Brief About ICFRE

Autonomous body of the Ministry of Environment, Forest and Climate Change, Government of India

An apex body in the national forestry research system that promotes and undertakes need based research, education and extension in the forestry sector.

ICFRE undertake forestry research, education and extension programs through a network of its nine institutes and five centres located in the different parts of the country.
1. Sustainable Land and Ecosystem Management (SLEM) Project (GEF/World Bank funded)

- Provided technical support to the project partners for implementation of SLEM projects under SLEM-CPP
- Built the capacity of the project partners and other stakeholders on SLEM
- Documented 22 best practices on SLEM developed by the project partners in different parts of the country
2. Ecosystem Services Improvement Project (GEF/World Bank funded): ESIP supports the goals of the GIM

Objective: To improve forest quality, land management and NTFP benefits for forest dependent communities in selected landscapes in Madhya Pradesh and Chhattisgarh.

Component 1: Strengthen capacity of government institutions and communities on forestry and land management

Component 2: Improving the forest quality in selected landscapes through restoration of degraded forest lands

Component 3: Scaling up SLEM best practices
3. REDD+ Himalaya Project

- ICIMOD has initiated a ‘REDD+ Himalaya Project’ to build the capacity of REDD+ stakeholders in trans-boundary landscapes of Bhutan, India, Myanmar and Nepal.

- In Indian part, ICFRE is implementing the project as a Project Partner and mainly focusing the REDD+ capacity building in North-Eastern state of Mizoram.

State REDD+ Action Plan for Mizoram is being prepared through multi-stakeholders consultation
4. Uttarakhand REDD+ Project
• ICFRE in collaboration with Uttarakhand Forest Department is implementing this project in Kalsagola Sub-Watershed of District Nainital
• State REDD+ Action Plan for Uttarakhand is also being prepared through multi-stakeholders consultation in collaboration with ICIMOD.

5. National REDD+ Strategy
On behalf of MoEFCC, GOI, ICFRE has prepared the National REDD+ Strategy.

- Prepared Rehabilitation and Restoration Plans for more than 40 mines and hydro electric power projects
- Prepared DPR on Forestry Intervention for River Ganga under Namami Gange Programme
Research supports provided by ICFRE in Restoration of mined areas and other areas
Measures applied in Restoration

- **Mechanical measures**: includes construction of check dams, gabion structures, retaining wall etc.
- **Stabilization of exposed rock surface with 80-90% slope**: through bio-degradable matting, bamboo tube
- **Biological measures**: use of pioneering species of shrubs, grasses and trees
- **Application of Consortia of rhizobium, VAM and PSB**
- **Broadcasting of seeds and planting of cutting of different species collected from nearby unmined area before monsoon.**
- **Mulching with waste wood shavings and saw dust**
- **Mud balls of 5-6 cm dia with compost and moss having seeds of grasses, herbs, shrubs and trees were spread over the area.**
Ecological Restoration of Coal Mined Areas

Major activities undertaken:

➢ Preparation of road map for eco-restoration of coal mined areas

➢ Developing eco-restoration models

➢ Providing consultancy and
Mixing of seeds in soil

Preparation of seed mixed soil balls
Planting by stem cuttings (*Vitex negundo*)  
Creation of live hedge fencing (*Vitex negundo*)
Planting by root stock (*Pennisetum purpureum*) and its growth on OB dumps
Planting by bulbils *(Agave sislana)*

Planting through seedling
Mango

Aonla

Fruit bearing trees on OB dumps
Habitat formation for faunal species

*Centropus sinensis*
(Greater Coucal or Crow Pheasant)

*Canis aureus indicus*
(Indian Jackal)
Diverse vegetation covers on OB dumps after three years of restoration
SENSITIZATION OF LOCAL PEOPLE AND OFFICIALS
Identification and reclamation of degraded land and biodiversity development at NCL, Singrauli, M.P. India

Operation carried out before restoration of site

View of the restored site
Preparation of roadmap for Ecological restoration works at NCL Singrauli
Lime Stone Mining in Himachal Pradesh
Site preparation for Rehabilitation
Rehabilitated Site
Ecorestoration of Stone Mines of Gurgaon

Site condition before restoration

Spread of coir mat to arrest the erosion & conserve soil moisture

Vegetation cover in restored mined area
SCENARIO IN MINED LANDS

Restoration of Rock Phosphate mined areas at Maldeota, Uttarakhand
Series of check dams

Planting of grasses

Combination of legumes & grasses
The restored phosphate mine overburden area

Trema politoria  Buddleja asiatica  Dense and diverse vegetation

AFTER 25 YEARS

Species richness : 55

fuel wood : 1.2 t/ha
fodder : 2.2 t/ha
timber : 4.4 t/ha
fiber & other NWFP’s
RESTORATION OF DEGRADED HILLS OF ARAVALLI RANGE, WESTERN INDIA
Rainwater harvesting devices. Top: contour trench (left) and box trench (right). Bottom: gradonie (left) and V-ditch (right).
PLANTATION & SEED SOWING

Plantation of
- Acacia catechu
- Azadirachta indica
- Dendrocalamus strictus
- Emblica officinalis
- Gmelina arborea
- Holoptelia integrifolia
- Sizigium cumini
- Zyziphus mauritiana

Seed sowing of
- Acacia senegal
- Acacia catechu
- Azadirachta indica
- Butea monosperma
- Jatropha curcas
Apluda mutica

Themeda quadrivalvis

Heteropogon contortus
Acacia ferruginea (left) and Acacia leucophloea (right)
LIVELIHOOD SUPPORT FOR THE LOCAL PEOPLE

• Fodder availability
• Fuel wood supply
• Water availability for extended period
SAND DUNE STABILIZATION IN INDIAN DESERT
SAND DRIFT CONTROL BY SURFACE VEGETATION

- Surface vegetation effectively control of reactivation of sand drift
- *Cassia angustifolia* and *Cenchrus ciliaris* could be sown to develop under canopy vegetation and for effective sand drift control
- These species can also be sown in advance in checker board design to save the cost of micro wind break erection
LIVELIHOOD SUPPORT FOR LOCAL PEOPLE

- *Calligonum polygonoides* and *P. juliflora* cover the soil surface more efficiently than *A. tortilis*
- Biomass of *C. polygonoides* was higher (7.15 tone ha⁻¹) than to *P. juliflora* (7.0) and *A. tortilis* (5.3) at age of 50 months

- *Cassia angustifolia* produce 15.58 tones ha⁻¹ fresh mass compared to 5.03 tones ha⁻¹ by *Cenchrus ciliaris* in 3 years
- Production of biomass from surface vegetation was high with *Calligonum polygonoides*

- *Cenchrus ciliaris* can provide 1.22, 1.58 and 2.36 tones green fodder ha⁻¹ year⁻¹ with *A. tortilis*, *P. juliflora* and *C. polygonoides*, respectively.
- *Cassia angustifolia* can provide dry leaves worth Rs 9120, 11520 and 16720 ha⁻¹ year⁻¹ with *A. tortilis*, *P. juliflora* and *C. polygonoides*, respectively.
RESTORATION OF WATERLOGGED AREA
Thanks for kind attention
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