



INTEGRATED FARM DEVELOPMENT FOR SUSTAINABLE LAND PRODUCTIVITY

A SLEM BEST PRACTICE

Indian Council of Forestry Research and Education has documented Integrated Farm Development for Sustainable Land Productivity as a best practice for sustainable land and ecosystem management (SLEM) under the World Bank funded SLEM Project.

Monoculture based farming practices, rainfed agriculture, lack of awareness on integrated farming and fragmented land holdings have not only reduced the agriculture production but also affected the soil health and livelihood of the farmers.

To address these problems integrated farm development (IFD), one of the innovative agricultural techniques, helps in augmenting the income of the farmers through natural resource management and livelihood diversification.

Integration of resources is made through a combination of land, water and animal resources of a farm through careful planning. It is also observed that monoculture farming practices has high risk factors for farmers. Integration of agricultural enterprises includes cropping, animal husbandry, fishery, agro-forestry etc. This practices assumed to be important in the states of Chhattisgarh and Madhya Pradesh, where farmers lack farming diversity and sustainable agriculture practices.

The major benefits of integrated farm development (IFD)

- ▶▶ Introduces a change in the farming techniques for maximum production in the cropping pattern and takes care of optimal utilization of resources.
- ▶▶ Less dependence on external resources.
- ▶▶ Helps in meeting the rising demand of food, feed, fiber, fuel and fertilizer.
- ▶▶ Optimum utilization of land
- ▶▶ Self-sustainability and value addition



Selection of components for IFD

- ▶▶ Crops may have sub-system like monocrop, mixed/intercrop, multi-tier crops of cereals, legumes (pulses), oilseeds, forage etc.
- ▶▶ Tree components may include small timber, fuel wood, fodder and fruit trees

Types of IFD

Some common IFD practices are:

- ▶▶ Agriculture + Horticulture + Agroforestry
- ▶▶ Horticulture + Fish Culture + Agroforestry
- ▶▶ Agriculture + Silvi-pasture
- ▶▶ Agroforestry

Factors to be considered in IFD

- ▶▶ **Physical factors:** Soil type, topography
- ▶▶ **Economic factors:** Availability of resources, transport and marketing facilities and cost, labour availability, capital, land holdings, demand for produce
- ▶▶ **Social factors:** Culture, skill, knowledge, willingness of farmers to adopt
- ▶▶ **Environment factors:** Climate, rainfall and its distribution and length of growing season

The needs and resources available to the farmers also decide the selection of IFD components in any farm.

Design criteria of IFD

- ▶▶ The selected farmer should have minimum 1-2 acreland adjoining to the farm pond.
- ▶▶ The farm pond and adjoining land should be close to homestead land as far as possible for better watch and ward. If such suitable land is not available the farmer must engage watch and ward of his cropped area.
- ▶▶ The size of the pond must be 40x40 m and depth 3 m.
- ▶▶ For fish farming, about 2500 fingerlings of catla, rohu, mrigal and grass carp ranging from 100-150g size.
- ▶▶ A trench with dimensions of 2x1 having 1.5 m depth dugout around the paddy field. This trench has been used for cultivation of fish and the bunds on the trench were planted with papaya and banana.
- ▶▶ At least one organic manure unit and vermicomposting unit



Suitable grain crops

Based on soil type, farmer can select following suitable crops.

- ▶▶ Cereals: Maize, wheat, rice
- ▶▶ Millets/Minor Millets: Sorghum, bajra, kodo, kutki and ragi
- ▶▶ Pulses: Green-gram, pigeon pea, black-gram, red-gram, chickpea and soyabean
- ▶▶ Oilseeds: Sunflower, soyabean, groundnut, castor and sesame etc.
- ▶▶ Other crops/vegetables: French bean, okra, satavar, tomato, chilli, cucurbits and oilseeds etc.

Suitable forage crops

Fodder sorghum, fodder bajra, rhodes grass, napier, fodder bajra, fodder jowar, fodder ragi and marvel grasses.

Suitable tree species

- ▶▶ Tree Species: Bel (*Aegle marmelos*), palash (*Butea monosperma*), neem (*Azadirachta indica*), jamun (*Syzigium cumini*), mahua (*Madhuca longifolia*), etc.
- ▶▶ Fruit Species: Improved which are locally suitable varieties (grafts to reduce gestation period) of fruits like mango, litchi, sapota, guava, orange, papaya, cashew nut, custard apple, lemon, aonla and jack fruit etc.
- ▶▶ Species for bio fencing: Sisal agave (*Agave sisalana*), babul (*Acacia nilotica*), mulberry (*Morus alba*), dhak (*Anogeissus latifolia*), moringa (*Moringa oleifera*) etc.

Measures for IFD practice

- ▶▶ The diversity of the farm should be increased as much as possible by introducing improved varieties of cereals and pulses, vegetables, fruit trees, fuel wood and fodder trees. This could ensure food and livelihood security throughout the year.
- ▶▶ Resource demand to be prioritized based on economic impact and sustainability. Resource based contingent plan should be prepared in advance. This will serve as a security and sustainable alternative in case of crisis
- ▶▶ Measures should be taken to conserve soil and to harness rainwater. Measures should also be taken to prevent water runoff and soil erosion.
- ▶▶ Fast growing multipurpose trees to be grown. Pigeon pea and bamboo should be planted as they add high nutrient content in soil. Scarce resource on the farm should be allocated for the most important activity
- ▶▶ Use of chemical pesticides and fertilizers are to be stopped while practicing integrated farming. Emphasis should be given on preparing and using organic manure, green manure, vermi-compost, extract of various plants and weeds or ash as organic weedicide and bio pesticide etc.
- ▶▶ Area specific crops/trees to be selected by farmers in integrated farming.
- ▶▶ The organic wastes generated from farms, cow shed, households should be reused as fish feed or may be applied in paddy or vegetable field.
- ▶▶ Selection of multipurpose forestry species that supply pods/leaves for a longer period or throughout the year. The recommended spacing between the plants must be 5x5 m.
- ▶▶ The surplus fodder leaves, crop residues etc. during the rainy season should be preserved as silage/hay for lean season (summer).
- ▶▶ Due care should be taken to maintain the inlet and outlet in pond and periodic efforts should be undertaken to clear the aquatic weeds.

Indian Council of Forestry Research and Education (ICFRE), Dehradun as Ecosystem Services Improvement Project Implementing Unit (ESIP-PIU) is building the capacity of the local communities of ESIP project areas of Chhattisgarh and Madhya Pradesh for upscaling of Integrated Farm Development for Sustainable Land Productivity: A SLEM Best Practice.

Brief About ESIP

The World Bank funded Ecosystem Services Improvement Project (ESIP) supports the goals of the Green India Mission by demonstrating models for adaptation-based mitigation through sustainable land and ecosystem management and livelihood benefits. ESIP will introduce new tools and technologies for better management of natural resources, including biodiversity and carbon stocks. Main components of the project are: strengthening capacity of government institutions in forestry and land management programs, improving forest quality, and scaling up of sustainable land and ecosystem management (SLEM) best practices. ESIP is being implemented in the states of Madhya Pradesh and Chhattisgarh by Indian Council of Forestry Research and Education, Chhattisgarh State Forest Department and Madhya Pradesh State Forest Department under the overall direction of Ministry of Environment, Forest and Climate Change, Government of India.

Brief About ICFRE

Indian Council of Forestry Research and Education (ICFRE) is an autonomous body of the Ministry of Environment, Forest and Climate Change, Government of India. It is an apex body in the national forestry research system that promotes and undertakes need based research, education and extension in the forestry sector. It has a pan India presence with its 9 research institutes (Arid Forest Research Institute, Jodhpur; Forest Research Institute, Dehradun; Himalayan Forest Research Institute, Shimla; Institute of Forest Biodiversity, Hyderabad; Institute of Forest Productivity, Ranchi; Institute of Forest Genetics and Tree Breeding, Coimbatore; Institute of Wood Science and Technology, Bengaluru; Rain Forest Research Institute, Jorhat and Tropical Forest Research Institute, Jabalpur) and 5 centers located at Agartala, Aizawl, Prayagraj, Chhindwara and Visakhapatnam. Each institute are directs and manages research, extension and education in forestry sector in the states under their jurisdiction.

Published by :



ESIP - Project Implementation Unit
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