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Climate-resilient paddy-cum-fish farming in NICRA Village Jatipur, Puri District: A community-based success story

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Abstract

The coastal district of Puri in Odisha faces severe agricultural challenges due to frequent cyclonic activity, heavy rainfall, and prolonged waterlogging during the kharif season, leaving large tracts of farmland uncultivable for up to eight months annually. Under the NICRA-TDC project, a pilot intervention was implemented in Jatipur village during 2022-23 to introduce scientific sequential paddy-cum-fish farming as a climate-resilient livelihood strategy. A compact block of 17 acres was developed with strengthened embankments, improved water management, composite fish culture, integrated livestock and duck rearing, and diversified horticulture along embankments. High-yielding flood-tolerant paddy varieties (Swarna Sub-1 and CR-1009 Sub-1) were cultivated in the post-monsoon season following fish harvest. The integrated system resulted in a 22-24% increase in paddy yield (43.6-46.2 q/ha), additional net incomes of ₹8,300-₹10,600/ha from rice, ₹1,65,000 from fish (35.7 q), and ₹2,30,000 from vegetables (360 q) during the no-income kharif period. The intervention demonstrated significant improvements in food security, farm profitability, and resilience against climate-induced disruptions. The successful model, now known as the "Jatipur Model," offers potential for scaling in similar agro-climatic zones.

Keywords: Climate-resilient farming, sequential paddy-cum-fish system, flood-tolerant rice, composite aquaculture, livelihood diversification, Odisha, NICRA-TDC, integrated farming systems, coastal agriculture, climate change adaptation

Introduction

In recent times, the combined impact of global warming and climate change has resulted in frequent low-pressure formations over the Bay of Bengal. These systems trigger erratic weather patterns such as untimely heavy rainfall, cyclones, super cyclones, floods, and flash floods. Being a coastal district of Odisha, Puri is among the worst affected. Over 70% of its geographical area is low-lying and becomes waterlogged during the monsoon season. In these regions, water often stands 3-4 feet above the crop fields, making rice cultivation during the kharif season nearly impossible.

For 6-8 months of the kharif period, farming activities come to a standstill. Many farmers are forced to migrate to different parts of the country, taking up work as daily labourers in brick kilns, construction sites, agricultural farms, hotels, spinning mills, and other sectors to sustain their livelihoods. Considering the severity of the situation, a small village named Jatipur, with 72 households in Puri Sadar block, was adopted in 2022-23 under the KVK's NICRA-TDC project for targeted interventions.

Entry point activities

A preliminary PRA survey was carried out in the village, which covers a total geographical area of 77 ha. From this, a compact block of 17 acres of paddy fields, owned by 17 small and marginal farmers, was selected for the introduction of scientific sequential paddy-cum-fish farming. Several village meetings were organised to create awareness and encourage farmers to adopt composite pisciculture in this identified area during the fallow period of Kharif 2022. In May 2022, as part of the entry point activity, the peripheral embankment of the 17-acre plot was mechanically strengthened to a height above the highest flood level experienced in the past 10 years. Within the selected patch, two farm ponds with a total water spread area (WSA) of 0.3 acres were already present. These ponds were dewatered, sun-dried, refilled with fresh water, fertilised, and initially stocked with 4,000 Jayantirohu stunted fingerlings. To initiate supplementary livelihood activities, interested farm families

were provided with 400 Khaki Campbell ducks, 1,000 Kadaknath chicks, and 1,000 White Pekin ducks. Subsequently, during July and August 2022, the two farm ponds were stocked in phases with 10,000 genetically improved (GI) Catla fry, 8,000 Jayantirohu fry, and 10,000 Amur carp fry.

Technological interventions

By the end of August 2022, the 17-acre patch had impounded sufficient rainwater, with depths ranging from 3 to 5 feet due to the undulated bottom. Water quality parameters total alkalinity, total hardness, and pH were tested, and based on the results, 800 kg of lime was applied. Five days later, the water was manured with eight tractor loads (approximately 2,000 kg) of raw cow dung. Two days after manuring, one side of the two farm ponds was cut open to allow auto-stocking of fish seed into the larger impoundment.

In September 2022, about 150 kg of grass carp juveniles were introduced to control the excessive growth of emergent weeds (*Nymphaea*). From the first week of October, artificial floating feed was provided daily to the fish. In mid-November, another 800 kg of lime was applied to the large pond as a winter disease prophylactic measure.

Along the newly strengthened 925-metre peripheral embankment, 800 Andhra Patakapura banana plants were planted, with intercrops such as sweet corn (var. Madhuri), colocasia, okra, cowpea, radish, marigold, and cucumber. Additionally, with support from the KVK's NICRA-TDC project, a custom hiring centre equipped with major agricultural implements was established in the village. This centre is managed by the Grama Jalabayu Kshati Parichalana Samiti, a village-level committee.

In December 2022, beneficiaries of the 17-acre plot were supplied with high-yielding paddy varieties Swarna Sub-1 and CR-1009 Sub-1 under KVK's NICRA demonstration programme for summer paddy cultivation. By mid-January 2023, farmers had prepared their nurseries for transplanting. Immediately after dewatering and fish harvest, the land remained mucky and ready for paddy planting, enabling farmers to complete transplanting across the 17 acres by 25 January. The paddy exhibited luxuriant vegetative growth due to the organic matter enriched during the preceding fish culture. With minimal application of manure and fertilisers, and negligible pest infestation, farmers harvested a bumper crop by the first week of May 2023.



Conclusion

With this technological intervention, the yield from summer paddy was increased up to 22 - 24% over previous years with productivity of 43.6 and 46.2 q/ha for Swarna sub-1 and CR-1009 sub-1 with additional net incomes of Rs.8,300/- and Rs.10,600/- per ha respectively. During the “No income period” of Kharif season farmers could able to produce 35.7 q fish of worth Rs.3,60,000/- with net income of Rs.1,65,000/- and 360q of vegetables of worth Rs.4,21,000/- with net income of Rs.2,30,000/- approximately. The income from banana plantation is yet to come. With the success of the project, the model is now popularly called as “Jatipur model”.

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