

Linking global to local using multi-scale scenarios

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Abstract: The chapter focuses on how global and local forest sector issues can be linked to each other and how futures or foresight work can act as capacity-building tools for this. In particular, we focus on the *multi-scale participatory scenario (MSPS) approach*, showing how it has been used for this purpose and what it could offer for the forest sector to better link the global and local scales. The chapter is not a “review” article of MSPS but rather introduces the approach, presents practical examples of it, and elaborates the advantages and disadvantages of the approach. The purpose is also to illustrate how it may work as a capacity-building tool for futures thinking in SFM. Finally, research and policy implications are presented.

Keywords: Multi-scale scenarios, future, foresight, linking global and local, capacity-building

4.1 Background

Global environmental and forest-related policy-making and strategies involve many different interests, both governmental and non-governmental, the business and science communities, and local forest communities. The case studies in this book (Parts II and III) emphasise that strong links and understanding between these actors and the global, national, and local policy-making levels in which they are involved are crucial. They demonstrate that for sustainable forest management (SFM) to succeed, it is essential to involve and have the support of people and actors also at the local level (villages, rural districts). For example, in more than half of the case studies, progress in implementing SFM is typically related to promoting stakeholder cooperation and participation, whereas in less successful cases, local actors tend not to have been empowered to take part in critical decisions regarding forest management and use. Similar conclusions can be drawn from success in enhancing economic benefits derived from forests and forest resources.

The drivers that influence forests, such as globalisation of markets and investments, including potential carbon markets (e.g. through REDD⁽¹⁾), are strong forces steering forest-related development in most countries (Galloway et al. 2010). In some cases, these forces are leading to large-scale land concessions to the detriment of local forest-

related development and livelihoods. In other cases, they provide employment, income, and new opportunities to engage local actors in forest-related production and ecosystem-services value chains. How globalisation affects forest management at the local level – whether it has positive or negative outcomes – seems to depend very much on the understanding, cooperation, and feedback among global, regional, national, and local levels. For successful SFM, each part in this multilevel social-policy value chain needs to be part of the solution.

In this light, how can the problems faced by the forest sector be solved and SFM enhanced? Lessons learned from the case studies (Part III), clearly indicate a need for capacity-building at the local level. Local communities tend to be increasingly impacted by global or national changes in the operating environment and the policies related to them, but they are often unprepared to respond to them. For example, climate change, globalised forest-products markets, international forest and environmental policies and

⁽¹⁾ REDD is a mechanism that has been under negotiation by the United Nations Framework Convention on Climate Change (UNFCCC) since 2005, through which countries reduce emissions from deforestation and forest degradation and foster conservation sustainable management of forests, and enhancement of forest carbon stocks.

strategies, and technological changes (like digitalisation) are high-level processes having manifold impacts at local levels. Think, for instance of the impacts of FLEGT⁽²⁾ and REDD+ policies, or strategies to improve payments for ecosystem services. These global and national-level processes can only be successful if their meaning and implications are well understood at the local level and the actors at that level want to work to enhance these processes. But the challenge is not only to build capacities and empower actors to implement these policies at the local level but also to achieve better understanding of the local-level context at national, regional, and global levels.

The case studies from, for example, Argentina (Part II, chapter 2), Brazil (Part II, chapter 1), Bosnia-Herzegovina (Part II, chapter 23), Madagascar (Part II, chapter 20), Mozambique (Part II, chapter 21), or the US Pacific Northwest (Part II, chapter 10) suggest that to implement SFM, as well as forest communities being able to respond successfully to global challenges and opportunities, more local participation and community engagement are necessary. From these case studies and other literature (e.g. Bizikova et al. 2010, McKenzie et al. 2012, Mistry et al. 2013, Palacios-Agundez et al. 2013), it is also evident that this type of synergy and mutually supporting development between the global and local scale in SFM does not take place automatically. The success stories show that there have often been significant efforts before tension between the different scales could be overcome. Interestingly, the case studies also show that these issues are relevant both in the low-income regions, such as Africa, and in high-income industrialised countries, such as the United States, in the case of the Pacific Northwest (see Part II, chapter 10).

The focus of the case studies is mainly on past or current experiences in local forest management, that is, on developments, conditions, and structures already in place. But they are also valuable for preparing for future developments: we first need to know where we are today in order to build meaningful future scenarios. However, systematic foresight analysis is also necessary to be better prepared for the future (Glenn 2009, Hurmekoski and Hetemäki 2013). The rapid and evermore complex changes in global forest sector in the 21st century highlight this need (Part IV, chapter 2).

The objective here is to review useful foresight and scenario approaches in a context of the local-

global interaction, and in particular, in addressing forest sector issues. We hope to show that using these approaches makes it possible to provide new foresight analysis, help solve the tensions between local and global perspectives, and build capacities for SFM at each level. The foresight process itself may also work as a bridging tool in integrating local and global perspectives and the increasing understanding and implementation of policies and programmes and, in the end, SFM. We focus on a foresight approach known as multi-scale participatory scenarios (MSPS). The chapter seeks to demonstrate through literature review that MSPS can help forest planning and negotiations, build capacity for futures thinking, and integrate global and local-level forest processes and strategies.

The structure is as follows: an introduction to the scenario concept and MSPS; examples of using MSPS; implications for the forest sector and how MSPS could possibly help solve some of the future challenges that emerge from the case studies in Part II; and, finally, general policy and research implications.

4.2 What are multi-scale participatory scenarios?

4.2.1 Scenarios

Systematic scenario planning is often claimed to have been started by Herman Kahn, who worked on military scenarios in the 1950s at the RAND Corporation (Kahn 1962, van der Heijden 1996). In the corporate world, the most well-known example is the scenario work done to help strategic thinking in the Shell company for more than 40 years (Wilkinson and Kupers 2013).

In scenario planning, the purpose has never really been about predicting the future but rather opening minds to previously inconceivable or imperceptible developments. *Scenarios* are plausible descriptions of how the future may develop based on a coherent and internally consistent set of assumptions about key relationships and driving forces (van der Heijden 1996). A scenario can be regarded as a story or, more precisely, a series of events leading to an end point. They can be constructed using many different methods or a combination of methods – qualitative and/or quantitative – and information on current and past conditions. It is important to stress that the purpose of a scenario is not to produce accurate forecasts or predictions but rather to consider a variety of possible futures. In fact, the time scales of scenarios are rather long, typically 10 to 50 years, for which it is not meaningful to try to generate “accurate” forecasts.

The fundamental dilemma related to all future-

⁽²⁾ FLEGT stands for forest law enforcement governance and trade. The European Union’s FLEGT Action Plan was established in 2003. It aims to reduce illegal logging by strengthening sustainable and legal forest management, improving governance and promoting trade in legally produced timber.

oriented research is: how can the future be studied when it does not exist? No method can yield correct or even reliable information about the future, since we do not know the future. Therefore, the more relevant question is: how useful are studies for addressing the future? The foresight literature and practical experience strongly points out that scenario studies are specifically useful for providing insights for longer-term developments, during which the factors shaping the future are highly uncertain and largely uncontrollable. For example, a recent survey by Rohrbeck and Schwartz (2013) found that scenario and foresight work has had clear benefits for companies, especially by enriching perception, the ability to interpret changes and to propose responses, and the capacity for organisational learning and influencing others.

Scenario work has also been found useful in addressing complex environmental issues for example, shown in the review of literature by the European Environmental Agency (2011) and Bengtson et al. (2012). Environmental scenarios, outlooks, and other types of forward studies help us to address discontinuity and uncertainties of future developments and to design robust policies that can withstand the test of time. Scenario-based approaches can, for instance, provide a platform to reflect on different options for the future, identify uncertainties, frame policies by identifying priority and emerging issues, check whether and how targets can be met, develop robust measures and precautionary actions, analyse cause-effect relationships (driving forces), anticipate possible surprises, and facilitate long-term thinking in a structured way.

How scenario work has been used in the forest sector includes, for example, outlook studies (Pelli 2008, Hurmekoski and Hetemäki 2013). However, for the focus of this book, the most interesting scenario work in the forest sector relates to participatory scenario approaches applied in forest communities, i.e. at the local level (e.g. Wollenberg et al. 1999, Evans et al. 2014). The results of these studies indicate that participatory scenario approaches at the community level can lessen the resentment and uncertainty towards the future and lack of trust in governance regimes in addition to recognising communities as active participants in global and national forest issues.

The purpose of this chapter is to demonstrate that MSPS methods can be used to improve adaptiveness not only by responding to changes but also by anticipating them and linking the global and local-level processes. Important advantages of scenarios in futures analysis lie both in the actual process of constructing scenarios (capacity-building) and in the results of a systematic examination of how uncertainties and possible future paths interact (outputs).

4.2.2 Multi-scale scenarios

Based on the goal and objectives of a scenario study and the approach adopted, different spatial scales for scenario development are involved, ranging from the global to the very local scale, such as villages (Biggs et al. 2007, Zurek and Henrichs 2007). For example, Intergovernmental Panel on Climate Change (IPCC) climate scenarios are typically first generated at the global level but then analysed at a more detailed level, such as for region of a country. There are a number of reasons why linking these scenarios across different geographical scales may be desirable. First, the processes at different scales may directly depend on each other. For example, REDD+ is a result of a global policy process, but it is implemented at the local level. The objectives and phenomenon behind REDD+, climate change, is itself an issue that affects biophysical processes across the world, while regional and local socio-economic developments govern future climate trajectories to a large extent. On the other hand, it may be important for a regional or local decision unit to differentiate between developments that the local scale can or will influence from the ones to which it will have to adapt. Understanding which global or national factors are external to the local or regional system is important in order to set boundary conditions for developing responses and strategies.

According to Zurek and Henrichs (2007), scenarios can be linked across geographical scales in two ways: via *scenario development processes* or via the *scenario elements*. The processes by which scenarios are linked together can be carried out in various ways – for example, by starting from a global scenario process, which is then linked to national, regional, or local scenario processes. Second, the scenario elements or outcomes can be linked across different geographical scales. The linkages vary by the degree of interconnectedness, for instance, the scenario elements may be very closely linked or only loosely linked at different scales (Zurek and Henrichs distinguish five types of interconnectedness). Depending on the process and type of coupling of the elements, the cross-scale linking of scenarios will differ. They can range from fully equivalent scenarios developed in joint processes at different geographical scales to complementary scenarios developed via independent processes that share a common general theme.

The choice of the specific multi-scale scenario approach will depend on the purpose of the scenario exercise. For example, if scenarios are developed for research or academic work, a high degree of consistency or equivalence is often needed. Well-known examples of this are the IPCC-based scenarios for climate change. For these, the consistency between elements at global and regional level is essential.

Here the global scenario is the driver of the process to which regional scenarios adapt.

On the other hand, in supporting discussion and actions at a regional or local level, the issue of cross-scale consistency may be of less importance. Information from global scenarios may provide a useful background for regional-scale scenario development but may not capture or may even misrepresent some regional dynamics. The dynamics within a socio-economic system, particularly, are often driven primarily by regional-scale developments, such as forest ownership and income and employment opportunities. The higher-scale scenarios may provide a useful starting point, but eventually it may be more important to maintain regional relevance in the multi-scale scenarios. The scenarios are unlikely to be useful if they are not seen as relevant by the decision-makers at the local level.

The MSPS approach could especially be helpful for developing countries.⁽³⁾ Although single-scale scenario planning typically engages stakeholders and considers factors operating at multiple scales, they are not considered MSPS. In a multi-scale scenario exercise, storylines are developed at several scales, for example, global and national, and are linked to one another to some degree (Biggs et al. 2007, Zurek and Henrichs 2007). Motivations for developing multi-scale scenarios are to engage stakeholders and help understand driving forces, processes, perspectives, and responses at different scales, as well as to get the stakeholders at different scales to own and be empowered by the scenarios. As stated by Biggs et al. (2007), “Multi-scale scenarios can better maintain relevance across multiple decision-making scales than, for instance, a single-scale global exercise, and thereby potentially enhance stakeholder engagement and use of the scenario results.” From the perspective of this book, the MSPS approach can also link global and local-level forest issues and empower the local communities to implement SFM.

One caveat of MSPS is that they are challenging in many circumstances, and there is a need for systematic capacity-building before they can be used widely. For example, at the regional and local levels, there may be a lack of experience with scenario and strategic futures thinking, at least among some stakeholders, such as foresters, local

officials, communities and indigenous groups, and small- and medium-scale operators. Since they may not have been exposed to foresight exercises and scenario work, they may not have a good grasp of its purpose, meaning, and implications for their own work and future opportunities and challenges. Consequently, the global or regional scenarios, such as those provided by the IPCC or the UN Food and Agriculture Organisation (FAO) forest sector outlook studies, may seem remote at the local level and their implications difficult to understand. It may be that even the language and concepts used in these studies are not clear to participants in MSPS exercises. So global policy processes and strategic long-term scenarios may not reach the regional or local levels in a meaningful way, despite their important implications, for instance, to national forest policies. On the other hand, local-level concerns and thinking may not show up in global policy processes or strategic futures thinking, such as the global scenarios. Therefore, there is a need to better link global and local levels, and MSPS can be one tool to accomplish that. Thus, the MSPS should also be seen as a tool for capacity-building for long-term planning and strategic futures thinking, for example, when countries are preparing their national forest programmes.

In fact, the Millennium Ecosystem Assessment (MEA) process can be seen as an important process sparking more interest in MSPS (Millennium Ecosystem Assessment 2003). For example, the MEA sub-global assessments were designed to meet the needs of decision-makers at the scale at which they are undertaken, strengthen the global findings with on-the-ground reality, and strengthen local findings with global perspectives, data, and models. Assessments at sub-global scales are needed because ecosystems are highly different across space and time and because sound management requires careful local planning and action. Local assessments alone are insufficient, however, because some processes are global and because local goods, services, and energy are often transferred across regions. The MSPS were applied for the MEA, for instance, by Biggs and Zurek (2007) and Palacios-Agundez et al. (2013).

The review of MSPS literature show some typical features associated with different scale MSPS studies (e.g. Biggs et al. 2007); some of the typical characteristics at different scales are summarised in Table IV 4.1.

The literature on MSPS is not yet large: the MSPS approach is still at its pioneering stage with respect to forest sector literature. But given the complexities of the forest sector issues and their multi-scale nature, one can expect its popularity to increase in the future.

Depending on the purpose of the study, scenarios at different scales may be loosely linked and share a common framework (e.g. MEA scenarios), or they may be very tightly linked and scientifically consis-

⁽³⁾ The concept and meaning of multi-scale participatory scenarios is not yet well-established, and it cannot be regarded as a single approach. Indeed, at this writing (December 2013), there isn't even an entry in Wikipedia under this name. Also, the concepts of nested scenarios (Dermawana et al. 2013) or cross-scalar analysis (Mistry et al. 2013) are used for similar approaches. For an introduction of MSPS, see Biggs et al. (2007) and Zurek and Henrichs (2007).

Table IV 4.1 Typical characteristics of different scale scenarios. Based on Biggs et al. 2007

Global, continental, and national	Regional or village
Global or continental focus, with very little discussion about local implications.	Very detailed on local implications and no discussion on global implications.
Cover longer time scale (e.g. 20–50 years).	Cover shorter time scale (e.g. 5–15 years).
Perspective of international agreements, policies, institutions, and multinational companies form a strong basis for the scenarios.	Important driving forces of change in forests at the local scale are often outside the control of local stakeholders; for example, roundwood harvests may be determined by national or international markets.
High expertise and educational level of participants.	Low expertise and educational level of participants.
Communication and engagement are at broad stakeholder level, with formal dialog processes (seminars) and detailed presentations and reports geared toward the more specialised and highly educated stakeholders, who operate in international and national policy contexts.	Communication of the scenarios usually takes place within community-based or grass-roots organisations, and stakeholders often include people with varying levels of education and experience.

tent with each other (e.g. IPCC climate scenarios at different scales). According to Biggs et al. (2007), loosely linked scenarios may more effectively serve the goal of engaging stakeholders in an exploratory dialogue and allowing for more freedom to cope with the issues of concern to the stakeholders at each scale. Scenarios too tightly linked can even have unintended and undesirable consequences when they alienate stakeholders at different scales (Biggs et al. 2007). However, this is not an overarching rule-of-thumb but depends on the particular case, as the IPCC scenarios indicate.

From the perspective of practical implementation, MSPS can have the additional drawback that they tend to be rather resource intensive, typically engaging a large number of stakeholders, meetings, and preparatory work. However, depending on the case and resources available, less ambitious MSPS may be possible. Moreover, as the process of MSPS may itself be even more important than the outcomes or results, it should be seen not only as a means of generating foresight or futures information but also as a process for building capacity and mutual understanding.

4.3 Examples of MSPS in the forest sector

Multi-scale scenarios have been applied in several participatory scenario development exercises on many continents: Europe (Biggs and Zurek 2007, Özkaynak et al. 2010, Stratigea and Giaoutzi 2012, Brand et al. 2013, Palacios-Agundez 2013); Africa (Biggs and Zurek 2007, Kok et al. 2007, McKenzie et al. 2012); Asia (Dermawan et al. 2012, McKenzie et al. 2012, Stratigea and Giaoutzi 2012); South America (McKenzie et al. 2012, Mistry et al. 2013); North America (Shaw et al. 2009); and Oceania (Bohensky et al. 2011). The following section looks more closely at MSPS applications in the forest sector context and summarises some lessons learned.

Table IV 4.2 summarises some of the forest sector applications of MSPS, presenting a very short overview of the objectives and results of the studies. In order to provide deeper understanding of the contributions of these studies, two of the cases are discussed in more detail.

4.3.1 Socio-ecological scenarios of the Guiana Shield forest sector

The Mistry et al. (2013) study is an interesting example of MSPS use in the forest sector. It focuses

Table IV 4.2 MSPS studies including forest sector applications.

Study	Scope and subject	Lessons learned
Brand et al. 2013	The case of an Alpine mountain region in Switzerland facing global change sheds light on the methodological question of how to produce multi-scale scenarios by combining expertise on global and national developments with knowledge on more specific regional developments. The second aim was to achieve a more systemic and stakeholder-based understanding of the study region by means of scenarios, i.e. illustrate possible futures of the Visp region.	Better understanding of the challenges and future development at the local level in mountain regions facing global change.
Dermawana et al. 2013	Testing a multi-scale scenario approach for smallholder tree plantations in Indonesia and Vietnam. Smallholder tree plantations are seen as a promising way to alleviate poverty and increase forest area in Southeast Asia. However, their establishment has been disappointing. MSPS approach is used to mitigate the risk of unwanted outcomes. In the MSPS process, the scenarios elaborated at higher scales provide a frame for scenarios at lower scales. However, not all of the larger-scale critical uncertainties are relevant at smaller scales or in a particular landscape, and so the approach does not fit in the category of methods that impose consistency across scales, rather it falls into the category of being complementary across scales.	The method presented provides a useful structure for the workshops on smallholder tree plantations and can be more widely applied to contexts where distinct driving forces act at different spatial scales and affect the analysis. The nested framework allows for local differentiation within a consistent set of scenarios. It is a modest but significant variation on the standard intuitive logic approach – modest because it can be grafted almost without change onto existing intuitive logic approaches, but significant because it can accommodate participants who are active at different scales in the initial development of a multi-scale scenario exercise. It therefore contrasts with multi-scale approaches that start with a high-level scenario and then ask participants to fit themselves within it. The method is also applicable if a set of high-level scenarios is constructed separately from those at lower-levels. Scenarios at the smaller scales might adopt all or only part of the scenario framework at the larger scales, depending on local conditions. The method is particularly useful in situations where the participants come from localities with different characteristics and in countries where policy-making is relatively decentralised.
McKenzie et al. 2012	The ecosystem-services outcomes of scenarios can be assessed using InVEST (Integrated Valuation of Ecosystem Services and Tradeoffs). InVEST is a software tool for assessing how the location, quantity, and value of ecosystem services change under different scenarios. InVEST uses scenarios expressed as maps of land cover or coastal and marine uses. It can link scenarios at the different scales, and therefore is useful for MSPS. Many applications of using the InVEST scenario tool in MSPS can be found from different continents.	The process of scenario development and analysis can have as much – or more – impact on decision-makers than the final results. Local- and regional-scale land-use scenarios are more relevant for InVEST applications, but there have recently been a number of global environmental scenarios that may also be of interest to InVEST users. The IPCC's SRES* scenarios describe alternative paths for global greenhouse gas emissions and are now widely used by governments and NGOs to assess possible future implications and risks associated with climate change. These global scenarios can be part of multi-scale scenarios to frame storylines at the local, national, or regional scales where InVEST is being applied.

Table IV 4.2 Continued.

Mistry et al. 2013	Socio-ecological scenarios of the Guiana Shield. The conclusions drawn from the study show that there is a clear disarticulation between the local-national scales that focus primarily on governance and transparency issues and the regional-global scales that focus more on policies, attitudes, and approaches to different key areas (e.g. environment, society, markets, technology). This reveals a difference in the scales between policy-making and practice. Thus, there is a need to bridge the gap between the scales of policy making and governance.	<p>It is important to use participatory approaches, such as MSPS, to successfully implement, for example, REDD+ and ecosystem payments schemes.</p> <p>National governance can play a key role in transferring best approaches from the international level to the local level. On the other hand, the best approaches from the local level should also have an influence at higher scales.</p>
Palacios-Agundez et al. 2013	<p>Ecosystem management policies related to Millennium Ecosystem Assessment (MA) in the Basque country</p> <p>The study describes scenarios for Basque country through 2050 in an integrated and participatory way by downscaling MEA global scenarios, analyses how ecosystem services and human well-being might change in a range of plausible futures, identifies management strategies for the territory through a back-casting process and explores the relevance of scenarios to policy-making.</p> <p>The purpose is to strengthen the link of the scenario process to policy-making and to achieve a real implementation of the research results in ecosystem management policies.</p>	<p>This participatory scenario description process, together with its associated management proposal and social learning, has been shown to be relevant for local policy development. In fact, it may lay the foundations for sustainable land-use planning in Biscay.</p> <p>Probably the most important thing that stakeholders learned during the scenario-planning process was to see different perspectives. They began to understand different points of view for example, public administration personnel explained to NGO members the different aspects regarding the pace and proceedings of administration while NGO members talked about relevant aspects that should be considered in ecosystem-based management.</p> <p>The MSPS represents a novel approach that facilitates consensus building and allows for saving both time and resources. Novel elements include: organising back-to-back workshops, creating coherent scenarios across scales, using visual elements to present exploratory scenarios, and combining exploratory scenarios with normative back-casting using a World Café methodology (for the method, see http://www.theworldcafe.com/method.html).</p>

* Scenarios published in 2000 in the IPCC's Special Report on Emissions Scenarios (IPCC 2000) are termed the SRES scenarios.

on some of the current hot topics of SFM in developing countries, such as REDD+ and payments for ecosystem services. The study is based on the COBRA project, which is the acronym for Community-Owned Best practice for resource Adaptive management in the Guiana Shield, South America. COBRA's objective is to bring together South American and European organisations and scientists to find a community-owned solution and to manage and develop ecosystem services in a way that maximises social justice and ecological sustainability.

The Guiana Shield ecosystems offer many possible directions for the region's development. Large- and small-scale mining, logging, and agricultural activities that have been implemented in the region over the past decades could suggest possible future directions. However, international policies directed towards better protection of forests and other natural resources, such as schemes for payments for ecosystem services, may potentially prevent large-scale exploitation of natural resources.

The aim of the research was to identify a range of possible future scenarios with regards to the socio-ecological systems at the international, regional, national, and local community levels and to compile and prioritise a range of win-win, win-lose, and lose-lose options for local communities from the different scenarios.

A significant result of the study's multi-scale analysis is that there are extremely few synergies between the local and global scales: there seems to be no common vision between the smallest and biggest scales of analysis. At the global and regional scales, the focus is more on policies and how these can influence society and the environment, with public-private partnerships as the most promising strategies. At lower scales, the focus is on practices, the actual operationalisation and implementation of effective development and environmental management. More relevant future steps relate to education and capacity-building, mechanisms to safeguard natural resources, and communities joining government and private enterprises in decision-making.

In worst-case scenarios, the linkages from local level to higher levels are weak and the scenarios at one scale do not impact other scales. On the other hand, the few win-win situations identify a close link between the local and national scales. These scenarios underline issues of governance and highlight the importance and influence of effective and equitable power structures at the national level on local-level sustainable futures. Mistry et al. (2013) see the national scale as a key mediator between the local and regional-global scales, which can be seen in the case of REDD+ processes and its implementation. National governance plays a key role for the trickling down of best practices from the international level to their implementation at the local level. According

to Mistry et al., however, the best approaches from the local level could remain at a local-national level without any beneficial influence at higher scales unless efforts are made at the global level to be more responsive to local perspectives.

In order to promote the development of win-win scenarios, what should politicians and practitioners focus on? The study shows certain themes that constitute strong threads linking scales to one another: values, participative democracy, corruption, social policies, environmental policies, and dominant stakeholders. The development of participatory processes for policy development and implementation, involving stakeholders at all scales, could potentially be a key pathway for the trickling up of community values.

In summary, the study shows the importance of participatory approaches to natural resource management, such as SFM. In Table IV 4.2., a number of studies using MSPS in the context of SFM were described. MSPS could also be very much applicable to REDD+ and implementing other ecosystem payments schemes. A local understanding of and involvement in the processes is the key to positive outcomes through participatory scenario development, avoiding conflicts and the loss of value.

4.3.2 Swiss alpine region in the face of climate change

The background and motivation of the Brand et al. (2013) study relates, on one hand, to the regional and local structural changes in Alpine mountain areas of Switzerland, and on the other hand, to the potential impacts of global climate change on the regional ecosystem. Although not a specific focus of the study, the forest sector is part of the regional setting. According to the study, traditional sectors such as timber industries have declined whereas the service sector, particularly tourism, has become the economic backbone in many areas. These changes have been accompanied by a number of societal and economic transitions that have also tended to result in considerable changes in ecosystem services, such as scenic beauty, recreation, and avalanche protection. At the same time, the Swiss alpine regions have been projected to experience severe climate change impacts, such as decreased snow reliability, melting of glaciers, and a higher frequency of natural hazards.

Brand et al. (2013) argue that in order to achieve a better understanding of these kinds of challenges, (besides basic research in natural science), there is a need for interdisciplinary frameworks that take into account the complexity of human-environment systems and relate natural to social-science knowledge.

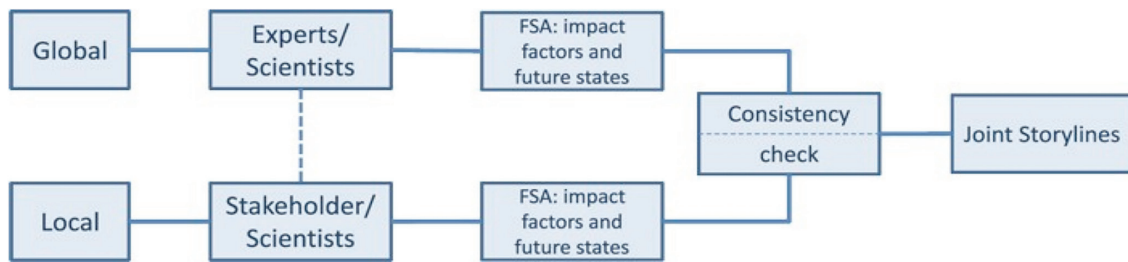


Figure IV 4.1 Illustration of the Brand et al. (2013) MSPS approach.

They see MSPS as a useful method for achieving these objectives. Behind this approach is also the view that scientists and practitioners are experts in different knowledge domains in which both sides may benefit from a mutual learning process through applying MSPS together. This type of learning process is likely to result in socially robust knowledge and a better understanding of the challenges and of future development for Swiss mountain regions facing global change.

Brand et al. (2013) set up local scenarios for the Swiss alpine region of Visp and linked them to scenarios developed for the global and national scales. Multi-scale scenarios were developed in close collaboration with key stakeholders from the Visp region, working in areas such as tourism, forestry, and administration. The multi-scale scenarios were produced by combining expertise about global to national developments with knowledge on more specific regional developments. Also, the purpose was to arrive at a more systemic and stakeholder-based understanding of the study region through scenarios of possible futures for the Visp region. The process is illustrated by Figure IV 4.1.

The study generated six multi-scale scenarios that covered the global, national, and regional levels. The scenarios represented illustrations of how to form a systemic picture of the study region, anticipate possible futures, and point to strategies to cope with local and global challenges. Brand et al. (2013) conclude that the MSPS processes can build capacity, consensus, analytic mediation, and legitimisation of future changes in the Visp region in the face of future challenges. They show that the place-based knowledge and values of stakeholders are very important elements in broadening perspectives and in developing strategies geared towards more desirable states. In addition, using the MSPS helps the scientists to focus on problems that are relevant to the people in the study region.

The lessons one could learn from Brand et al. (2013) in the context of SFM at the local scale include the following. First, the participation (e.g. workshops with different local stakeholder groups) was necessary for building trust, consensus, and ap-

preciation of the scenarios built during the process. As a result, the scenarios were not perceived as something delivered from above (or global scale), with no relevance to local actors. For example, the authors indicate that the scenarios succeeded in getting local stakeholders to also consider unwanted but possible (climate change) scenarios instead of only desirable or wishful scenarios. Building a realistic picture of the future (e.g. climate change), where the major driving forces may be global (instead of local), may also be essential for SFM to succeed.

4.4 Research and policy implications

This chapter has introduced and reviewed the MSPS as a tool to help address some of the problems faced when implementing SFM and link global to local levels, and vice versa. It is motivated by the results from the case studies of this book and many other studies in the literature (e.g. Biggs et al. 2007, Zurek and Henrichs 2007, de Oliveira et al. 2013). They clearly indicate that global policies and strategies, such as REDD+, may not necessarily succeed at the regional or local level if there is a lack of understanding, capacity, and ownership of the higher-level initiatives. On the other hand, the higher-level policies and strategies could benefit from better understanding of local-level perspectives. Indeed, this topic is at the heart of the entire book: local responses to global issues.

The MSPS approach is still rather new and evolving (e.g. Stratigee and Giaoutzi 2012, McKenzie et al. 2012). It is a tool that can be used to address some of the practical limitations of other scenario and foresight approaches when geographically different scales are involved in the issues studied and when local capacity-building and empowerment are essential to address future challenges. In recent years, increasing numbers of applications of MSPS have emerged, also in the forest sector (Table IV 4.2).

MSPS can also be an important tool to build capacity for general foresight or futures thinking at the

local level, where there is perhaps more likely to be a lack of it. MSPS can help build capacity to proactively assess future opportunities and challenges, rather than reactively act on them when they are already affecting local actors.

What are the lessons learned – the opportunities and the challenges – related to MSPS? What are the implications for decision-makers and stakeholders, and for further research needs?

First, and most important, MSPS clearly appear to be one promising approach and process for trying to help resolve some of the problems of implementing global or national-level policies, strategies, and SFM at regional and local levels. The practical case studies (Part II) and the research literature (Table IV 4.2 studies), clearly show that without local-level engagement, understanding, and ownership of the global and national policies and strategies, it is very difficult to implement SFM successfully. Furthermore, it is equally clear that these objectives will not be achieved automatically but require systematic efforts for capacity-building at the local level. However, it also appears that capacity-building is not only required from the global level to local level but also vice versa. That is, when global and national policies and strategies are planned, more attention should be devoted to understanding local-level conditions and realities than typically has been the case. MSPS may provide one useful tool for systematically addressing these shortcomings.

One important consideration of the MSPS approach is that it typically requires a significant amount of resources, time, and involvement at different scales, which may not always be available. MSPS, however, can be applied flexibly and be resource efficient when circumstances demand it. Undoubtedly, the MSPS approach can also be further developed in this respect with more research, experience, and practical learning. However, the MSPS approach is not a silver bullet and is unlikely to be useful in all circumstances. For example, Shaw et al. (2009) raise the difficulty of using MSPS in the case of trying to derive local-level scenarios from global-level climate change scenarios. Also, in some cases, there may simply be a lack of resources or interest among all of the relevant stakeholder groups for the series of scenario workshops typically needed. Thus, the suitability of using the MSPS approach needs to be carefully assessed for each case, and if it is chosen, preparation must be thorough.

Some of the MSPS case studies discussed analysed the future opportunities and challenges related to climate change scenarios, implementing REDD+, and payments for ecosystem services in the forest sector. All these issues are likely to be important in the coming decade, and their successful implementation at the regional and local levels can be enhanced with MSPS. The World Bank, national foreign aid

agencies, and national governments should direct funding for implementing and facilitating MSPS in developing countries. Also, when FAO is conducting the outlook studies and scenarios at the continental level (Africa, Asian-Pacific, Europe, North America), it could explore the use of MSPS to compare trends at national and regional levels. This would link the FAO outlook studies better to national and regional forest-sector outlook studies and scenarios. How this linking could best be implemented in different studies requires further research.

In general, global policy-making involves many different interests, both governmental and non-governmental and business and scientific communities. It is necessary to ensure that there are strong links between these actors and policy-making at national and local scales. It is also important that plans, strategies, and decisions are made at the same scale at which they are implemented. This type of thinking is, for example, behind the European Union's subsidiarity principle, which aims at determining the level of intervention that is most relevant in the areas of competences shared between the European Union and member states. This may concern action at European, national, or local levels. In all cases, the European Union may only intervene if it is able to act more effectively than the member states. Similar principles could perhaps be used in implementing SFM, and it could be enhanced by using MSPS.

When reviewing the forest sector scenario literature, one interesting aspect that emerged was that the researchers also tend to work at different scales. Some researchers may mainly work at the local (community, region) level (e.g. Evans et al. 2008 and 2014, Dermawana et al. 2013), whereas others work more at the national or global level (many of the studies reviewed in Pelli 2008 and Hurmekoski, European Environment Agency 2011, and Hetemäki 2013). Accordingly, the models, methods, and approaches applied at different scales also tend to be different and reflect the perspective (scale) of the researchers. The national and global-level scenarios typically utilise more quantitative models and methods, whereas the local-level (community) studies are more focused on qualitative "soft" social science methods (Lynam et al. 2007). There is perhaps even a tendency to publish the results in different journals (this was not systematically analysed), for instance, the national-and-global-level scenario studies typically in journals focused on economics and policy, and the local-level (community) studies in the ecological or "soft" social science journals. Future challenges for the research community are to try to cross these scales and forums, enhance the dialogue between different approaches, and publish diverse approaches in journals. It can also be fruitful for researchers to integrate local and global perspectives more in their own research.

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