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Integrating Flower and Inland Pisciculture An Innovative Method for Climate Resilience in Wetland Ecosystem of Kanyakumari District

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ABSTRACT

An immediate challenge to the Kanyakumari district's production system is climate change effects. In order to adjust to the changing environment, farmers are investigating novel farming techniques. Innovative methods are becoming more popular in wetland ecosystems. The COVID predicament has given rise to a number of new strategic methods. This case study investigates how the wetland ecosystem of the Kanyakumari area views a novel approach of combining inland pisciculture and flower farming. The innovative approach that was used was combining lotus with fish aquaculture in wetland ecosystem. Pink, red, and white cultivars of lotus are used for this approach. In addition to being cut flowers, they can be utilized as loose flowers, potted plants, and in pond landscaping and has a lot of medicinal uses. A case study was conducted to enlighten on the perceptions and opportunities in the novel approach that can boost up the income of farmers.

INTRODUCTION

Climate change poses an acute threat to the production system in Kanyakumari district. As the region's economy is predominantly rainfed agriculture farmers are exploring innovative farming systems adapting to the changing climate. Uptake of novel approaches has been trending in wetland eco systems. Several new strategic plans have emerged since the occurrence of COVID situation. The present case study examines the perceptions of such an innovative method of integrating flower and inland pisciculture in the wetland eco system of Kanyakumari district. Integrating Lotus with fish farming was the innovative method followed, Lotus is widely distributed in subtropical and tropical regions of south and southeast Asia. In India, it occurs throughout the country exhibiting enormous morphological and genetic diversity with a large number of racial variants in different shapes, sizes and shades of pink and white flowers. The beautiful cultivar of pink, red and white flowers are used for cutflower having 4-5 days of vase life. Apart from being used as a cut flower, they are also used as loose flower, and potted plant and in landscaping of ponds and huge lakes. Besides its floricultural uses, lotus is a plant where all parts viz. roots, stems, leaves, flowers and buds are commercially being utilized in food or for traditional medicinal purposes.

Novel Approach- Integrating Lotus and Fish Farming

Lotus is propagated by the division of rhizomes and seeds. Rhizomes with new sprouts are cut into small pieces having at least three nodes. Seeds are scarified at both the ends for early germination. They are grown in damp soil usually a combination of loam *and* clay soil. They require at least six hours of sunlight a day and should be sparingly fertilized in the first year. It is important to protect the lotus roots from freezing. About 35000-40000 rhizomes are required for planting one hectare of land. It can be cultivated commercially by utilizing some pond management practices, fertilizer application etc. The multiple benefit of this method of cultivation has been recognized in recent decades from provision of water and food and support the biodiversity for regulation of climate, mitigation of water related disasters and supporting livelihood. Wetlands are preferred for cultivating Lotus because of their higher monetary return.

Farmer Details

Name and address of the achiever	**Abdul Kadher** **Madhavalayam** **Thovalai Block** **Kanyakumari District** 
Telephone and telephone numbers	9025797645
Details of area under the intervention	Land Size : 3 Acres own land : 1 Acre Leased land : 2 Acres (Shamnmugapuram)
net income	Rs 764750 per annum
Extend of diversification	Decentralization of lotus cultivation , procurement of flowers from small and marginal farmers and marketing to outside states like Delhi and Mumbai. Extended to Importing and growing new varieties of lotus plants and encouraging other farmers to purchase flowers to generate income and stabilize the supply chain to ensure sustainable income.

Beneficial Effects

Lotus possesses many medicinal, economic and nutraceutical properties. In the ancient medicinal literature, it has been reported in several *Ayurvedic* formulations as sweet, cooling, astringent, demulcent useful in weakness, dysentery, diarrhoea, and also in curing cough and cold. The flowers are recommended as cardiotonic, liver, urinary and veneral disorders. The seeds are highly valued in conception, blood disorders and as cooling medicine. The leaves and rhizomes in powdered form are prescribed for the treatment of piles. The rhizomes and fresh seeds are edible and cooked for the preparation of several delicious dishes. The rhizomes are edible and sold in the vegetable market. The leaf and leaf stalk are eaten as vegetable. The leaves are also used as plates in rural areas for serving the food. Lotus flowers are in great demand in the floriculture market. The leaves can be used for making plates, boxes and packing materials. Whole flowers, petals and seed pods can be used as dried floral crafts.

Potentials of Integrating Lotus and Fish Farming

Kanyakumari district experiences tropical climate with a rainfall of around 1400mm per annum. Wetland Habitat have been an integral part of our socio- cultural ethos in the district. The district has 2623 tanks having 159000ha. There are 1486 rain fed tanks and 161 system tanks (fed by canals). Hence there is vast scope of getting better remuneration to the wetland farmers.

Successful Intervention

A demonstration unit was established for integrated flower and fish farming at KVK Kanyakumari. The unit integrates lotus cultivation and composite fish culture with IMC and GIFT Tilopia. Demonstration of integrating flower and inland pisciculture for profitable farming and training was provided to farmers. Awareness was created among farmers. Training was provided to 25 farmers and the demonstration unit was showcased to visitors under ATMA from the district and nearby districts, RAWE students and farmers. So far more than 500 farmers have visited the unit. A success story of Mr Abdul Khader was recorded at Madhavalayam village at Thovalai block of the district. He owns one acre of wetland and two acres of leased land.

Lotus Component (One Acre)

Nature of input	Measurement/ Quantity	Cost involved (Rs)
Unit area of water body:	One acre Cost of establishment and land preparation+ Number of lotus plants per acre : 3000 nos Labor Wages for Harvesting :	Rs 200000/ - Rs 365000
Gross Cost of Production	Establishment +labour	Rs 565000
Lotus Harvesting @500 Nos /day from 2 nd month	Income from Lotus @ Rs 5/ - on an average Price range -Rs 2 -35	Rs750000/ -
	Lotus leaves @Rs 70/ - per bundle of 100 - 20 bundles/day	Rs 280000/ -
	Average yield of lotus flower	500 nos
Gross income		1030000
Net Returns		665000
BCR in first year		1.8
BCR from second year		2.82

Fish Farming Component (One Acre)

Nature of input	Measurement/ Quantity	Cost involved (Rs)
Unit area of water body:	One acre	
Stock size	3000 nos	15000
Period	10 months	
Species	Rohu , Katla , Mrigal	
Pond Depth	6.5 to 10 feet	
Recommended diet	A mixture of bran and chickpea flour in the ratio of 4:1 . 500gm/day dose up to 5 - 6% of body weight After the body weight reaches 500-1000 grams, reduce the feed to 3.5%	
Gross income		Rs 243000 / acre
Net Returns		Rs 228000
Gross Profit		Rs 893000
Overall BCR		2.19

CONCLUSION

The association of lotus-fish integration yields substantial returns. Economic analysis comparing the production costs and farm-gate sale prices indicates significantly higher profits for farmers. Integration requires high initial investment but results in much higher income that the initial establishment cost is obtained during first year itself and higher levels of profit in the subsequent years. Relatively higher income is obtained compared to non-integrated farming method with less effective labour and resource utilization. With land being a limited resource, integrated farming provides a viable solution to produce more income from existing nonproductive waterlogged land. This integrated farming method is likely to play a crucial role in boosting production, ensuring remunerative

PHOTOGRAPHS

Integrating Flower and Inland Pisciculture

Lotus Harvesting

returns, creating employment opportunities for rural populations, improving livelihood, and has been valued as an opportunity for improved incomes and for coping with unfavorable soil conditions. Scientists initially framed lotus farming as a means to adapt to climate change and cope with flood extremes. Regardless of the feature of climate adaptation, the farmer is operating in response to the commercial opportunity brought about by lotus cultivation, with the help of other farmers. The lotus farming integrated with fish farming, as indicated by this novel approach, is the most profitable under the wetland ecosystem.