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Economic analysis of enhancing the productivity on Okra in Tamil Nadu irrigated agriculture management project of India

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ABSTRACT

The Tamil Nadu Irrigated Agriculture Modernization Project (TN-IAMP) is a project aimed at improving irrigation infrastructure, water management, and agricultural productivity in the state of Tamil Nadu, India. The target area is two different phases of sub basins is selected and the project's objective is productivity enhancement in vegetable crops. The horticulture interventions is implemented in about 2100 tanks out of a total of 4778 tanks in 43 sub basins in 30 districts. Vegetables and mango are cultivated only in tail ends in sub basin area. Cultivation of vegetable crops is taken up in all the five zones. The focus of horticulture interventions is on optimizing productivity and diversification of the cropping systems. The beneficiaries are selected by the village level Asst. Horticulture Officer and block level Horticulture Officers. Selected farmers are provided inputs like seed, planting material, fertilizers, bio-pesticides etc. well before the planting time. Without Project Yield (MT/ha)" represents the yield that would have been achieved without the project. Percentage Increase in Yield" shows the percentage increase in yield achieved with the project compared to the scenario without the project. The data suggests that implementing the project has led to a significant increase in the yield of the okra crop across different phases, with an average percentage increase of around 45.6%. The average percentage increase in net profit is around 189%, which indicates the positive impact of the project on the economic outcomes of the farmers. In Phase-I, the B/C ratio for the WP scenario is 2.52, indicating that the project generates significant benefits relative to its costs. In the WOP scenario, the B/C ratio is 0.92. In Phase-II, the B/C ratio for the WP scenario is 2.41, again indicating a positive economic impact. This indicates that the project generates more benefits than the costs incurred, making it economically viable and potentially beneficial for the farmers.

KEYWORDS

Productivity, Okra, Income Analysis, B/C Ratio, Yield Analysis, With Project, Without Project, Horticulture

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The Tamil Nadu Irrigated Agriculture Modernization Project (TN-IAMP) is a project aimed at improving irrigation infrastructure, water management and agricultural productivity in the state of Tamil Nadu, India. The project aims to enhance water use efficiency, increase agricultural production and improve the livelihoods of farmers.

The key components of the project typically includes, promoting best practices in crop management, soil health, and water-saving techniques to enhance agricultural productivity. Improving the socio-economic conditions of farmers through increased crop yields, income diversification and improved access to markets.

Incorporating sustainable agricultural practices and environmental considerations to ensure the long-term viability of horticultural practices and addressing climate change challenges by adopting technologies and practices that enhance the resilience of horticulture to changing climatic conditions. The horticulture interventions is implemented in about 2100 tanks out of a total of 4778 tanks in 66 sub basins in 30 districts. Vegetables and mango are cultivated only in tail ends in sub basin area. Cultivation of vegetable crops is taken up in all the five zones. The focus of horticulture interventions is on optimizing productivity and diversification of the cropping systems. The project plans to adopt an extensive approach for optimizing productivity of the existing crops by disseminating improved technologies, providing need-based adoption support and piloting cultivation of new crops through marketed extension. The main objective of the programme is to accelerate crop diversification from high water requiring low-income crops like paddy and sugarcane to lesser water requiring high profit horticulture crops, especially vegetables and fruits through promotion of high productivity and water conservation technologies. For laying demonstrations on the farmers' fields, the unit cost is adopted as per the norms in Mission for Integrated Development of Horticulture (MIDH) and Pradhan Mantri Krishi Sinchayee Yojana (PMSKY).

The demonstrations is covered an area of 450 ha at an out lay of Rs. 90 Lakhs. The size of individual demonstrations is varying from 0.2 to 1.0 acre depending upon nature of the crop – 0.2-0.5 acre for vegetables. Based on the performance of the crop under demonstration and the income of the stakeholder, the farmers nearby is enthusiastic to take up the crop without expecting any financial assistance from the project. The required technical guidance is given from sowing to harvest of the crop by the technical staff of department of horticulture. The objectives with which the Department of Horticulture and Plantation Crops are implemented in the sub basin:

- To improve the productivity of horticulture crops by technology and training in the sub basins
- To improve returns to farmers through development of better market linkages and promotion of business development services
- To facilitate cost reduction through demonstration of appropriate technologies, agronomic practices and collective inputs procurement
- Diversification to high yielding and water efficient crops adopting new technologies by farmers
- Facilitating the introduction of market driven crops through diversification
- Popularizing the hybrid varieties in vegetables, spices and quality grafts in fruit crops, for better economic returns.
- Sustaining soil health by promotion of INM/ IPM
- Promoting reduced pesticide village's concept to produce vegetables in clusters
- The focus is on short duration HB vegetables and other horticulture crops in the sub basin command areas.

The focus of horticulture interventions is on optimizing the existing crop productivity and diversification of the cropping pattern. The project plans to adopt an extensive approach in optimizing productivity of the existing crops by disseminating improved technology, providing need-based adoption support and piloting of new crops through market led extension. The project envisages strengthening of extension services through partnerships with research organizations and other public institutions such as TNAU, Krishi Vigyan Kendra (KVK) etc. The project implementation is built on the experience of these agencies and complementing resources. The nodal officer in the Sub-Basin is identify the personnel to be trained on extension and procurement activities and arrange imparting trainings to them through 132 recognized training institutes as approved by the HOD. Necessary agencies for supply of inputs are then finalized according to the powers delegated to the procurement officers. The district procurement officer is issued supply orders for the supply of inputs (hybrid seeds, MN mixture, bio-fertilizers, bio-pesticides etc.) required to the implementing officer to carry out the identified demonstration in the selected field at the right season.

Methodology

This intervention is mainly focus on intensification of the existing cropping system and promotion of market lead cropping systems through demonstration of selected horticulture interventions such as introduction of HB vegetables, quality

planting materials, integrated nutrient and pest management, improved agronomic and water management practices depending on emerging market opportunities. The demonstrations are conducted in the fields of selected farmer's. The beneficiaries are selected by the village level Asst. Horticulture Officer. Selected farmers are provided project inputs like seed, planting material, fertilizers, bio-pesticides etc. well before the planting time. The concerned Horticulture Officers and the Assistant Horticulture Officers of the block identify the demo plots/farmers. These officers are responsible for conducting the demonstrations and training of farmers participating in respective demonstrations and review the adoption in their fields through periodic field visits.

They are conducted trainings on different aspects at the demonstration area at critical stages of vegetable crops.

Results and Discussion

Phase Wise Yield Analysis for Okra crop

The table 1 that presents yield analysis for the WP (With Project) and WOP (Without Project) scenarios for the crop okra across different phases and an overall project average. The table shows the state average, end of the project yield as per PAD (Project Appraisal Document), yield with the project, yield without the project, and the percentage increase in yield for each phase and the project average. Here is a breakdown of the information:

Table 1. Phase wise yield analysis for the WP & WOP scenario

Okra	State Average	End of the Project Yield as per PAD (MT/ha)	With Project	Without Project	% Increase in Yield
Phase-I	8.97	10.40	16.41	11.28	45.53
Phase-II	8.97	10.40	15.35	10.54	45.69
Project Average	8.97	10.40	15.88	10.91	45.61

In the above table, sub-basin refers to the geographical region or area where the analysis is being conducted. Crop indicates the specific crop being analyzed which is okra in this case. Phase indicates different phases of the project. State average represents the average yield of the crop in the state.

End of the project yield as per PAD (MT/ha) represents the projected yield at the end of the project based on the project appraisal document. With Project Yield (MT/ha) indicates the actual yield achieved with the implementation of the project.

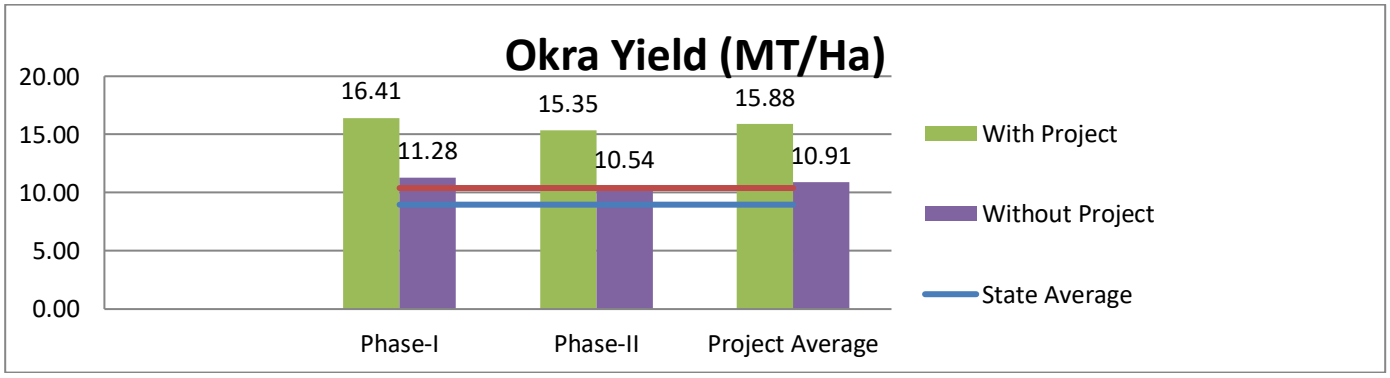


Fig 1. Phase wise Average Yield

Without project yield (MT/ha) represents the yield that would have been achieved without the project. Percentage increase in yield shows the percentage increase in yield achieved with the project compared to the scenario without the project.

The data suggests that implementing the project has led to a significant increase in the yield of the okra crop across different phases, with an average percentage increase of around 45.6%. This improvement in yield demonstrates the positive impact of the project on agricultural productivity.

Phase Wise Income Analysis for Okra Crop

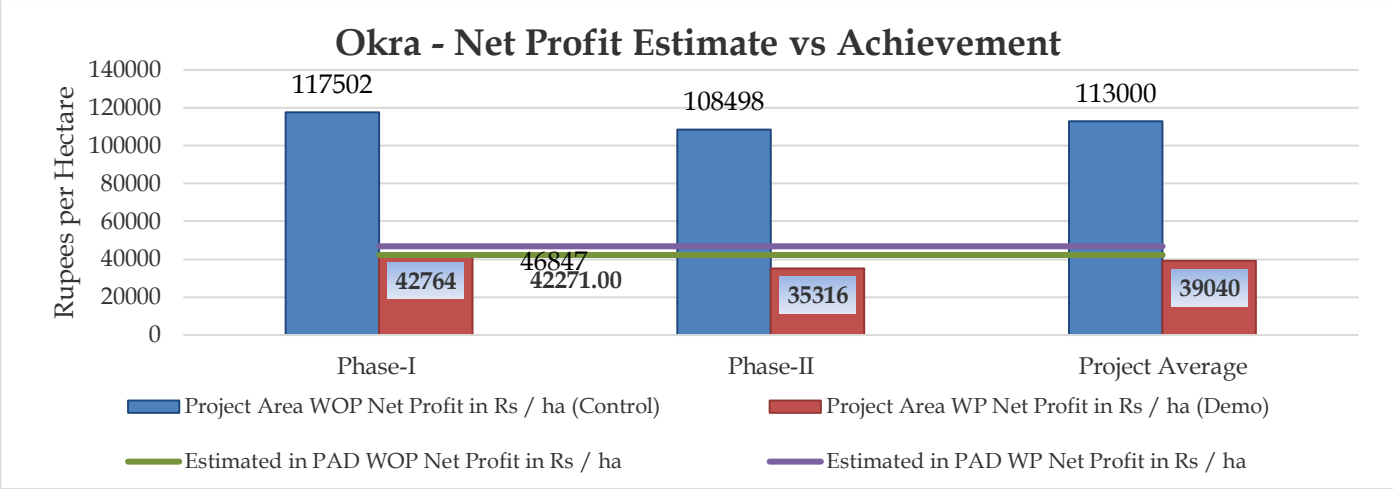
The below table that presents the net profit analysis for the okra crop project across different phases, comparing the WOP (Without Project) scenario to the WP (With Project) scenario. The table includes data such as the WOP net profit in Rs/ha (control), WP net profit in Rs/ha (demo), percentage increase in net profit, and the estimated net profit values as per the PAD (Project Appraisal Document). Below given the breakdown of the information:

Table 2. Sub basin wise income analysis for the WP & WOP scenario

Okra	Project Area		%	Estimated in PAD		%
	WOP Net Profit in Rs / ha (Control)	WP Net Profit in Rs / ha (Demo)	Increase in Net Profit	WOP Net Profit in Rs / ha	WP Net Profit in Rs / ha	Increase in Net Profit
Phase-I	42764	117502	175%	42271.00	46847	11%
Phase-II	35316	108498	207%	42271.00	46847	11%
Project Average	39040	113000	189%	42271.00	46847	11%

In this above table, "WOP Net Profit in Rs/ha (Control)" shows the net profit per hectare in the scenario without the project (control group). "WP Net Profit in Rs/ha (Demo)" represents the net profit per hectare in the scenario with the project (demonstration group). Percentage Increase in Net Profit" indicates the percentage increase in net profit achieved with the project. "Estimated Net Profit in Rs/ha (PAD)" shows the net profit per hectare as estimated in the Project Appraisal Document (PAD). Percentage increase in net profit indicates the percentage increase in net profit compared to the PAD estimates.

The data suggests that implementing the project has led to substantial increases in net profit for the okra crop across different phases. The average percentage increase in net profit is around 189%, which indicates the positive impact of the project on the economic outcomes of the farmers. The actual net profit values in the WP scenario are significantly higher than those in the WOP scenario, demonstrating the project's contribution to improved financial outcomes.



Phase Wise Cost Benefit Analysis for Okra Crop

The below table that presents the cost-benefit ratio analysis for the okra crop project in different phases, comparing the WP (With Project) scenario to the WOP (Without Project) scenario.

The table includes data for the cost benefit ratio (B/C) in the WP and WOP scenarios for each phase and the project average. Here's a breakdown of the information:

Table 3. Phase wise Cost Benefit Analysis for the WP & WOP scenario

Okra	Cost Benefit Ratio WP (B/C)	Cost Benefit Ratio WOP (B/C)
Phase-I	2.52	0.92
Phase-II	2.41	0.50
Project Average	2.47	0.71

The cost-benefit ratio (B/C) is a financial metric used to assess the economic viability of a project. It is calculated by dividing the total benefits generated by the project by the total costs incurred. A B/C ratio greater than 1 indicates that the project is generating more benefits than costs and is considered economically viable. A B/C ratio less than 1 indicates that the project may not be economically feasible. In phase-I, the B/C ratio for the WP scenario is 2.52, indicating that the project generates significant benefits relative to its costs. In the WOP scenario, the B/C ratio is 0.92. In Phase-II, the B/C ratio for the WP scenario is 2.41, again indicating a positive economic impact. However, the B/C ratio for the WOP scenario is notably lower at 0.50. The project average B/C ratio for the WP scenario is 2.47, while the average B/C ratio for the WOP scenario is 0.71. These ratios suggest that implementing the project has a positive impact on the economic feasibility of the okra crop project, as the B/C ratios are consistently greater than 1 in the WP scenario across different phases and on average. This indicates that the project generates more benefits than the costs incurred, making it economically viable and potentially beneficial for the farmers.

Conclusion

Economic analysis of hybrid okra involves evaluating the financial performance, profitability, cost structure, and economic viability of cultivating hybrid varieties of the okra crop. Based on the economic analysis, provide recommendations for farmers, policymakers, and other stakeholders regarding the feasibility and benefits of adopting hybrid okra cultivation. We must remember that the economic analysis of hybrid okra should be context-specific, considering factors such as geographic location, local market dynamics, climate conditions, and the preferences of consumers and farmers.

Consulting with agricultural economists and experts in hybrid crop cultivation can provide valuable insights for a comprehensive analysis. Yield analysis of okra involves evaluating the quantity and quality of the crop harvested from a specific area of land. Yield analysis provides insights into the effectiveness of cultivation practices, the impact of various factors on yield and the overall productivity of okra crops. Based on the yield analysis, provide recommendations for optimizing cultivation practices, addressing challenges, and improving yield performance to sub basin farmers. Income analysis of okra involves assessing the financial aspects of cultivating and selling this crop. It focuses on evaluating the revenue generated from the sale of okra produce, considering factors such as yield, market prices, and overall profitability. Based on the income analysis, provided recommendations on improving income, optimizing expenses, and maximizing profitability to the farmers. Calculating the cost-benefit ratio (C/B ratio) for okra involves assessing the economic viability of cultivating the crop by comparing the benefits gained from the cultivation to the associated costs. The C/B ratio is a useful metric to determine whether the investment in cultivating okra is financially worthwhile. Based on the C/B ratio analysis, provide recommendations for optimizing costs, increasing benefits, and improving the financial performance of okra cultivation.

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