownership
China is a wide Country in fast economic and social development with natural and human resources requiring sustainable management models. The Project “Agroforestry: agro-food. Environment” (A.A.A.) born from the cooperation, active since 1996, between National Research Council (CNR) Institute for Agro-environmental & Forest Biology (Porano, TR) and Chinese Academy of Forestry (CAF) Institute of Forestry, and previously in 1995 with Chinese Academy of Agriculture (CAAS). The project is co-financed by Italian Ministry of Foreign Affairs (MAE) with the cooperation of CNR, CAF and Xinjiang, Shandong and Henan Provinces. MAE approved the Project both in 2003 and 2004; consequently the activities are still in development. The Project plans to provide useful information and instruments for the sustainable management of agroforestry systems with walnut (Juglans regia L.) at agro-biological, environmental and socio-economic levels. It intends also to stimulate small enterprises for the processing and transformation of horto-fruit products in same “sample” Regions chosen for their characteristics: Xinjiang, located in the North-West, with natural resources but having wide zones particularly dried and under populated, somewhere subjected to erosion problems; Shandong in the central China, where the industrial component is increasing, whereas some areas especially hilly zones start suffering erosion because of the human abandonment; Henan, in central China, characterised by an agricultural economy, where the social conditions are rather problematic because of the high population density. Nevertheless in the three provinces there is a particular attention towards J. regia not only for fruit but also for wood production. During the first year project, in collaboration with our Chinese colleagues, some agroforestry system plantations have been planned and established. These agroforestry systems were realised with walnut (pure or mixed with other fruit species like apricot, peach, pomegranate, almond and pistachio) intercropped with annual herbaceous species. The efficiency of the agroforestry systems in these three different zones, the genetic characterisation of the provenances, the plant acclimation, the different methods of management for various purposes, are the bases to spread information and news and training in which the Chinese and Italian competencies are mutually improved. In this framework, during 2003, researchers from CAF attended some stages in some laboratories of CNR: IBAF’s laboratory in order to acquire molecular methods, in IBBA (MI) and IBIMET (FI) to deep biochemical analysis methodologies for fruit quality and for the analysis of natural resources (water, soil, abiotic stress). In China, Italian researchers visited the plantations executed following the agreed plan and carried out various seminars and meetings with politicians, researchers, corps of Chinese foresters, agricultural managers and farmers. Because of the great interest earned from these initiatives and considering the questions of the above participants, a handbook on the more appropriate practices to obtain walnut for wood production has been published. This scientific technical handbook in English and Chinese languages was given to Chinese partners and was spread among the agricultural communities. Moreover, some scientific equipments (PCR and meteorological stations) were provided to the Chinese Colleagues so that they could apply the information and expertises acquired during the Italian stages. As above stressed, the research, technical and spreading activities are still in development.
Puerto Rico’s Extension Service Urban Forestry/Arboriculture Program.

Sally González-Miranda, Associate Urban Forester and Landscape Architect Specialist.

In 1990 the first attempt to start a program in urban forestry and arboriculture started as part of the initiative of President George Bush “America the Beautiful”. At that moment the Puerto Rico Extension Service (PRES) didn’t have in its initiative that area of work. The program started as an invitation of the US Forest Service and the Department of Natural Resources to develop an educational program for Puerto Rico. The Landscape Architect Specialist for Extension Service was assign to this project.

The Urban Forestry Council ‘Borinquen Reverdece” was established as an integral component of the program. Hurricane Hugo swept the north side of the Island and the program launched in perfect timing. Everyone was starting to develop awareness for the urban scenario.

The educational program started with the identification of partners in other agencies and non-profit organization (NGO’s). In 1993 the first group of certified arborist by the International Society of Arboriculture (ISA) got their certification (3). Educational campaigns and educational materials have been developed in aspects of tree selection planting, and maintenance.

As part of the educational program a professional conference started in 1995 the “Puerto Rico Urban Forestry Conference (PRUFC)”. In 2000 a partnership with Virgin Island Extension Program evolved and since then the conference is offered alternately between PR and VI under the name “Caribbean Urban Forestry Conference (CUFC)”.

Currently over 60 professionals from the private and government sector are ISA Certified Arborist and a local association of this professional emerged in 2000. All agricultural agents from PRES have completed at least 25 hours of training in arboriculture and urban forestry. At the undergrad level courses in urban forestry and arboriculture have been develop in the Horticulture Department.

Details of the program success and constrains will be presented as a case study of implementing a new programmatic area under Extension Service.
Participation and Communication in Forestry Training: the Case Study of Chestnut Fruit Filière in Southern Italy

E. Pagliarino, A. Pisanelli, L. Cherubini, L. Palmieri and F. Cannata

World over, it has been demonstrated that a well-functioning information and knowledge system comprising of research, extension, education and training responds to the economic, social and environmental challenges faced by rural people. These challenges, furthermore, are more and more difficult in the current phase of deep changes and persistent weaknesses of rural areas. Most education and training programs have had little contact with, influence on or relevance for the rural communities they were meant to serve.

This work illustrates a tree-years research project that firstly analysed the subject of forestry training in Italy (characteristics, actors, problems and perspectives), then developed and tested a prototype strategy of forestry training for replication on a larger scale.

The model was tested in a mountain area in Southern Italy, applied at the chestnut fruit sector. Widely spread in Italy, the chestnut is a multipurpose tree, still representing an important source of life in rural areas.

The model consists of 5 phases:

1. involvement of stakeholders;
2. training needs analysis;
3. curriculum development;
4. training;
5. monitoring and evaluation.

The most innovative aspect of the model is the large use of participation and communication principles, methods, instruments and techniques.

This work presents the results of the research, outlining the elements of success and failure.
Agroforestry systems as an alternative to pure forest plantations for timber production on arable lands in Italy

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Current interest in agroforestry in Italy relates mostly to the wider general focus on sustainable agriculture for environmental protection. This focus is often in great contrast to the urgent economic needs of rural people. A partial solution to this problem has come through funding from the European Union for sustainable agriculture and afforestation of arable lands. Trees, mostly valuable broadleaved (hardwood) species like walnut, cherry and ash, were planted back into farmland using public funds and with the aim of producing high quality timber, which is in very short supply on the Italian market. More than 100,000 ha of agricultural lands were afforested in Italy during the ‘90s. A significant proportion of those plantations were unsuccessful due to poor site quality, wrongly chosen tree species and/or poor tree care. Alternative and new cultural models, such as agroforestry and mixed models, were studied for replacing hardwood plantation forestry. These studies are in connection with the Mediterranean tradition of mixed cultural systems, which are now marginal. Researches show that both cultural models have numerous advantages in comparison with traditional forestry plantations. Tree growth and timber quality are often improved due to enhanced tree care, better site quality and synergisms among plant/system components. Technical advantages are augmented by ecological ones, such as improved biodiversity, soil erosion control and reduced fire risk. Farmers’ reactions to innovative agroforestry systems have also been studied. Agroforestry can be more effective than pure cultivation for the restoration of degraded agro-ecosystems and for the preservation of rural landscape.
FARMERS’ AWARENESS OF SILVOARABLE AGROFORESTRY SYSTEMS: PERCEPTION AND INTEREST IN ITALY

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Silvoarable agroforestry systems comprise widely spaced trees intercropped with arable crops. Recent findings indicate that modern silvoarable systems may be very efficient in terms of resources’ use and can be considered innovative agricultural models both environment-friendly and economically profitable. Within the European research project SAFE (“Silvoarable Agroforestry For Europe”, European Union Contract n° QLK5-CT-2001-00560) a survey on-farm was carried out with the aim to assess the farmers’ interest on silvoarable agroforestry systems and to determine the technical and socio-economic conditions for establishing the practices at farm level. The study was conducted in the European countries participating at the project using a common questionnaire. This work reports the results obtained in Italy where a total amount of 40 farmers, randomly selected in Central and Northern Italy, were interviewed. The main results illustrate that farmers usually have a positive perception of agroforestry, mainly related to the capacity of the systems to produce environmental services and to diversify the farm production. On the contrary, the main constraints are due to the difficult to manage the systems, the lack of technical knowledge and the uncertainty of the economic perspectives. Policy implications are also discussed in the context of the EU agricultural and forestry grant schemes.
Abstract

Communication for development means the planned use of different strategies (media and others) to help people become aware of and articulate their position, exchange knowledge and skills to take control over their lives, reach consensus and manage conflicts, and improve effectiveness of organizations (Ramirez & Quarry, 2004). In more practical terms a communication for development approach to NRM is the systematic design and use of participatory activities, communication methods and media to share information, knowledge and skills among all stakeholders in a particular agro-ecological context in order to ensure attitudes and actions that result in sustainable resource use.

The key to Communication for Development is essentially to assess and understand the communication needs and appropriateness of the different communication tools or approaches at hand. In a specific context this will of course depend on a number of factors such as livelihood approach, literacy levels and confidence of the communicators, the existence and control of media or channels of communication, local culture etc. Tools and approaches will also be more or less suitable according to message content and who the communicators are. A communication for development approach can be applied for awareness raising and information, education, and building participation and in some cases the need for two way and open ended channels of communication is more important than to reach a larger audience.

FAO’s and other’s experiences of facilitation of decision making processes with the use of for example video recording and playback or images has proven to be a powerful tool, and the use of radio demonstrates its value time and time again as a low cost and accessible media for Communication for Development. Digital video has also proven effective to produce campaigns for TV broadcasting or as extension tools. The adaptation of new Information and Communication Technologies (ICTs) to rural development has posed new challenge, since access for only the privileged is increasingly becoming a concern. Therefore, the task of bridging the so called rural digital divide has become a motto and focus of attention for FAO’s Communication for Development group. This specifically involves the increased access to ICTs by farmers, extension workers and decision makers, and local adaptation and collection of information. The appropriation of, and increased access to, ICTs is often strengthened by complementing ICTs with other media such as rural radio.

From this it is said that communication for development should be at the core of any development initiative, and planned and systematic use of communication must be recognised as an important agent in both the planning, implementation and monitoring and evaluation. There are however some important enabling factors for the inclusion and sustainability of communication for development that should be considered. Communication for Development is dependent on skilled facilitators with a profound understanding of its importance and of the basic principles underlying all participatory processes that can only be achieved through thorough capacity building. The creation of training manuals and inclusion of communication for development in national curricula is therefore an important part of FAO’s Communication for Development effort. There is also a need for support and recognition of the importance of communication for development at all levels of decision making. In this respect the development of national communication policies has been an important FAO contribution to the integration of communication for development to institutions and line ministries. The synthesis of experiences and networking efforts in the field of Communication for Development is another strong card on the hand of FAO and its advisory role.

At the stage of transforming participatory approaches or methodologies to practical action the quality of the methodology is revealed. As said earlier capacity building and general support are of course important preconditions, but more important is the degree to which a methodology is built on practical experience. Communication for development approaches, tools and methods are under constant review and updating, and critical self assessment is an important part of the methodological framework and a general trend in communication for development. Some important common principles have been identified by Communication for Development practitioners from all over the world:

- Start communicating, early in the life of a project or programme, with all the parties involved.
- All the activities under the consultation and communication process should:
  - contribute to the social, environmental, and financial sustainability of the initiative,
• be flexible and adapt to local needs and conditions,
• promote the participation of the stakeholders throughout the life of the initiative, and
• be conducted in a transparent and open manner.

- Offer concrete solutions and use realistic technologies.
- Move forward at the pace of the community.
- Facilitate horizontal communication within the communities in which people are working.
- Accompany the process with a communication plan involving other stakeholders (NGOs, other villages, timber companies... ) and local or national authorities.

(FAO 2004)

FAO experiences further illustrate the importance and usefulness of Communication for Development methodologies, tool and approaches as key agents in rural development and NRM:

• Communication for Development in Central and Southern America: Watershed management, rural radio and video
• Communication for Development in Cambodia, Training and Strategic Communication in NRM