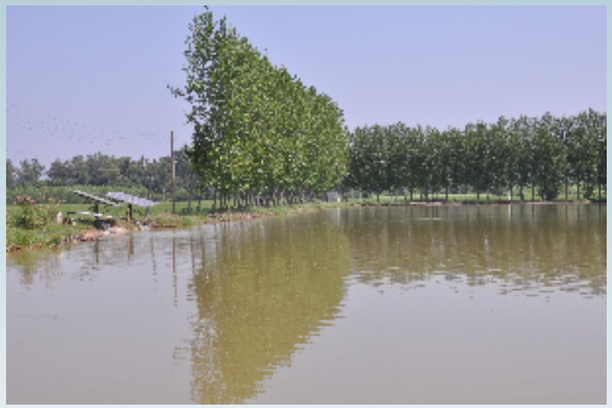


Designed & Published by

Director and Warden Fisheries, Punjab

SCO 1040-41, Sector 22-B, Chandigarh

Phone : 0172-2705827 Fax : 0172-2541827

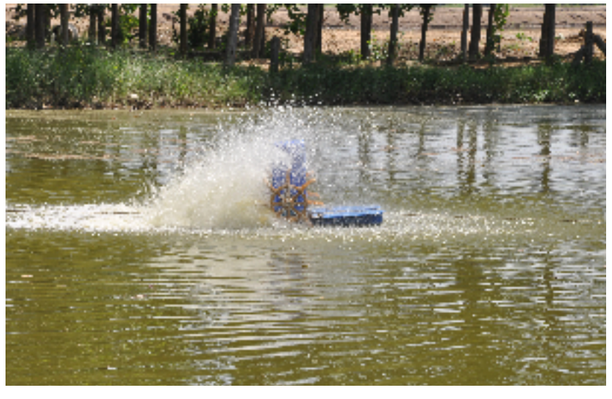
Email : dwfpunjab@gmail.com

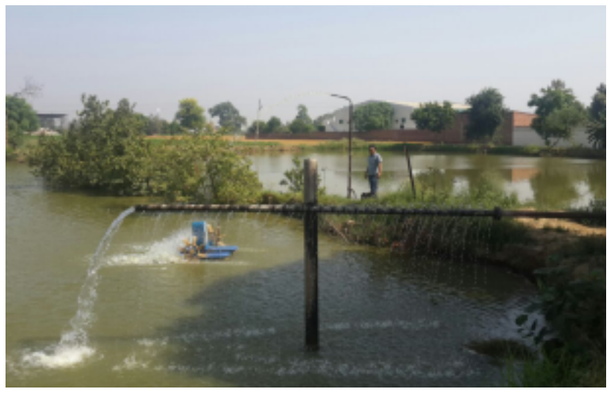
website : www.pfdb.in

PUNJAB

TOWARDS BLUE REVOLUTION

Scope and Prospects of Aquaculture





Message

It is a great pleasure to note that Fisheries Department Punjab is publishing a booklet "PUNJAB TOWARDS BLUE REVOLUTION".

Aquaculture sector contributes to the food security; provide employment generation opportunities and financial security apart from contributing to national economy in general. Aquaculture can also help in crop diversification.

The booklet "Punjab Blue revolution" is expected to provide valuable knowledge to the fish farmers. It shall also motivate farmers to adopt aquaculture in waste and water logged lands.

I wish this endeavour all the success.

Nov. 2014

(Parkash Singh Badal)
Chief Minister, Punjab

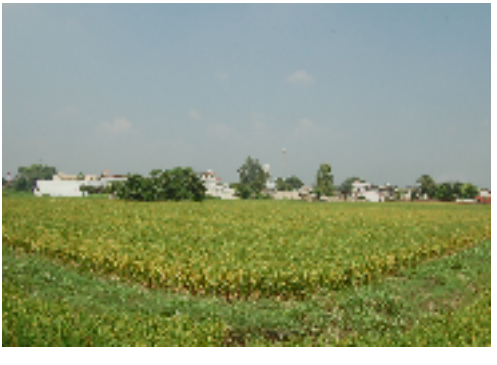
PUNJAB - TOWARDS BLUE REVOLUTION

Scope and Prospects of Aquaculture

India is an Ancient Civilizations with thousands of years of history and heritage. The cradle of the Indian civilization was the soil of Punjab. The name Punjab comprised of two words:' Punj' meaning five and 'ab' meaning water, thus the land of five rivers .The most significant factor concerning the development of the Indus Valley civilization was undoubtedly its fertile soil and the rivers of Punjab.

Punjab - the Provider

The state of Punjab occupies 1.57% geographical area of India, contributing more than 50% of grain supplies, 55% of wheat and 42% of rice to the central



pool. More than 83% of land in Punjab is under agriculture as compared to the national average of 40.38% The state has experienced phenomenal increase in agricultural production during the last three decades, mainly due to extensive adoption of rice-wheat cropping system with assured irrigation facilities, leading the country in achieving food-sufficiency.

State of Art

Agriculture is mostly irrigation based in Punjab. Three perennial rivers, viz., the Sutlej, Beas and Ravi, flow through the state. The water from these rivers is utilized for irrigation through a network of

canal systems covering over 14,500kms.

Injudicious surface water irrigation and excessive ground water extraction have led to a situation in where fresh ground water resources have been depleting at an alarming rate in most parts of the state.

In the south-western parts of Punjab, problems are further compounded by very severe problems of water logging and salinization. The land area affected by salinity and water logging is estimated to be over 2 lakh hectares.

Groundwater depletion on one side and water logging on the other, are perhaps two maladies of

our flawed farming strategies that have led to extreme ecosystem vulnerabilities, stemming from lack of proper drainage system, poor percolation because of impervious clay strata and constant seepage from the extensive irrigation canal systems.

Farming Diversification

Burgeoning Scope for Aquaculture

Diversification in farming is accepted worldwide, to meet increasing costs and reducing profit margins in any mono-cropping systems. Promoting

aquaculture is a sustainable farming strategy for rehabilitating saline soils and it is the pertinent solution to cope with the above problems.

Aquaculture fits well into the agriculture

diversification plan in Punjab as it enables optimal utilization of water resources for multiple production systems. It is expected to salvage and redress the current economic and environmental crisis emanating from soil problems in the state.

Extensive research shows that inland saline water resources can be suitably harnessed for sustainable aquaculture. Initial experimental trials to use saline soil for brackish water aquaculture with some selective species have been highly promising.

However, inland saline water aquaculture is yet in its infancy in India and large scale commercial utilization is yet to become a practice. Saline water aquaculture in inland locations away from the sea, as large scale commercial enterprise is altogether a new approach. Growing salt water shrimps and fish in these areas is a profitable venture.

The vast open water resources such as the canal systems of Punjab can also be used for fisheries development. The state is endowed with vast water resources that include village ponds 10369 ha (7326) private ponds 2670 ha (1992) total area 13039 ha (9318), reservoirs (5804 ha) and 868 km of rivers.

Apart from this, the south western district of the state, namely Bathinda, Faridkot, Ferozpur and Muktsar are severely affected with the problem of salinity and water logging. All such areas can be profitably utilized for aquaculture.

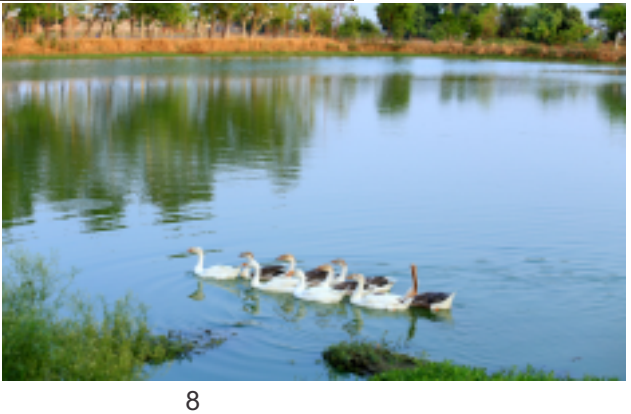
Open water fish culture in enclosures is an option,

for cultivating high value fish, in running water

systems under more crops per drop concept.

Promoting open water cage culture for cultivating high value fish in the vast network of canals system (12200 km) offer immense opportunities by involving entrepreneurs, in a public-private partnership mode.

Intensification of region specific Integrated Farming Practices combining agriculture, aquaculture,



livestock, poultry, duckery etc. also has immense scope to improve income and sustainability in farming.

In regions where water table is high, and waterlogging is a perennial problem fish farming is considered most promising option as the ponds will serve as salvage/drainage systems so that the water logging problems in adjacent fields will be resolved.

Meeting the Challenge

The aquaculture development initiative is a new challenge for the State Department of Fisheries, Punjab, which is one of the oldest fisheries departments in India. Started in the erstwhile

Punjab province in 1912, after the First World War, the state passed the law for conservation of fish in natural waters under the Punjab Fisheries Act 1914. Punjab was the first state in India to have introduced a fish species, mirror carp and scale carp to enhance fisheries production as back in 1952 and is credited to have undertaken massive stocking of village ponds for production of food fisheries early during the first 5 year plan.

Indian Fisheries Surging Ahead

Aquaculture development initiative in Punjab is taken up at a crucial stage when Indian fisheries has been growing most vibrantly showing an 11 fold increase in fish production from 0.75 million tons in

1950-51 to 8.3 million tons in 2011-12 with an annual average growth of 4.5%. Fresh water aquaculture has shown an overwhelming growth from 0.37 million tons in 1980 to 4.03 million tons in 2010 in India. The fish requirement of the country by

2025 would be of the order of 16 million tonnes, of which at least 10 million tonnes need to come from aquaculture.

The Government of Punjab is committed to providing all facilities with full fledged environmental surveillance laboratories and mobile water testing units for soil & water testing for the benefit of aqua farmers.

Many fish and shell fish species have been

identified for farming in saline soils. This include viz., the Tiger shrimp, *Penaeus monodon*, Indian White shrimp, *Fenneropenaeus indicus,* Banana Shrimp, *Fenneropenaeus merguiencsis,* Freshwater Prawn, Scampi, *Macrobrachium rosenbergii,* Mud Crab,

Scylla serrata. Asian Seabass, *Lates calcarifer,* Milkfish,*Chanos chanos,* Grey Mullet, *Mugil cephalus, Liza tade, Liza macrolepis, Liza parsia,* Pearlspot, *Etroplus suratensis* and, Tilapia, *Oreochromis niloticus* etc. and several endemic cultivable species such as *Labeo kalbasu, Labeo fimbriates, Labeo bata, Cirrihnus cerohza, Puntius*

serrana etc. that are in high market demand among migrant communities. Integrated fish farming combining livestock and horticulture has been able to utilize agricultural byproducts and wastes as principal input. This is highly remunerative and farmer friendly.

Fresh water farming of prawns will be promoted through monoculture/polyculture along with major carps by appropriately timing the cropping season, avoiding the extreme winter.

High density cage farming for Tilapia, Seabass, pearl spot in open water cages in saline areas is

also being experimented upon. Potential for farming of milk fish, Chanos chanos is being probed.

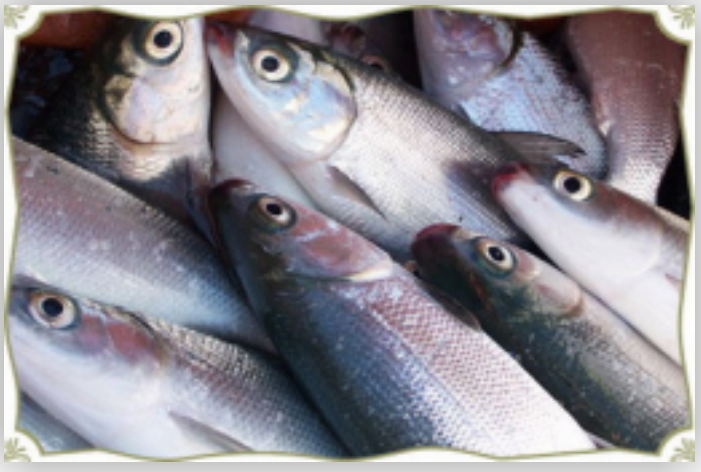
One of the problems identified for introduction of saline tolerant species is that the seeds of these species are available only in coastal states in India and that too during specific months; the Government is committed to establishing a chain of potential fish/shellfish hatcheries locally in Punjab.

Efforts are also being made to standardize and popularize the technology of mass seed production of endemic species, murrels, *Channa striatus*, Magur, *Clarias batrachus*, *Wallago attu,* based on regional importance.

Canal Fisheries Development

In order to popularize running water fish culture, the Government intends to establish a separate canal fisheries division that will fully put to use our

reservoirs, rivers and major irrigation canals and its tributaries, extending over 14500 km. Developmental strategies for freshwater aquaculture will include both horizontal and vertical increase in production.



India is home to 10% of fish diversity and country ranks 2nd in the world in total fish production with annual production of 9.06 million metric ton. The share of inland fisheries and aquaculture has increased from 46% in 1980 to over 85% currently in total fish production.

Popularizations of induced breeding of carps and catfishes, establishment of hatcheries for mass

scale spawning, rearing and carp polyculture with epoch making technology has contributed to aquaculture development in India.

The Way Forward

The Govt. Intends to double inland fish production from the current 1.03 lakh tons to over 2.0 lakh tons in Two years by

(a) Development of a sound fisheries policy

(b) Establishment of the Punjab Fisheries Development Board (PFDB) on the pattern of National Fisheries Development Board, (NFDB), India

(c) Strengthening the organizational set up of the fisheries department with better infrastructure and human resources and

(d) Introducing professionalism in Fisheries and Aquaculture Management.

Aquaculture Policy

- The aquaculture policy recognizes the diversity of resource endowments in different regions of the state and therefore the state will be divided into different aqua climatic zones and package of

practices and policy options is being developed for each zone.

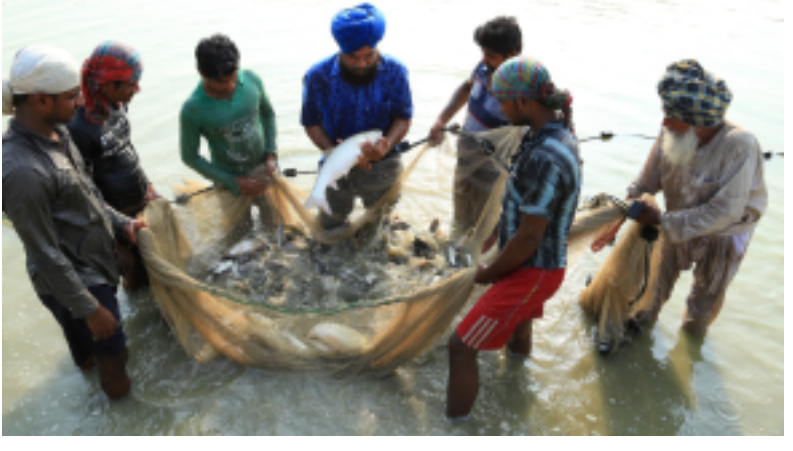
- The Government intends to realize the full potential for farming of Giant Tiger Prawn, Exotic White Legged Prawn, *Litopenaeus vannamei* and farming of fish species such as Milk Fish, *Chanos chanos*, Pearlspot, *Etroplus suratensis, Oreochromis nilotica* etc. that have shown promises for commercial aquaculture in inland saline water areas.
- Demonstration programs using saline tolerant GIFT Tilapia farming under national initiatives for climate resilient aquaculture (NICRA) is suggested as an option for saline water areas.
- Aquaculture in Punjab is at present more or less restricted to carp culture, however the people generally prefer boneless fishes, a shift from Carps to Murrells, catfishes and freshwater prawns will be promoted.
- The productivity of reservoirs in Punjab is very low, that is 40-50 kg per hectare per year, which will be enhanced to 100-150 kg and institutional arrangements that solve the issue of inter sectoral conflicts of ownership of these reservoirs.

- For utilization of saline waters in rice farming areas, one option proposed is to intercept the saline water by gathering the same in a series of pond systems or irrigation tanks for brackish water fish farming. In such an irrigation tank, water can be cautiously replaced for fish culture and fish in high density can be raised.
- In rice farming areas, the prevalent direct irrigation system shall be modified for re-circulatory high density fish farming system that would also render judicial irrigation to the agricultural fields.
- Aquaculture development will be supported by establishing aquaculture based irrigation pond systems that will ensure optimal irrigation but also

ensure utilization of fish droppings, feed residues and algal rich water as a good source of nitrogen to crop farming.

- In the central zone of the state, where water table is declining, water drawn from ground water can be stored first in specially developed head ponds or irrigation ponds, which can be gradually fed to the agricultural fields more judiciously.
- The small reservoir with high propensities to production, in terms of primary and secondary such as Dolbaha Dam and Maili Dam in Hoshiarpur, that have very low level of production will be managed into culture based capture fisheries, by adopting effective management strategies. Uses of advanced fingerlings that ensure high survival will be promoted by encouraging fingerlings rearing farms. Development of ornamental fisheries as a backyard farming activity will be encouraged.
- Aquaculture development also calls for development of ancillary industries such as feed mills, fish processing units, cold storages support equipment industries as availability of balanced supplementary feed is the important prerequisite for aquaculture expansion.

- Necessary support will be provided to entrepreneurs to establish feed mills to manufacture species specific balanced supplementary feed to suit different aquaculture systems and growth stages.
- The Government is committed to declaring a Land and Water lease policy with regard to fish farming to promote aquaculture.
- There is imperative need for evolving policy for long time leasing of water bodies for aquaculture resource enhancement with a view to generate gainful employment opportunities in rural areas.
- The Government is committed to Promoting Aqua



tourism on lines of Eco-tourism in the state. Establishment of State of the art Water & Feed analysis and Disease Diagnostic Laboratories

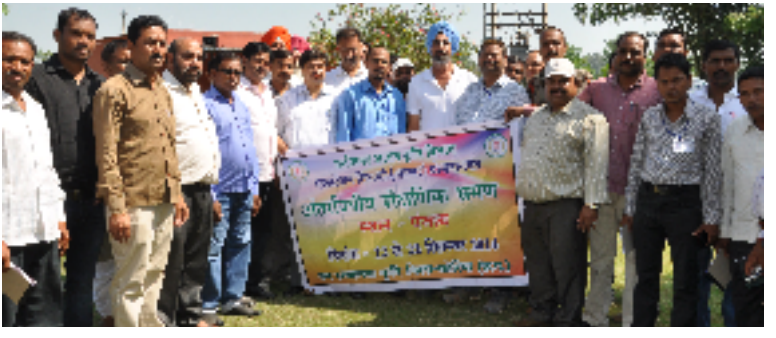
including mobile laboratories is part of this initiative.

- Institutional financial support will be offered for extending crop loans to fisheries, at par with agricultural crop loans.
- Effective steps are proposed for value addition in ready to cook and ready to eat fish products from cultured carp fishes. Food processing centers will

Wholesale and Retail Hygienic Fish Market at Ludhiana

be promoted in the state. In order to popularize fish consumption among people of Punjab, fish festivals will be organized as an annual event and the promotion of fish as health food for enhanced nutrition.

- Establishment of more ice plants and insulated trucks etc. for fish transport under subsidy support is being considered.



- Establishment of Aqua super markets in major aquaculture districts to ensure availability of all aquaculture equipments, implements, critical inputs and knowledge dissemination kiosks is considered a priority initiative.
- Establishment of front line demonstration ponds in major fish farming clusters including low saline water logged areas
- Facilitate farmer- farmer tie ups between the farmers of other states in India and with those of other developing countries.