Land Degradation Neutrality through Natural Resource Conservation, Management and Soil Carbon Enrichment

Land Degradation Neutrality (LDN) is a condition where further land degradation with regards to loss of productivity caused by environmental or human factor is prevented and already degraded lands are restored. The extent of land degradation in India is estimated to **120.40 million hectares** (NAAS, 2021). India has planned to achieve a target of **26 million hectare** land restoration by 2030. The degraded land loses its capacity to absorb carbon dioxide (Co2), the biggest cause of global warming. Carbon sequestration in soil improves the productivity of land and is important for achieving LDN. Carbon sequestration, improving soil fertility and biodiversity are interlinked to each other. Soil Organic Carbon (SOC) is an important soil health indicator for its contribution to food production, climate change adaptation and mitigation.

BAIF's Approach:

Avoid, Reduce and Reverse land degradation process: The key theme of LDN is followed and implemented through different interventions of soil and water conservation/watershed, Agri-Horti-Forestry (*Wadi*), silvipasture, soil health improvement, agro-biodiversity conservation and nature based solutions to rejuvenate landscapes on cluster basis and contribute the most pressing national development challenges to achieve the Sustainable Development Goals (SDGs), combating desertification and carbon sequestration. These initiatives focuses on comprehensive assessment of the state of natural resources, participatory planning and execution of conservation and restoration measures not only enhance livelihoods but helps in emission reduction and maximize carbon sequestration in soils and hence achieve land degradation neutrality.

Different initiatives of BAIF for Land Degradation neutrality and soil carbon enrichment:

- **Integrated Watershed development and climate proofing**- The watershed based resource conservation and soil carbon enrichment techniques have the potential to reduce the land degradation and address the problem of water scarcity, drought, climate change and biodiversity loss. BAIF has taken-up watershed development on area of **372109 ha** in high altitude regions, arid as well as semi-arid rain fed areas in **12** states of India. These started a virtuous cycle of good soil health, increased land productivity, food security and improved livelihoods. Adoption of watershed based approach, Region specific strategies and plans are developed and implemented for water resource development and combat drought. Promotion of micro irrigation practices in all programmes for efficient management of water and productivity enhancement. Solar pumps have been installed and promoted for drinking water supply and irrigation which are reducing carbon foot print.
- **Agro-Horti-Forestry (Wadi)**- Integrated Wadi model of tree based farming is attributed to sustainable livelihoods of poor ST families but also illustrates the sustainability aspects like ecosystem and biodiversity restoration, carbon sequestration and climate change adaptation and mitigation. The model has potential to sequester large quantities of carbon (23t/ha).
  The peninsular system harvest solar energy year round and the biomass produced helps in increase of soil organic carbon. Programme is successfully implemented on area of **89136 ha** and benefitting **222840** tribal and poor families in **12** states of India

- **Silvipasture Development**- Silvipasture Development programme successfully implemented in **76** villages covering area of 2550 ha and has helped to reduce soil degradation and to increase ground water table, enhance biodiversity and increase fodder yield from 0.19 - 0.61 tons/ha/annum. The degraded non-productive community pastures in Rajasthan and Uttarakhand are rejuvenated, building on the traditional in-situ water conservation. The programme has ensured drought proofing increased carbon sequestration and improved livestock productivity**.**
- **Soil Health and Productivity Improvement**: Emphasis on improving soil organic carbon through soil sample testing, integrated nutrient management, green manuring, intercropping with legumes, organic matter recycling, biochar application, crop rotation and crop diversification which facilitate soil microbial activity on area of **7500** ha in Vidarbha region of Maharashtra.
- **Agro biodiversity Conservation-** Biodiversity and agriculture are strongly interrelated. More than 5500 farmers involved and conserved about 597 different accessions of crops and vegetables. It has helped in adaptation of agro ecological practices, understanding traditional food systems, establishment of Nutri- gardens and ex situ and In situ conservation of local seeds. Reduced use of chemical fertilizers and pesticides. 150 Accessions are registered with NBPGR and 31 crop varieties registered with PPVFRA, New Delhi
- **Nature Based and Nature Positive Solutions**: are being demonstrated through different programmes of rural development. Adoption of circular economy through livestock based waste circulation and biomass recycling through Farmer Producer Organization for Bio char production and Bio PROM use for soil health improvement and productivity enhancement. Integrated Renewable energy for sustainable agriculture (IRESA) bio gas model is developed and established in more than **2000** Households which helps in improving soil fertility and reducing methane emission. The spent slurry is fortified with rock phosphate and is rich in microbial culture. PROM hence plays a key role in reducing the requirement of chemical fertilizers and enhancing soil fertility.

Key Outcomes:

1. Control of soil erosion, increase in ground water table and increase in crop production by 25-30%
2. Increase in soil organic carbon from 0.49 to 0.58 %, farm productivity and farm resilience.
3. Increased green cover, micro climate and 2.0 million tons of carbon sequestered through established wadis on areas of 89136 ha.
4. Soil moisture conservation, silvipasture, soil health and water use efficiency programmes helps in increasing carbon sequestration of more than 109000 tons per year
5. Wadi programme upscale in 25 states of India benefiting more than 0.5 million families through NABARDs TDF Programme
6. Conservation of 597 local varieties of different crops and vegetables for nutrition and food security.