

EXPLORING THE UNTAPPED POTENTIAL OF FRESHWATER POND AQUACULTURE IN KERALA

By

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Abstract

Aquaculture is an emerging sector in the modern economy. It helps address the basic problems of traditional agriculture and those created by capture fisheries. Rural people and urban capitalists use artificial tanks for aquaculture development. However, there are large numbers of water bodies and areas that remain unutilised for aquaculture activities. Kerala possesses significant potential for the development of both freshwater and brackish water aquaculture. The unutilised freshwater ponds can be considered as a potential area for the development of freshwater aquaculture. Proper utilisation of freshwater ponds will help people find employment, raise income, and strengthen forward and backward linkages in economic activities across sectors.

Keywords: *aquaculture, capture fisheries, freshwater aquaculture, freshwater ponds, pond aquaculture kerala.*

Introduction

The term 'aquaculture' refers to the cultivation of aquatic animals and plants in fresh, brackish, and marine environments. The National Oceanic and Atmospheric Administration, USA, defined aquaculture as "the breeding, rearing, and harvesting of fish, shellfish, algae, and other organisms in

all types of water environments". Aquaculture addresses many of the drawbacks of capture fisheries. Capture fisheries are subject to many problems, such as resource depletion, food and nutrition deficiencies, and declining export earnings. Proper formulation and implementation of government policies play a vital role in

solving the problems created by the capture fisheries. The Technical Guidelines for Responsible Fisheries of the FAO (2025) noted that global seafood production has expanded through aquaculture. The advancement of technology, proper disease management, development, and the shift to new species help expand aquaculture.

In the global production of aquatic animals, India, China, and Indonesia were the three major aquaculture producers in 2023, accounting for more than 73 per cent of total aquaculture production. It provides an opportunity to develop into a leading producer and exporter of aquatic animals and products. To achieve this, the Government of India formulated and implemented several programmes. Blue Revolution –Neel Kranti Mission (2014), National Fishery Policy (NFP) 2020, Pradhan Mantri Matsya Sampada Yojana (PMMSY) for the financial year 2020-21 to 2024-25 and Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY) for the year 2023-24 to 2026-27 are some of the examples of the Government initiatives. A major focus of the PMMSY is the development of Inland fisheries

and aquaculture. As a State in the Federal System, Kerala also adopted and implemented all these programmes. There are large areas of water resources in Kerala that remain unexploited for aquaculture, especially freshwater aquaculture. The government of Kerala intends to increase aquaculture production to 70,000 tons in the next five years.

Objectives of the Study

The following are the objectives of the present Study;

1. To identify the various categories of freshwater ponds in Kerala.
2. To examine the extent of untapped fresh water ponds in Kerala.

Data and Methodology of the Study

The study is based on secondary data. The data on the potential and utilised numbers and areas of freshwater aquaculture are collected from the Aquaculture Resource Book, Department of Fisheries, Kerala. The study utilises data from 2020-21, the last officially available information on the potential and use of freshwater ponds for aquaculture activities. The

study estimated the untapped potential in Kerala at the regional level. The study divides the regions into three: Southern Region (Southern Kerala), Central Region (Central Kerala), and Northern Region (Northern Kerala). The Southern Region consists of the LSGs (Local Self Governments) under the Thiruvananthapuram, Kollam, Pathanamthitta, and Alapuzha Districts. The Central region includes the LSGs under the Kottayam, Idukki, Ernakulam, Thrissur, and Palakkad districts. The LSGs in the Malapuram, Kozhikode, Wayanad, Kannur, and Kasargod districts are under the Northern region. The arithmetic mean is used to estimate the average number and size of freshwater ponds remaining unutilized for aquaculture in Kerala.

Freshwater aquaculture and Pond aquaculture in Kerala

The rearing of aquatic organisms in fresh water is known as freshwater aquaculture. It is also known as inland aquaculture because the freshwater bodies are located on land. Freshwater aquaculture is classified into Pond

aquaculture, Riverine aquaculture, Dam aquaculture, Lake aquaculture, and Cold-water aquaculture. Pond aquaculture refers to the rearing of aquatic organisms in a pond. The main sources of Pond Aquaculture in Kerala can be classified into the following categories.

1. Natural Freshwater Private Pond
2. Natural Fresh water Public pond under the control of LSGI
3. Other freshwater ponds under the control of various institutions

Natural, fresh-water private ponds are an integral part of the ecosystem and are located on private land holdings such as homesteads, quarries, plantations, etc. It is fed by rainfall, underground springs or seepage from nearby water bodies. It carries fresh water and can be used for domestic use, irrigation, and aquaculture activities. Aquaculture activities help households supplement their income and nutrition. It will ensure a sustainable aquaculture in the rural areas.

Like the fresh water private ponds, fresh water public ponds under the control of LSGIs are fresh water bodies

(non-saline) controlled and managed by the Local Self Government Institutions like Grama Panchayath, Municipalities, and Corporations. Its formation is similar to that of freshwater private ponds. Unlike the Private ponds, it is a common property resource. Ecologically and economically, it is vital to the community. There should be utmost care in utilising this water body.

Besides the private and Public ponds, there are freshwater ponds under the ownership and control of government departments, educational institutions, and religious bodies. These water bodies can be used as 'demonstration models' for sustainability. Government departments and educational

institutions used this as a unit for research and training in aquaculture practices.

Aquaculture Potential, Utilisation, and Untapped Resources of Natural Freshwater Ponds in Kerala

The potential, utilisation, and untapped resources in Kerala for freshwater aquaculture can be analysed in terms of the number and size of freshwater ponds.

In the case of Natural fresh water private ponds, there is underutilization of the existing resources. The potential resources, utilisation, and underutilisation in various regions of Kerala can be analysed using Table 1.

Table 1. Potential, Utilised and Untapped Natural Fresh Water Private Ponds in Kerala

Sl.No	Region	Potential		Aquaculture Undertaken		Unutilised Potential	
		Number	Area(ha)	Number	Area(ha)	Number	Area(ha)
1	Southern Region	12154	1813.75	9674	1353.82	2480	539.93
		(20.26)	(30.70)	(23.13)	(35.58)	(13.65)	(22.85)
2	Central Region	24785	3193.83	17467	1792.55	7318	1401.28
		(41.31)	(51.78)	(41.77)	(47.11)	(40.27)	(59.30)

3	Northern	23052	1080.44	14676	658.77	8376	421.67
	Region	(38.43)	(17.52)	(35.10)	(17.31)	(46.09)	(17.85)
4	Total	59991	6168.02	41817	3805.14	18174	2362.88
		(100)	(100)	(100)	(100)	(100)	(100)

Note 1. Adapted from “Aquaculture Resource Book”, by Director of Fisheries (2021), Department of Fisheries, Thiruvananthapuram, Kerala. 2. The figures in the brackets are the percentage value.

It is evident from the table (Table 1) that the aquaculture potential in terms of the number of ponds and area of ponds is more in the Central region of Kerala. The utilisation of the area for aquaculture is also higher in the central region. This is due to the favourable availability of fresh water, the higher population density, the prevalence of homestead water resources, and the commercial orientation of farmers. In terms of the number of ponds, the untapped capacity is higher in the Northern region. People in this region prefer to keep ponds for non-aquaculture activities such as agriculture, irrigation, bathing, and water storage. However, when the pond area is considered, in the central region, there

are large areas that remain untapped due to factors such as unscientific land fragmentation, a lack of interest in traditional farming, declining profits in traditional farming, etc.

The pattern of utilisation and underutilisation of fresh water ponds under the ownership of LSGs (Local Self-Governing Institutions) in Kerala (Table 2) shows that, in terms of number and area, the untapped potential is higher in the southern region. It is lower in the Northern region, and the LSGs there are keen to undertake and implement the Government-sponsored programmes. The higher unutilisation of potential capacity in the southern region necessitates the attention of local bodies.

Table 2. Potential, Utilised and Unutilised Natural Fresh Water Public Pond under the control of LSGIs in Kerala

Sl.No	Region	Potential		Aquaculture Undertaken		Unutilised Potential	
		Number	Area(ha)	Number	Area(ha)	Number	Area(ha)
1	Southern Region	3382	1062.15	2251	474.29	1131	587.86
		(37.38)	(53.91)	(30.73)	(36.70)	(65.64)	(86.73)
2	Central Region	3690	780.75	3358	704.53	332	76.22
		(40.79)	(39.63)	(45.85)	(54.51)	(19.27)	(11.25)
3	Northern Region	1975	127.31	1715	113.59	260	13.72
		(21.83)	(06.46)	(23.42)	(08.79)	(15.09)	(2.02)
4	Total	9047	1970.21	7324	1292.41	1723	677.8
		(100)	(100)	(100)	(100)	(100)	(100)

Note 1. Adapted from “Aquaculture Resource Book”, by Director of Fisheries (2021), Department of Fisheries, Thiruvananthapuram, Kerala. 2. The figures in the brackets are the percentage value.

The untapped potential for aquaculture also exists in the ponds owned and controlled by various institutions. This situation is illustrated in Table 3. A higher potential for aquaculture (in terms of number and area) exists in the southern region. The southern region accounted for 68.51 per cent of the total number of ponds utilised for aquaculture in Kerala. But

in terms of area utilisation, the Central region dominates the aquaculture practices. The number of unused ponds (39.76 per cent) is higher in the Northern Region. As a paradoxical situation, the southern region possesses a huge ‘area potential’ for aquaculture and a huge ‘unutilized area’.

Table 3. Potential, Utilised and Unutilised Natural Fresh Water Ponds under the control of other institutions

Sl.No	Region	Potential		Aquaculture Undertaken		Unutilised Potential	
		Number	Area(ha)	Number	Area(ha)	Number	Area(ha)
1	Southern Region	1133	157.08	607	27.33	526	129.75
		(41.10)	(47.26)	(68.51)	(29.94)	(28.11)	(53.81)
2	Central Region	746	120.22	145	45.02	601	75.2
		(27.06)	(36.17)	(16.37)	(49.32)	(32.12)	(31.19)
3	Northern Region	878	55.1	134	18.93	744	36.17
		(31.85)	(16.58)	(15.12)	(20.74)	(39.76)	(15.00)
Total		2757	332.4	886	91.28	1871	241.12
		(100)	(100)	(100)	(100)	(100)	(100)

Note 1. Adapted from “Aquaculture Resource Book”, by Director of Fisheries (2021), Department of Fisheries, Thiruvananthapuram, Kerala. 2. The figures in the brackets are the percentage value.

It is clear that there is significant potential for pond aquaculture, and the following table (Table 4) presents the

average untapped aquaculture potential in Kerala across various pond categories.

Table 4. Average number and area of unutilized fresh water Ponds in Kerala

Sl.No.	Category of Pond	Average Number of Fresh Water Ponds	Average Area of Fresh Water Ponds (ha)
1.	Natural Fresh Water Private Pond	1298.14	168.77

2	Natural Fresh Water Public Pond under the Control of LSGI	123.07	48.41
3	Natural Fresh Water ponds under the control of other institutions	133.64	17.22

Note. Adapted from “Aquaculture Resource Book”, by Director of Fisheries (2021), Department of Fisheries, Thiruvananthapuram, Kerala.

The average number and area of unexploited freshwater ponds are higher for privately owned ponds. The average number of freshwater ponds that remain unutilized is lower for ponds controlled and owned by the LSGIs. The average size of freshwater ponds that remained unutilized is comparatively smaller in ponds managed by other institutions. It is noted that there is significant potential for aquaculture in private hands. A proper policy and approach are essential to unleash the untapped potential for the development of freshwater aquaculture in Kerala. As an economic activity, it will create and enhance forward and backwards linkages with the nearby community. These linkages may take the form of employment, income generation, infrastructure development, food security, etc.

Conclusion

Aquaculture is a solution to the problems of the capture fishery. The sustainability of aquatic species is essential for the sustainability of the environment and economy. The Union and State governments formulated and implemented various policies to develop aquaculture in India. But there is significant untapped potential in freshwater pond aquaculture. There are several bottlenecks along the path to the development of freshwater pond aquaculture. A new approach is required to address the bottlenecks in freshwater aquaculture. A partial or full diversion from existing policies is essential for the proper development of freshwater aquaculture across different regions of Kerala.

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