BAIF Development Research Foundation

Committed to Sustainable Development of Rural India

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Vision

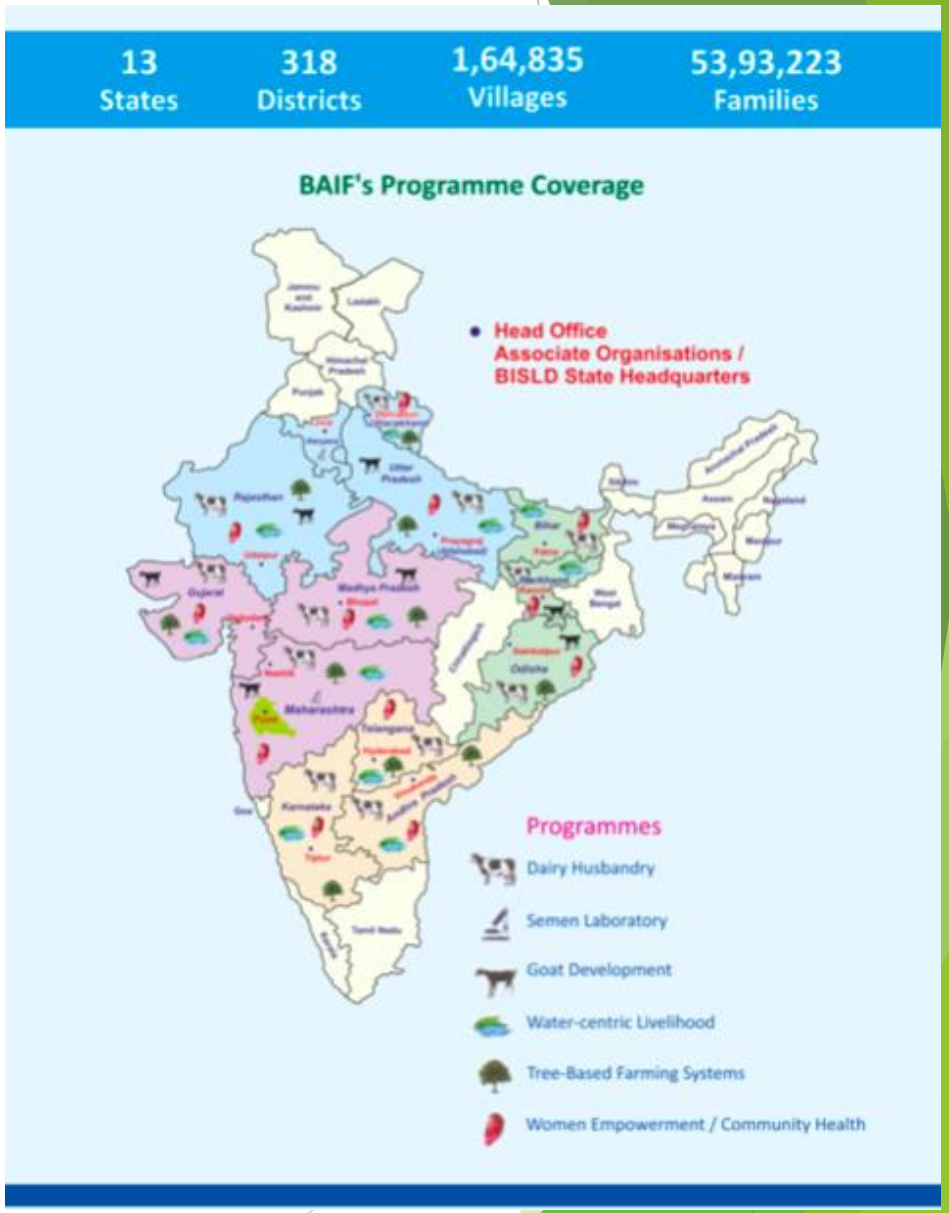
Building a self-reliant rural society assured of food security, safe drinking water, good health, gender equity, low child mortality, literacy, high moral values and clean environment.

Mission

BAIF's Mission is to **create opportunities** of **gainful self-employment** for the rural families, especially disadvantaged sections, ensuring **sustainable livelihood, enriched environment, improved quality of life and good human values.** This is being achieved through development research, effective use of local resources, extension of appropriate technologies and upgradation of skills and capabilities with community participation

BAIF's Program Coverage

- BAIF has a strong programmatic presence in 15 Aspirational Districts of India
- Reaches out to more than 53,93,223 families in 1,64,835 villages in the following states spanning over 318 districts
- Maharashtra
- Gujarat
- Karnataka
- Madhya Pradesh
- Rajasthan
- Andhra Pradesh
- Telangana
- Uttar Pradesh
- Bihar
- Uttarakhand
- Haryana
- Odisha
- Jharkhand



Core Programs

1 LIVESTOCK DEVELOPMENT

A family focused model, promoted for over 50 years transforming non-decript unproductive livestock into valuable assests, through breed enhancement and scientific management program. The program has been strengthened by cutting edge technologies and focus on backward – forward linkages.

Over 53.93 Lakh familes overreached through cattle development and over 40,000 landless familes outreached through Goat Development Program.

2 WATER CENTRIC LIVELIHOODS

A geography sensitive program, developed to optimize soil and water resource utilization, increase water availability, improve soil health and maximise water use efficiency, aiding growth in agriculture productivity and assured food security. Water Academy has also been established, to disseminate best practices and develop, stranderdise new technology to manage the critical resource.

55.11 billion liters of water has been conserved and 7855 water stressed familes have been benifited.

3 IMPROVED AGRICULTURE AND WADI

Understanding the needs of resource poor small and marninal farmers, the program devivers structured basket of interventions to improve farm productivity, reduce cost of production, diversify cropping patters and establish mechenisms to promote farm mechenisation and collectivision. The Wadi model converts 1acre plots through tree based farming systems into fruit orchards, with intercropping and forestry trees.

More than 204,895 familes have benifited through the effort.

4 CROSS CUTTING THEMES

Builing upon a holistic development approach, multidisciplinary program components are integrated across projects. Majorly these include promotion of climate resilent agriculture and climate smart innitiatives, bio-diversity conservation and non-timber forest produce management, value chain development, community health and gender sensitization, integration, and leadership development. These efforts are actualized through community organsations and village level comittees.

5 EMERGING THEMATIC AREAS

Efficient use of Solar energy, Waste Recycling, production of Bio Manur and use of information and communication based technologies provide an important window of transformation opportunities. BAIF ensures effective technology transfer and capacity building of grassroots communities to use solar energy for lighting, pumping, dehydration of fruits and vegetable, production of organic manures and bio-PROM, access crop and livestock advisory sevices and rural livelihood centric e-learning courses.

Research For Development: The programs are developed on the basis of strong scientific and applied research, conducted at the central research station and structured on farm research trails across geographies. Cutting edge technologies such as sorted semen, goat semen, high value fodder varieties such as BNH10, gene conservation of indigenous crop varieties, local seed production etc. are some of the initiatives catalyzed through various research centric projects.

Soil fertility restoration for achieving sustainable livelihoods, climate change adaptation and mitigation

Introduction:

- Soil: an important resource providing several ecosystem services

- Soil organic carbon: a vital role in climate change mitigation

- Challenges impacting sustainable development:
  - High climate risks
  - Increase in GHG emissions
  - Ecological degradation
  - Lack of knowledge about soil health management and food insecurity

- Resultant effects:
  - Poverty
  - Massive unemployment
  - Labour migration
  - Regional and inter-regional disparities
  - Degradation of natural resources and ecosystems

Objective:

- Soil restoration through integrated management practices to achieve climate change adaptation and mitigation and to rejuvenate landscape ecosystem for sustainable livelihood

- Scientific and innovative solutions for
  - Soil health and productivity improvement
  - Minimization of risks due to climate change
  - Reduction in GHG emissions
  - Conservation of biodiversity
  - To implement land degradation neutrality measures through involvement of community

Specific Objectives:

- Increase Soil Organic Carbon (SOC) stocks through convergent actions to enhance soil health and thus productivity on sustainable basis

- Minimize emissions (CO_2, N_2O etc.) from soil through measures of climate change mitigation and build resilience to adapt climate change

- Rejuvenate landscape ecosystem through participatory approach and standardize practices of soil restoration for its replication in analogous regions

Approach and activities:

❑ Integrated Soil Fertility Restoration Measures (ISRM):

- ➢ Soil Nutrient Management
- ❖ Composting
- ❖ Green manuring
- ❖ Biomass recycling and use of biological inputs
- ❖ Application of farm yard manure
- ❖ Bio char application

Vermi-compost preparation

Application of phosphorus rich manure treated with beneficial microbes

Integrated Renewable Energy & Sustainable Agriculture (IRESA)

Biogas System
- Pre-fabricated, ready to install family size plant
- Capacity (gas production) – 2 m3 / day
- Feed – 40-50 kg dung & 40-50 lit water daily
- Material – High Density Poly Ethylene (HDPE)
- 10-12 domestic LPG cylinder equivalent per annum

BAIF Slurry Filter (BSF) (patent pending)
- Cost effective & efficient solid-liquid separation
- 90% solids recovery
- 1.5 tons (dry matter) of slurry cake per annum
- Slurry filtrate storage
- Up to 50% water recycling

Slurry Value Addition
- From slurry cake
  -- 2 MT vermicompost per annum worth 12000/-
  -- Phosphate Rich Organic Manure (PROM)
- Organic liquid fertilizer production (patent pending) from slurry filtrate

Nutrition Garden
- IRESA attached nutrition garden to provide essential nutrients for a family for 1 year. Intensive small plot cultivation with organic inputs

Process Highlights	Economic Gains	Environmental Gains	Viability Quotient
• Ready to install model • BAIF Slurry Filter (BSF) for efficient in-situ slurry handling • Water saving through recycling • Slurry value addition	• Cost saving on fossil fuel & chemical fertilizers • Income generation from value added organic products • Improved soil health • Enhanced health through nutrition garden • Local organic liquid fertilizer enterprise setup	• Reduced carbon footprint • Reduced water footprint • Climate change adaptation & mitigation	• Micro level : Sustainable energy and cultivation practices • Macro level : Saving in import & subsidy

IRESA – PROM Enterprise Development

BACKGROUND
- **IRESA** is a complete package comprising of a portfolio of activities around the central **theme** of household level **biogas units**
- Use of biogas contributed in mitigation of climate change through reduced emission of greenhouse gases, avoided the deforestation and increased the carbon capture.
- Benefits include improved health, reduced hardship and saved time. BUT through **IRESA** BAIF intends to go **even Further**. !
- **Increased income** and **'Fertile Soil'** by producing Value Added Enriched **ORGANIC MANURE**

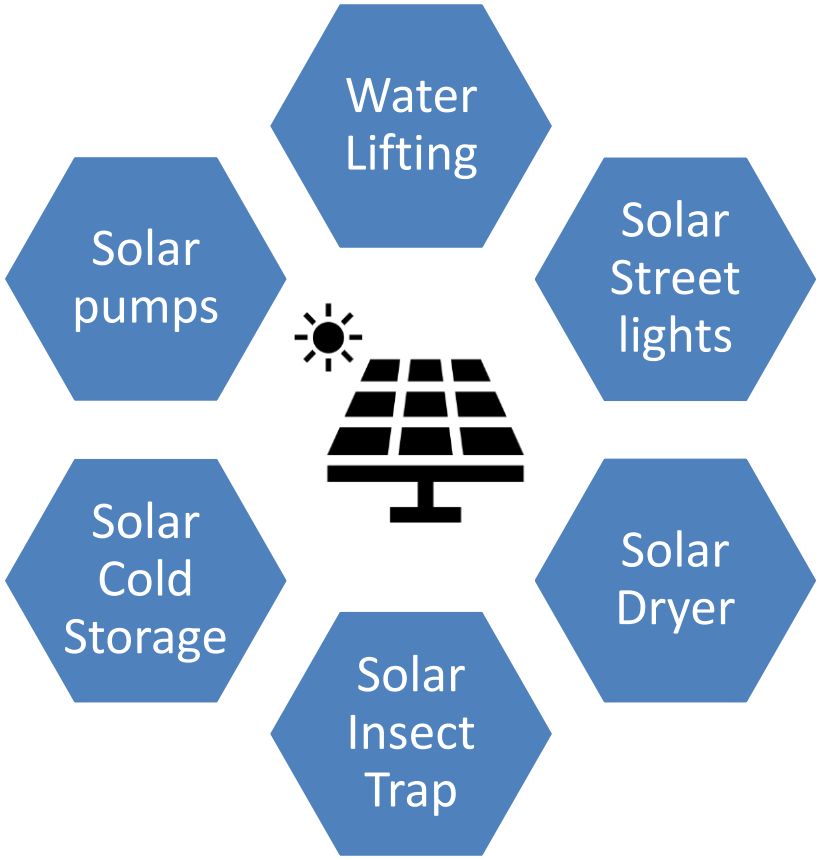
RELEVANCE
- In India, the National Programme on household biogas plants has been promoted for long (since 1982) and over 4 million small plants (1 m^3 onwards) for cattle manure are already installed
- Biogas Plants can be a perfect tool for treating wet biomass waste, generating gaseous fuel, producing organic fertilizer and reducing pollution.
- Unfortunately, there is a policy and perspective disconnect and thus these plants have been considered, generally, only as gas plants and the gas generated is highly insufficient to make it commercially viable
- Need of the hour:- **A workable business model.**
- Biogas plants NOT only for the GAS alone, but for the **additional REVENUE from By-products.**

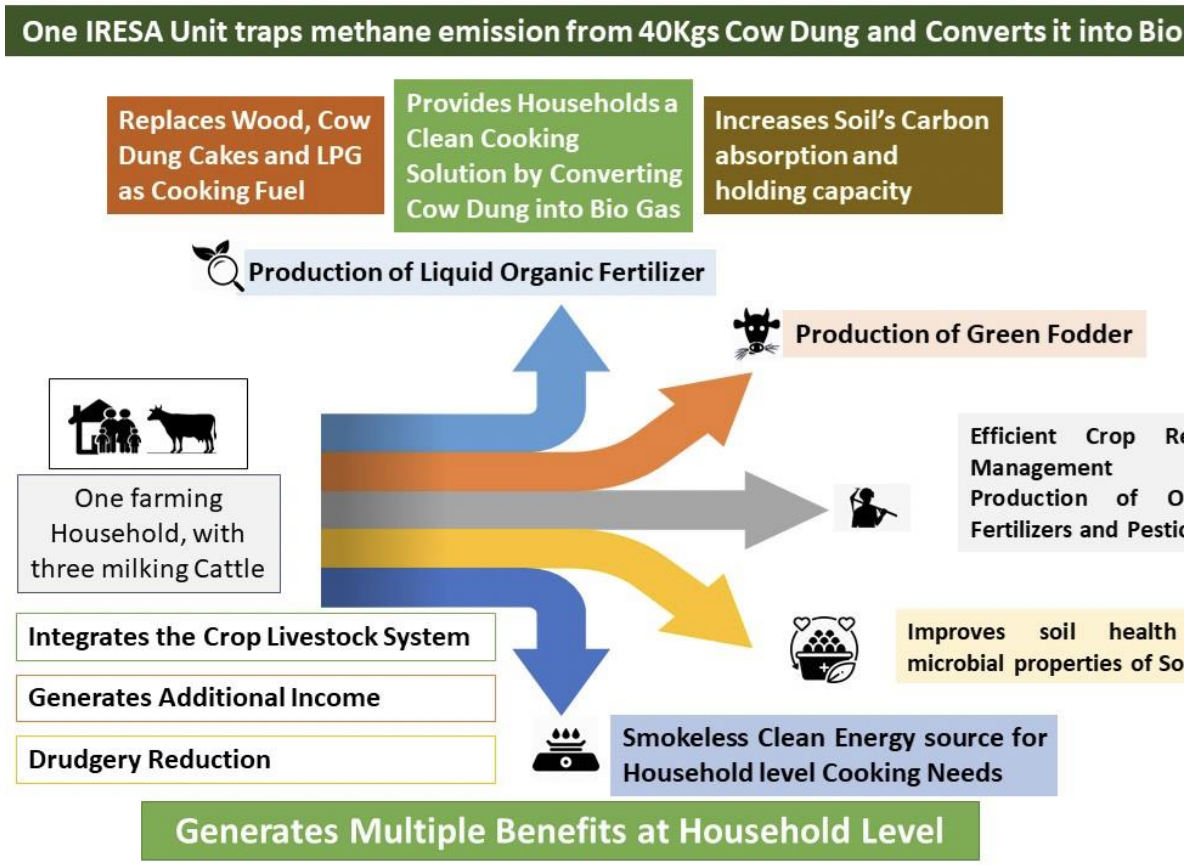
Phosphate Rich Organic Manure (PROM)
- Lack of knowledge on fertilizer value of Enriched bio-slurry has been the major cause of high payback period of initial investment made on biogas installation or farmer's unwillingness to maintain the plant throughout its lifetime.
- PROM is **a value-added product produced by co-compositing various organic wastes with high grade rock phosphate in fine size**
- **FPO level activity** – instilling a sense of Entrepreneurship. Complete ownership to FPO
- Reduces the payback period on biogas plant to less than 2 years

➢ Integrated Renewable Energy for Sustainable Agriculture (IRESA) and BIO PROM

IRESA unit

Promoting Technology Based Solutions on Popularize Clean and Renewable Energy





- Promotion of Bio char production using crop residue and its application at local level

Bio char preparation and application

- Sensitisation of farmers through agro weather advisories

❑ Carbon Sequestration Actions to Adapt and Mitigate Climate Change:

- Carbon sequestration through Agri-horti-forestry (**Wadi: Tree based farming system**) plantations on low productive lands
- Wadi: one-acre plantation of 2-3 fruit species and forestry along the border combined with annual crops

Wadi Tree Based Farming System

❑ Land Degradation Neutrality (LDN) Measures:

- Watershed development work to undertake repair and maintenance of erosion control measures through participatory approach
- Field runoff control measures (masonry field outlets)
- Water harvesting measures to catch the rain water for future use

Soil Conservation

Runoff Water Management

❑ Climate Smart Actions (CSA):

- Use of climate smart varieties and microbial consortia
- Integrated nutrient and pest-disease management
- Solar powered pumps
- Improved methods for crop cultivation
- Cropping pattern in different land use system
- Mulching
- Micro irrigation techniques
- Agronomic measures for conserving soil and water

Solar pump

Practices of Paddy improvement (Four step method, Direct Seeded Rice, System of Rice Intensification)

Community farm ponds

Low cost protected agriculture

Climate Change Adaptation Initiatives in BAIF

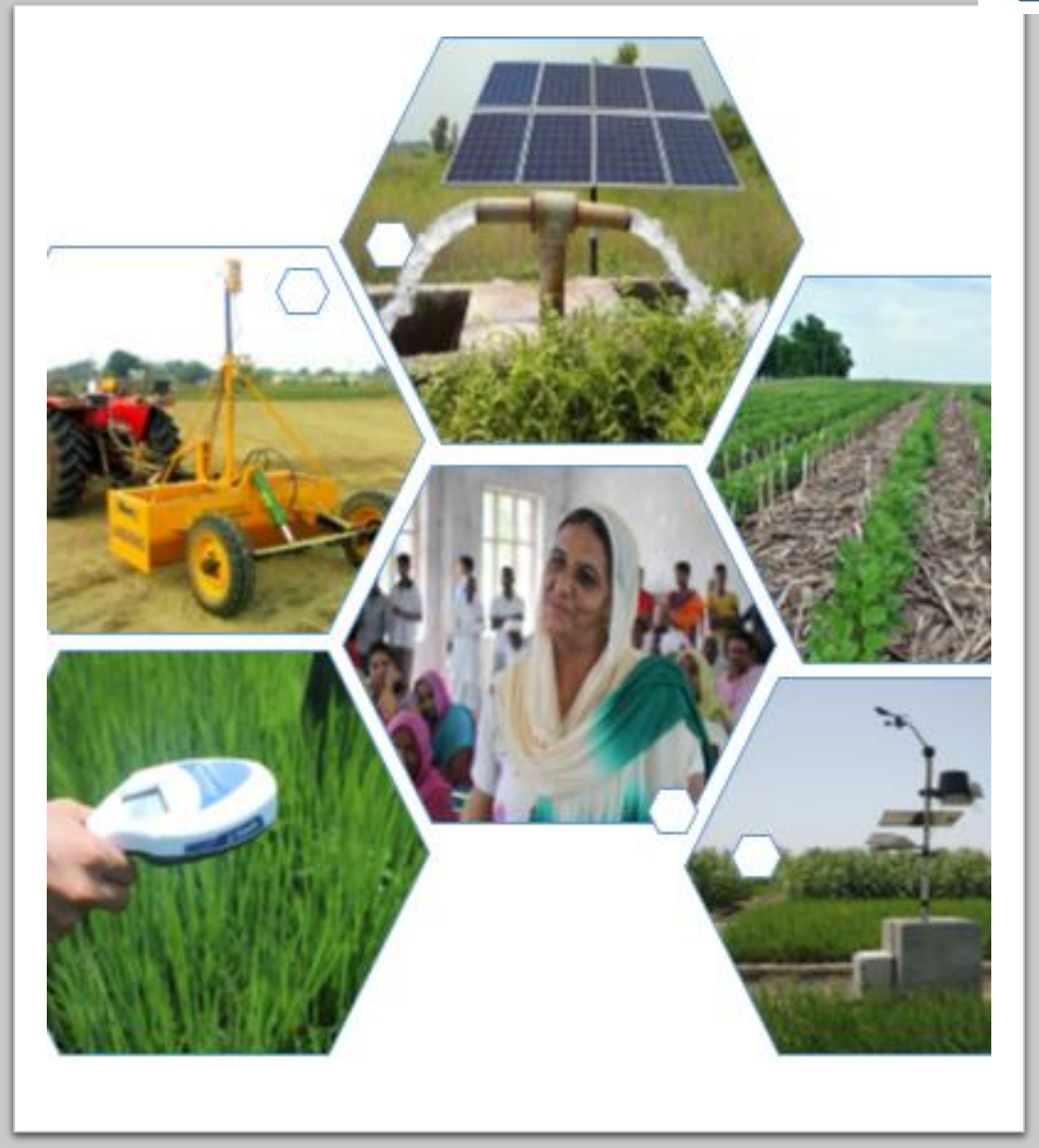
- **Total 7 states of India**
- In Partnership with NABARD- Adaptation Fund Board , BISA-CCAFS,CGIAR program

Weather-smart activities, water-smart practices, seed/breed smart, carbon/nutrient-smart practices & Institutional/market smart activities

Contingency planning, financial services, market information, gender equitable approaches & off-farm risk management strategies

Introduction of CSA practices & technologies in agriculture, water and Livestock sectors

Farmers' knowledge & capacity building on CSA technologies, participatory collective actions



❑ Biodiversity actions:

- ➢ Minimization of ecosystem degradation
- ➢ Conservation of local species suitable to existing agro climatic conditions
- ➢ Integrating crop and livestock farming
- ➢ Agro ecological interventions focusing crop and soil microbial diversity

Barnyard Millet Conservation

Habitat Eco-restoration

❖ Results/outputs/impact:

- Agri-horti-forestry system (**wadi**) as a carbon sink of plant biomass and soil

- Total above and below-ground biomass in a 10-year old wadi (Indian gooseberry or Mango) : 23 t ha^{-1} of carbon equivalent of 84.67 t CO_2 ha^{-1}.

- Increase in productivity due to rejuvenation of degraded land

- Improvement in biodiversity and ecosystem services

❑ Environmental impact:

- ➢ Conservation of natural resources through increase in vegetation cover, water availability and reduction in soil degradation
- ➢ Positive impact on sustainable livelihood
- ➢ Reduction in GHG emissions by adopting proper crop production system

❑ Social impact:

- ➢ Food and nutritional security
- ➢ Improvement in knowledge and skills

❑ Economic impact:

- ➢ Increase in crop yields up to 30%
- ➢ Increase in additional income

❖ Sustainability and replicability:

- High potential of replicability as dealing with climate change adaptation and mitigation through soil restoration approach, sustainable livelihood and conservation of natural resources

- Potential of replication in areas where having low productive lands, degraded lands, waste lands, risks due to climate change

- The *wadi* system with additional components such as water resources development and community mobilization replicated by BAIF over the past three decades

- Replicated nationally by the National Bank for Agriculture and Rural Development

- Sustainability by ensuring the participation of local institutes like farmer producer organisation, village development committees and women groups