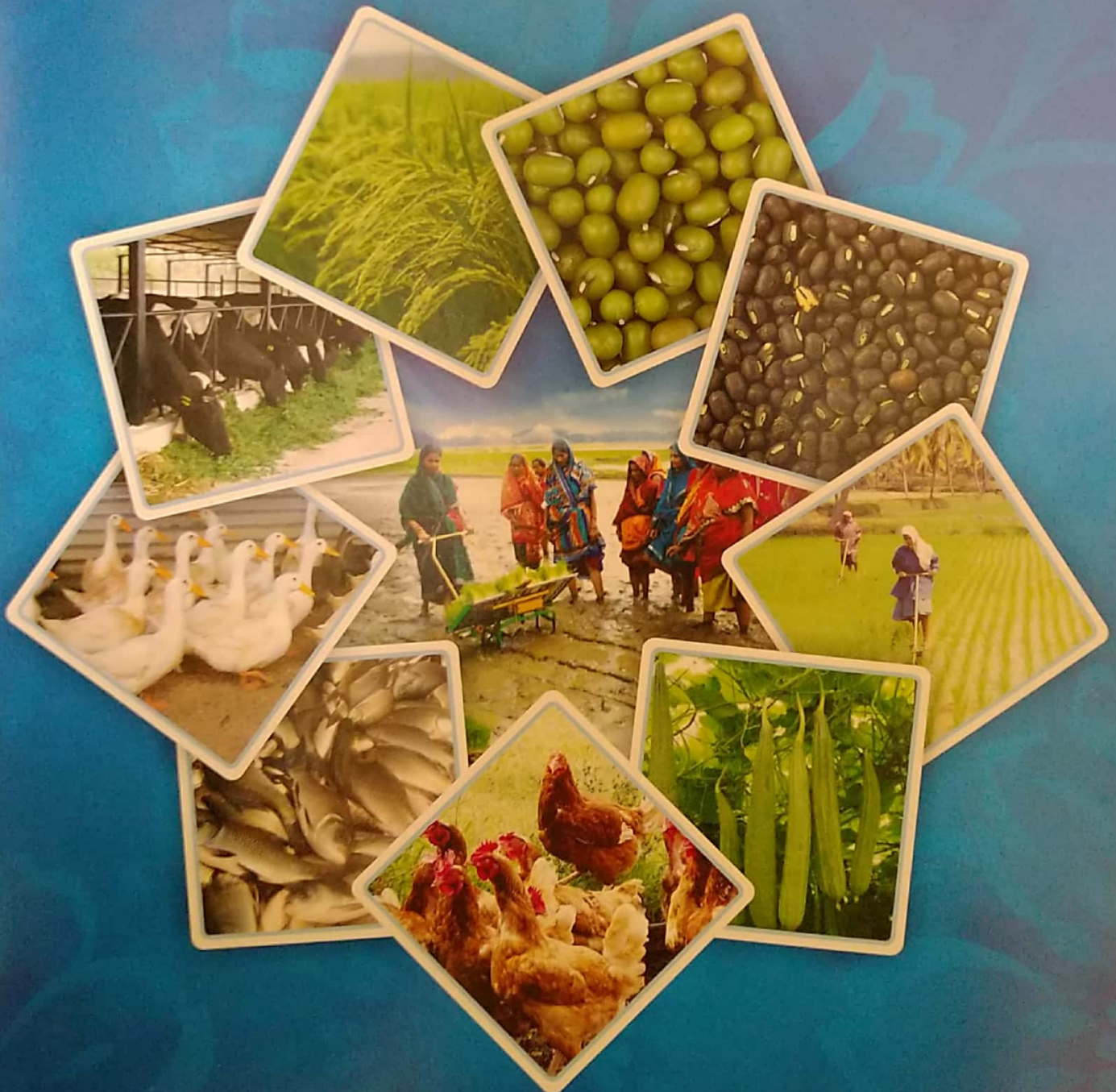


Increasing Productivity of the Rice-Based Production System Through Farmer FIRST Approach

(Project being implemented under Farmer FIRST Programme of ICAR, New Delhi)



ICAR-National Rice Research Institute

(Indian Council of Agricultural Research)

Cuttack-753 006, Odisha, India



Approach of Farmer FIRST Programme

The Farmer FIRST Programme (FFP) is an ICAR initiative to move beyond the production and productivity, to privilege the smallholder agriculture and complex, diverse and risk prone realities of majority of the farmers through enhancing farmers-scientists interface. There are concepts and domains that are new in emphasis like resource management, climate resilient agriculture, production management including storage, market, supply chains, value chains, innovation systems, information systems, etc. The Farmer FIRST as a concept of ICAR is developed as farmer in a centric role for research problem identification, prioritization and conduct of experiments and its management in farmers' conditions. The focus is on farmer's Farm, Innovations, Resources, Science and Technology (FIRST). Two terms 'enriching knowledge' and 'integrating technology' qualify the meaning of Farmer FIRST in Indian context. Enriching knowledge signifies the need for the research system as well as farmers to learn from each other in context to existing farm environment, perception of each other and interactions with the sub-systems established around. Technology integration is looked from the perspective that the scientific outputs coming out from the research institutions, many times do not fit as such in the farmers' conditions and thus, certain alterations and adaptations are required at field level for their acceptance, adoption and success.

Locale of the Study

The study is proposed to be conducted in the cluster consisting of four villages viz., Biswanathpur, Satyabhamapur, Laxminarayanpur and Ganeswarpur villages of Salipur block under Cuttack district of Odisha. The villages span its area from latitude 20° 29' 7.75" N to 20° 30' 5.65" N and longitude 86° 01' 15.84"E to 86° 02' 57.38" E and is situated in delta of Birupa and Mahanadi basin. The altitude of the village lands vary from 17 m to 22 m. The cluster is having a total geographical area of approximately of 650 ha. The net cultivated area is nearly 510 ha with upland (10 ha), medium land (436 ha) and lowland (64 ha). The area is characterized by hot dry sub humid ecosystem with warm summer and warm winter. The mean annual rainfall is about 1434 mm and majority of total annual rainfall is received during July–October. Both sandy loam and clay loam soils are prevailing in the village.

According to key informants and Gram Panchayat data, the cluster has population of 9,519 living in 1,762 houses. Among them 4,864 are male and 4,655 are female. The predominant religion in the village is Hindu followed by Muslim. Agriculture and livestock are the main occupations in the village. The fulcrum of whole village's economy lies in the agriculture. Invariably all the villagers have some sort of vegetable cultivation in their backyard (kitchen gardening). Cattle rearing are also practiced for self-consumption of milk, supplementing family income and engaging in farm operations.

Objectives

- To assess the problems, needs and opportunities of the farmers in rice-based production system through farmer-scientist interface.
- To identify the technologies/solutions available in the institute and outside, conduct participatory trials and transfer the refined technologies and approaches to the similar agro-ecosystems through e-enabled knowledge sharing.
- To find out refined technologies and develop approaches and methodologies for technological and economic empowerment of farm women and strengthen gender relations in the production systems for sustainable agriculture.
- To ascertain the operational constraints as perceived by the farmers and farmwomen in adoption of technologies during experimentation as feedback for refinement.
- To study the impact of these technologies on changes in knowledge, skill and adoption level of farmers and overall productivity gains.

Technological gaps, Research problem identification and Prioritization

One of the major factors limiting the productivity of rice-based production system in the cluster is the inadequacy of knowledge among the farming community on integrated technology. The yield gap between the on-station and farmers' field for most of the enterprises could be attributed to lack of system approach. The technological gaps, research problems and their prioritizations identified through Agro-ecosystem analysis with respect to the selected agro-ecology are given in the tabular form.

Sl. No.	Technological Gaps	Problems	Priority Areas
1.	Rice varieties for biotic and abiotic stress suitable to different ecologies	Severe pest and disease problem, weed infestation specially in low land	Demonstration of rice varieties to meet the stress and other purposes
2.	Rice varieties suitable for value addition and commercial importance	Poor market demand and low return from rice	Demonstration of high value rice varieties to fetch good market price and suitable for making value added products (VAPs).
3.	Integrated nutrient management of rice fields	Imbalanced fertilizer application over decades	Appropriate low cost integrated nutrient management practices in rice; soil health card and LCC based recommendations

4.	Mechanization in rice by small and marginal farmers	Low productivity and loss of crop due to high labour cost	Testing small machines and tools to reduce cost of cultivation and drudgery of women farmers
5.	Integrated weed management in rice	Loss of crop, poor yield and grain quality due to weed infestations	Location specific weed management methods
6.	Suitable black gram and green gram varieties for rice fallow and cold temperature	Poor productivity of local pulse varieties	Collection of suitable cultivars of pulses and developing package of practices
7.	Appropriate vegetable and fruit varieties for the locality	Spurious vegetable seeds and poor quality vegetable seedlings	Promotion of growing vegetable nursery by women groups, selection of suitable varieties and provision of appropriate fruit varieties for homestead
8.	Disease and pest management of vegetable crop	Poor yield from vegetable crops, excess applications of plant protection chemicals, health hazards of consumers	Safe and appropriate use of chemicals and botanicals for control of pest and diseases of vegetables
9.	Nutrition and health measures for cows, small ruminants and poultry, lack of improved fish breed and poor management of water bodies/fish ponds	Poor milk yield of cows, low weight and poor meat quality of small ruminants and poultry, low return, poor income from fish ponds	Spreading awareness through livestock health camps, demonstration of fodder cultivation for the livestock; approaches and mechanisms for technological and economic empowerment of women through poultry and duckery, and demonstration of aquaculture practices with spawn/fingerlings
10.	Efficient water management practices in <i>kharif</i> and <i>rabi</i>	Wastage of irrigation and rain water leading to scarcity during peak period of crop growth	Appropriate location specific water management methods
11.	Improper integration of other enterprises with rice	Poor income and unsustainability of the rice production system	Demonstration of Rice-based Integrated Farming System (IFS) Model; introduction of mushroom cultivation and vermi composting

Technology Assemblage, Application and Feedback

Under given micro-situation, the potential rice yield can be above 6 tons/ha, but the average yield obtained by the farmers is almost half i.e., 3.2 t/ha with the cost of production escalating every year and the profit margin has come to negative region. In the said context, the NRI has production technologies which are very critical and scope for application in many areas which can boost up the rice productivity by addressing many issues found out during agro-ecosystem analysis. The institute after careful analysis of its opportunities in the 'Farmer FIRST' project decided to opt for 'Rice-based Module'. Given below in the table are particulars of identified interventions with respect to rice followed by pulse, vegetable, livestock and others.

Module-wise Proposed Action Plan

I. Crop Based Modules:

A. Name of the Crop: Rice

1. Name of Technology	Stress tolerant rice varieties, varieties of commercial importance, integrated nutrient management, weed and water management, IPM, mechanization, Rice-based IFS Models, post harvest management
2. Nature of Intervention	Low cost and need-based technology, knowledge intensive, simple to moderately complex, needs cooperative endeavour, ability to solve the problems of women farmers.
3. Source of Technology	ICAR-National Rice Research Institute, Cuttack
4. Expected Out put	<ul style="list-style-type: none"> <input type="checkbox"/> Higher productivity <input type="checkbox"/> Reduction in cost of cultivation <input type="checkbox"/> Drudgery reduction of farm women, value addition in rice by women <input type="checkbox"/> Improvement in soil health <input type="checkbox"/> Higher market Price for slender, fine grain, short and aromatic rice.
5. Plot Size	0.5 acre/ 1 acre rice-based farming system models
6. No. of Farm Families	200 farm families per year × 2 = 400 farm families/ 4 nos. of IFS
7. Critical Inputs	Seeds, fertilizers, pesticides, pheromone traps, bio-control agents, weedicides, weeders, farm implements, exposure visits, HRD programmes

B. Name of the Crop: Vegetables and Fruits

1. Name of Technology	Improved varieties, integrated pest and disease management, vegetable seed production and nursery raising and appropriate fruit sapling for homesteads
2. Nature of Intervention	Need based and problem solving, women friendly technologies, Poly House structure for protected horticulture
3. Source of Technology	ICAR-IIHR-CHES, Bhubaneswar and other consultants
4. Expected Out put	Higher yield, quality seeds and seedlings of vegetables and fruits, higher income for women, technological empowerment, family nutrition
5. Area	0.25 acre/ homesteads
6. No. of Farm Families	200 farm families
7. Critical Inputs	Training, seeds, fertilizers, pesticides, hormone

C. Name of the Crop: Pulse Crops (Black gram, Green gram)

1. Name of Technology	Improved varieties, nutrient management
2. Nature of Intervention	Need based and problem solving, low cost simple to use, scope for women participation.
3. Source of Technology	KVK, Cuttack and OUAT, Bhubaneswar.
4. Expected Out put	Higher yield, higher profit margin, soil fertility improvement, wider adoption.
5. Area	0.5 acre rice-based/ fallow land
6. No. of Farm Families	100 farm families
7. Critical Inputs	Seeds, P ₂ O ₅ application, seed treatment chemicals, Rhizobium culture, sowing by seed drill

II. Rearing of Livestocks (Cows, Poultry, Duckery, Fishery)

1. Name of Technology	Parasitic treatment, mineral and protein supplement, appropriate strain for backyard poultry farming and improved fish spawns/fingerlings
2. Nature of Intervention	Problem solving, low cost, interest sustaining for women farmers, women from lower casts in sustaining their livelihoods through backyard poultry farming, supply of improved fish spawns/fingerlings
3. Source of Technology	ICAR-CARI Regional Station, Bhubaneswar, CPDO, Bhubaneswar, ICAR-CIFA, Bhubaneswar, OUAT, Bhubaneswar
4. Expected Out put	Higher milk yield, strengthening livelihood, technological and economic empowerment of farm women, productive use of leisure time of women, marketing of milk can be institutionalized, nutritional security of the family and enhanced fish productivity.
5. Area	One animal per family covering pregnancy and lactase period and ten poultry birds (Vanaraja, Khaki Campbell) to family, supply of fish fingerlings to selected ponds
6. No. of livestock / fish ponds	80 livestock and four fish ponds
7. Critical Inputs	Medicine for parasitic and reproductive problems, mineral and protein supplement, fodder cultivation, fish fingerlings, poultry birds

III. Mushroom and Vermi-Composting

1. Name of Technology	1. Mushroom Demonstration 2. Vermi-composting
2. Nature of Intervention	Women friendly, homestead based, simple, sustainable
3. Source of Technology	KVK, NRRI, Cuttack and OUAT, Bhubaneswar
4. Expected Out put	Improvement of soil in nursery and vegetable field, productive use of paddy straw, income generation, enhance family nutrition, cleanliness of the surrounding
5. Area	5 beds per women for mushroom farming; 1 vermi-compost per a group of 5 farm women
6. No. of Farm Families	200 farm families for mushroom farming; 50 farm families for vermi-composting under group approach (10 groups of 5 members each)
7. Critical Inputs	Spawn, bengal gram powder for mushroom farming; Vermi-compost structure, worms (earthworm)

Partnership and Institution Building

- **Institutional sources of technologies to be intervened:** Rice production, Rice-pulse cropping system etc - ICAR-NRRI; Vegetable, Poly-house, Mushroom, Vermi-compost etc. - OUAT, ICAR-CHES & KVK; Poultry and animal rearing - ICAR-CARI, Bhubaneswar & KVK, Cuttack, Fishery-ICAR-CIFA, Bhubaneswar
- **Technical backstopping & Monitoring:** ICAR-NRRI & KVK, Cuttack
- **Capacity building activities:** ICAR-NRRI, KVK, Cuttack & block level officers of state line departments (agriculture, horticulture, animal husbandry, fisheries, agriculture engineering, irrigation etc.)
- **Group mobilization:** Formation of Farmers' Interest Groups (FIGs) like Rice growers group, Seed producers group; Vegetable producers group; Women interest groups for vegetable nursery, livestock, mushroom and vermin-composting; Establishment of enterprise-based Value-Chain, Custom hiring of farm machineries group through FIGs etc. Involvement of panchayatiraj institutions (like, village panchayat, block samiti) for group mobilization etc
- **Linkage with financial institutions (like banks/ cooperatives):** Inviting the financial institutions and cooperative societies, NGOs to Interface meetings for helping farmers and farm women in opening of group/ individual savings account; for getting agricultural loans, crop insurance, starting of new enterprises etc.
- **Marketing linkages:** Linking vegetable growers with Udyaan Fresh, Govt. Of Odisha and, agro- processing & marketing industries by convening special meetings and institutionalizing it through MoUs.

Expected Outcome/Deliverables

- Sustainable Rice-based farming systems
- Sustainable natural resource management
- Socially, economically and technologically empowered farm women to meet the future challenges in agriculture
- Making rice a profitable enterprise
- Institutionalizing mechanisation in rice farming
- Enhancing nutritional security of households

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 Pressure Visit of Farmers & Farmwomen
 under "Farmer FIRST Project"
 ଠିକଣା: ICAR - ICFMD, କଟକ, ଓଡ଼ିଶା
 ତାରିଖ: ୦୧-୦୪-୨୦୧୭

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