

Enhancing farm productivity and profitability

with Farmer FIRST Programme, focus at Khordha district of Odisha

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The Farmer FIRST Programme (FFP) implemented by Odisha University of Agriculture and Technology (OUAT) in six villages of Khordha district has significantly enhanced agricultural productivity, profitability, and socio-economic conditions of farmers. The programme adopted an integrated module approach involving field crops, horticulture, livestock, enterprises, and resource-based activities. Interventions included replacement of traditional paddy varieties with high-yielding ones, off-season vegetable cultivation, improved livestock management, and promotion of mushroom and small-scale enterprises. These efforts led to yield increases of 23–87% in paddy and 33–116% in vegetables, and income gains ranging from 70–467%. Dairy, goatery, and backyard poultry modules recorded substantial improvements in productivity and profitability. The project also empowered women through resource-based enterprises like dal and flour mills, enhancing their income sources. Socio-economic impact analysis revealed marked improvements in farmers' participation, contact with extension agencies, decision-making ability, and social security. Case studies demonstrated income enhancement up to 215%, showcasing the success of FFP interventions in transforming smallholder livelihoods and promoting sustainable, inclusive growth in the region.

Keywords: High-yielding varieties, Livestock management, Mushroom cultivation, Odisha agriculture, Off-season vegetables, Socio-economic impact, Women empowerment

AGRICULTURE in Odisha, particularly in the coastal districts like Khordha, is characterized by small and fragmented holdings, traditional crop management practices, and limited adoption of modern technologies. To bridge the gap between research and field realities, the Farmer FIRST Programme (FFP)—an innovative initiative of the Indian Council of Agricultural Research (ICAR), implemented through Odisha University of Agriculture and Technology (OUAT) aims to strengthen farmer–scientist partnerships and promote need-based, location-specific technologies. The programme emphasizes enhancing farm productivity, profitability, and sustainability by integrating field crops, horticulture, livestock, and small-scale enterprises. In Khordha district, interventions under FFP have successfully transformed the livelihood of rural farmers through technological empowerment, diversification of farming systems, and development of rural enterprises, leading to measurable improvements in income and socio-economic well-being.

The district of Khordha comes under east and south eastern coastal plain agro-climatic zone with

several farming situations. The selected villages under the 'Farmer FIRST' programme were Govindapur, Gopalpur, Brahmapura, Brahmapurapatna, Lokipur, and Brahmapura II in Begunia Block of the district.

Modules undertaken and technical interventions

- **Crop based:** Replacing old and local paddy varieties with high yielding new varieties and capacity building on INM, IWM and IPM.
- **Horticulture based:** Off-season cultivation of hybrid pumpkin and hybrid cucumber with seedlings raised in pro-tray under poly house, capacity building on scientific management practices of cultivation of hybrid papaya and cucumber, introduction of cultivation of pointed gourd in trellis as an intercrop with papaya.
- **Livestock based:** Promotion of cross bred cow and goat through scientific practices of rearing and management.
- **Enterprise based:** Installation of spawn production unit and training to 6-8 farmers on spawn production in each village, capacity building on production,

processing, value addition and preservation of paddy straw and oyster mushrooms, rearing backyard poultry for egg and meat.

- **Resource based:** Providing an option for unemployed mass of village women to earn their own income source through dal mill and flour mill.

Outcomes of the project

FFP was implemented since October 2016 in four villages (Govindapur, Gopalpur, Brahmapura, and Brahmapurapatna) provided better opportunities for farmers to enhance their farm productivity and profitability through farmer-scientist interactions and capacity building on improved methods of crop cultivation and scientific rearing and management of livestock. After successful implementation of the programme in these four villages, the activities were subsequently extended to two more villages (Lokipur and Brahmapura II) from the year 2022–23.

The substitution of traditional paddy varieties with high-yielding varieties (HYVs) such as Swarna Sub-1, Hasant, Sarala, Kalajeera, Kalachampa, and Gitanjali enhanced productivity by 23–87% and increased farmers' net income by 70–207%.

Off-season (September/February) cultivation of hybrid pumpkin (Vimal Tokita) and cucumber (Annapurna Rajmata), with seedlings raised in pro-trays under polyhouses, increased productivity by 33–116% and 40–66%, and profitability by 75–467% and 277–432%, respectively. The introduction of commercial cultivation of hybrid papaya 'Red Lady 782' in place of local papaya in kitchen gardens and nearby homestead lands resulted in a 46–235% improvement in fruit yield and a 61–460% increase in income. Furthermore, when pointed gourd was grown in the inter-row spaces of papaya under a trellis system, productivity and profitability were further enhanced by 82–97% and 186–259%, respectively, over the sole hybrid papaya crop.

Capacity building on the scientific rearing and management of large animals such as cows and small ruminants like goats in the adopted villages, along with regular advice on artificial insemination, vaccination, deworming, and proper nutrition with suitable mineral mixtures, yielded positive results. Support to livestock farmers with medicines, vitamins, and mineral mixtures proved beneficial. Following the interventions, milk yield increased by about 200% (from 2–3 L to 5–6 L/animal), with a corresponding 241% enhancement in income (₹1,490 to ₹5,090 per month). In goatery, the introduction of superior Ganjam breed bucks into existing flocks reduced mortality from 20% to 4%, and meat weight per animal at marketable age (18 months) increased from 5 kg to 7 kg, leading to an 83% rise in income. Encouragement of backyard poultry with suitable breeds such as Vanaraja, Palishree, and Kadaknath enhanced profitability by 175%, with body weight increasing from 1.2 kg to 2–2.5 kg per bird at the 4–6 month stage.

Under the enterprise-based module, capacity building on mushroom spawn production using low-cost technology such as polypropylene (PP) bags and

paddy seeds instead of glass bottles and wheat reduced the cost of spawn production by ₹3 bag. Spawn quantity increased by 15% using PP bags. About 14 progressive farmers were trained in this technology, and 20 farmers received training on value addition of oyster mushrooms (drying and powder making).

Under the resource-based module, one self-help group (SHG), Omm Shiva Shankar, was empowered with the supply of a dal mill and a flour mill, ensuring a net income of ₹ 35,000–50,000 and ₹ 23,000–27,000, respectively.

Expansion of technology

Looking at the success of the technological interventions under the project, non-adopted farmers from the same as well as nearby villages showed keen interest in adopting these improved technologies. Considering the growing enthusiasm and demand among farmers, the technologies were continuously upscaled to cover a larger number of households. As a result, a remarkable expansion in the outreach and adoption of all technological interventions was observed during the project period.

Table 1. Up-scaling and out-scaling of the relevant technologies with intervention of the project

Particulars	Up-scaling with intervention of the project (number of households)		Out-scaling with horizontal expansion (number of households)
	2021–22	2024–25	2024–25
Crop (paddy)	250 (60 ha)	350 (140 ha)	420 (168 ha)
Pumpkin	43 (4.5 ha)	100 (9 ha)	215 (22 ha)
Cucumber	46 (4.2 ha)	90 (8 ha)	115 (13 ha)
Dairy	50 (100 ha)	200 (250 animals)	235 (285 animals)
Goatery	10 (12 animals)	55 (486 animals)	65 (639 animals)
Mushroom	20	120	135
Backyard poultry	30 (1,800 birds)	350 (4,800 Birds)	420 (6,150 birds)

Impacts of the project on socio-economic aspects

The detailed socio-economic impact study of the project in the adopted villages clearly indicated significant improvement in farmers' social perception, participation, and sense of security. The timely availability of quality seeds, adoption of new production technologies, irrigation at critical crop stages, and appropriate nutrient and plant protection management, supported by the continuous technical guidance of the OUAT team, made these outcomes possible. The beneficiaries' keen interest, perseverance, and hard work in effectively utilizing their land and labour for improved production practices brought notable changes in their livelihood conditions.

The villagers gained self-confidence in scientific paddy cultivation and livestock rearing, while the better utilization of paddy straw for mushroom cultivation contributed to additional farm income. The project also facilitated horizontal expansion of technologies through the provision of critical inputs and experience sharing

among farmers, leading to overall improvement in their socio-economic status. Furthermore, many farmers earned social recognition within their communities and emerged as role models, inspiring others to adopt similar scientific and profitable farming practices.

Table 2. Impacts of the project on socio-economic aspects of the farmers

A) Social impact	
Variables	Percentage change (%)
Participation in different extension activities	34
Contact with extension agents (agriculture/horticulture officers, input dealers, KVK and OUAT scientists)	42
Mass media contact	23
Social participation	30
Contact with financial institution	22
Decision making ability	34
Social security	46
B) Economic impact	
Variables	Change
Annual income	20–25% (increased)
Savings	Increased
Expenditure pattern	Modified (increased)
Debt	25–30% (decreased)
No. of earning members	Average 2 members per family (increased)

Case studies on DFI after interventions of Farmers FIRST Programme

Case study 1: Before the intervention of the FFP, Shri Harihar Pradhan of Gopalpur village earned an average annual profit of only ₹50,800 from the sale of farm produce from his 1.48 ha of land (2016–17). The low crop yield was analyzed in consultation with scientists under the FFP, and several remedial measures were introduced, such as the use of good-quality seeds (HYVs/hybrids), line transplanting, and nutrient management based on soil test-based fertilizer recommendations and leaf colour charts. Off-season cultivation of vegetables and proper grading of harvested fruits helped him fetch better market prices. In addition, capacity-building programmes on scientific crop management, along with demonstrations and exposure visits, were conducted. By the end of 2024–25, his annual net income had increased to ₹2,16,400—an improvement of more than 200% over the baseline income. In recognition of his achievements, Shri Harihar Pradhan was awarded by OUAT and the Department of Agriculture and Farmers' Welfare, Government of Odisha, as a progressive farmer.

Case study 2: Before the intervention of the Farmers FIRST Programme (FFP), Shri Subash Behera of Brahmapura-II village earned an annual profit of ₹40,000 from the sale of produce from his 1.12 ha of land (2022–23). With the introduction of scientific crop and livestock management practices under FFP, along with the inclusion of new crops such as cucumber,

Table 3. Increase in the income of Shri Harihar Pradhan through the FFP interventions

Components	Area (ha)	Production (t)	Gross income (₹)	Net income (₹)	Percent increase due to intervention	
					Production	Income
Paddy	0.80	3.60	79,200	30,000	38	71
Cucumber	0.20	5.00	75,000	45,000	Introduced	
Brinjal	0.04	1.00	20,000	10,000	20	11
Tomato	0.10	2.50	30,000	20,000	25	100
Okra	0.04	0.60	12,000	7,000	20	134
Bitter gourd	0.10	1.60	40,000	25,000	33	21
Pumpkin	0.20	5.00	40,000	20,000	42	67
Papaya	0.10	9.30	1,11,600	59,400	Introduced	
Total	1.58		4,07,800	2,16,400		213

Table 4. Increase in the income of Shri Subash Behera through the FFP interventions

Components	Area (ha)	Production	Gross income (₹)	Net income (₹)	% increase due to intervention	
					Production	Income
Paddy	0.80	3.50 t	77,000	27,800	25	44
Brinjal	0.04	1.00 t	20,000	10,000	25	43
Tomato	0.10	2.50 t	30,000	20,000	36	60
Okra	0.04	0.64 t	12,800	7,800	32	55
Cucumber	0.04	0.88 t	17,600	11,600	Introduced	
Bitter gourd	0.10	1.50 t	37,500	22,500		
Poultry (Kadaknath)	30	3,000 no. eggs	30,000	18,000	200	350
Paddy straw mushroom	500 beds	350 kg	52,500	32,500	Introduced	
Total			2,77,400	1,50,200		218



Crop based module



Horticulture based module



Vegetable based module



Off-season cultivation based module



Horticulture based module



Livestock based module



Goat based module



Poultry based module



Enterprise based module

bitter melon, and paddy straw mushroom, his farming system became more diversified and profitable. By the end of 2024–25, his annual net income had increased to ₹1,50,200—an impressive rise of about 215% over his previous income.

SUMMARY

The Farmer FIRST Programme (FFP) implemented by Odisha University of Agriculture and Technology (OUAT) in six villages of Khordha district has significantly improved farm productivity, profitability, and livelihoods. Using an integrated approach combining field crops, horticulture, livestock, enterprises, and women-led resource activities, the project introduced high-yielding paddy and hybrid vegetables, improved livestock management, and promoted mushroom

cultivation and rural enterprises. Paddy and vegetable yields rose by 23–116%, while incomes increased by 70–467%. Livestock modules recorded up to 200% rise in milk yield and 83% gain in goat meat yield. Women earned additional income through dal and flour mills. Socio-economic analysis revealed higher participation in extension activities, improved decision-making, and greater financial security. Case studies showed over 200% income growth, demonstrating the success of FFP interventions in transforming smallholder farming into a more productive, profitable, and sustainable system, fostering inclusive rural development in Khordha district.

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