



# Fish Farming and its Ripple Effects

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Fish farming is often taken to be an allied agriculture sector, but people tend to forget that fish farming is one subject, that is not just related to agro sector, but also has many other aspect attached to it, that must be considered as a serious contributor towards an economic growth of the geographical region, wherever it is done. Fish farming provides a large and consistent supply of fish compared to natural fisheries by growing fish more quickly than natural fisheries. Furthermore, natural fisheries have restrictions on the quantity of fish that can be caught. Fish farming plays an important role in the effort to stamp out malnutrition by providing an adequate supply of

protein rich in omega-3 oils and other essentials nutrients required by the human body, provided the farming is done without the use of chemicals like Superphosphate, Triple superphosphate, Ammonium nitrate, Ammonium sulphate, Ammonium phosphate, Diammonium phosphate (DAP), Calcium nitrate, Sodium nitrate, Urea, Kainite ( $MgSO_4+KCl$ ), Potassium nitrate, Potassium sulphate and Muriate of potash etc., that is provided by many organizations, one of which is TataVgyan Humanity Foundation. Their trustee who is also the author explains their nanotechnology based microbiological solution.



## Employment – Fishery :

While agriculture was considered to be a full time occupation, but even in early days after a pulse crop, the farm was required to be kept empty for nitrogen rejuvenation. Even during draughts and floods, agriculture cultivation can't be done. On the other hand, even if the farm is filled with water during or after floods or when farming is done for any water intensive crop, like rice, aquaponics comes into picture, where fish & rice farming is done together due to a symbiotic relationship between the fish & the plant. Thus fishery can be a wholesome employment engagement throughout the year.

Moreover, in fishery business, many ancillary employment opportunities also get generated. For example, cultivation needs some people, catching of the fish is also an employment, transport of the catch is yet another employment, selling fishes is also a business, and good part is that all these are possible to be done on small scale, instead of need for a large corporate. The entrepreneurial opportunities are immense.

## Employment- Boat rides & Ornithological Tourist Guide.

A water body, that can be developed for fish farming gets a natural ecosystem evolved, wherein a complete aquatic flora & fauna naturally, provided chemical farming is not being done. Because inorganic chemical fertilizers are too harmful to allow the ecosystem to flourish. Thus, an organic aqua farming has its own benefits that we help achieve

through our solution. But that was the aqua-ecosystem within the water. The fish farming also affects the landscape above water, which creates an opportunity like boating. The good part is, the natural ecosystem doesn't need advertising. If the water bodies have well enough a population of fishes, the news gets to the bird community automatically. And the flocks of birds keep visiting the water bodies converting the whole landscape into a tourist spot, and then there are good opportunities for boat ferries.

Locals of the region, often have wonderful knowledge of the bird species. This is a natural skill with a vertical enhancement of the knowledge generation by generation. And this knowledge itself can give them employment.

## Food security- Cheaper balanced diet.

Fish is a good source of protein. Fish is the biggest source of Omega-3 fatty acids, which is extremely beneficial to human heart; Omega-3 helps to keep our heart and brain very healthy. Since bodies don't produce Omega-3 fatty acids, the only source through which we can get it is by what we eat, that is where fish comes to the rescue. Fish is a low-fat high quality protein that is filled with omega-3 fatty acids and vitamins such as D and B2 (riboflavin), Fish is also very rich in calcium and phosphorus and is equally a great source of minerals, such as iron, zinc, iodine, magnesium, and potassium. Rice anyways is quite cheap and often available at subsidized rates as well. Just fish curry & rice is a completely balanced diet. Again, the condition is- zero fertilizer fish farming that is attained through our solution.



## Food security- Cleaner food chain.

In the natural aqua environment, no external synthetic food or fertilizer is required. And it goes on and on for years together. For fish to develop, breed, survive and flourish, just a natural aqua environment is sufficient, for as long as there is no human intervention like pH imbalance, addition of chemicals due to run off water from agri-land, or acid rain due to polluted atmosphere, high ammonia, lower DO (dissolved Oxygen) rate or higher BoD / CoD due to water pollution and so on.

Thus, here again our solution comes to rescue, as we create a natural aqua environment for dwelling, breeding, flourishing of fishes, removal of pollutants, chemicals, runoff water fertilizers, balancing the pH, increasing the DO Levels and reduction of BoD/ CoD level – all through organic eco-friendly microbiological process.





## Irrigation – Cleaner water supply

The water in the water bodies, when treated on a microbiological level with a balance pH, increased DO level, low BoD / CoD that is the right environment for fishes, by default matches the standards of the water standard desired for irrigation as well. The natural ecosystem generates a water that is fertile enough for a healthier plant, thus it is not just good for irrigation, but also ensures vegetation all through the course of the water body.

## Environment – Sanitation from mosquitoes.

If the population of fishes is good enough in the water bodies and the natural ecosystem is restored, many processes happen automatically- like end of mosquitoes dwelling, since fishes eat away all the larvae, end of bad odor since bad odor from water body is due to H<sub>2</sub>S generated by anaerobic bacteria that gets killed by aerobic bacteria when the DO level is high, end of BGA (Blue Green Algae), end of water hyacinth that causes dead water and so on. Thus a healthy organic fish farm in the vicinity, ensure environment safety and sanitation. Social – women Empowerment.

A recent study done by World Bank had many revelations on the small-scale capture fisheries. A global overview of the sector, with an emphasis on developing countries, done in year 2008 presented many newer perspectives for the emerging sector, a few of which relevant to us are as under "Securing Sustainable small-scale Fisheries: Bringing together responsible fisheries and social development" in Bangkok Thailand, on 13-17 October 2008 – A preliminary report of the Big Numbers Project\* by Food and Agriculture Organization of the United Nations (FAO) and World Fish Center.\*{ The Big Numbers Project – a collaborative effort by FAO, World Fish Center and World Bank –addresses the lack of accurate and accessible disaggregated information on small and large scale fisheries, in inland and marine waters, currently experienced in the international fisheries arena.} Aspect -1, It's Creating Livelihood. Fisheries contribute greatly to the well-being of many millions of people on our planet. Fish is a highly nutritious food and the sector generates employment and economic values that are important to individuals, communities and

national economies.

The experience and development of the sector over the last few decades have however taught us that the world's fishery resources are not infinite and, if we are not careful, will not be able to continue supporting lives and livelihoods in the same way in the future. Aspect – 2. It's women empowerment. In the small scale fisheries sector, across all the developing countries like Bangladesh, Cambodia, Ghana, Mozambique, Nigeria & Senegal and even geographically big and economically emerging BRIC countries including Brazil, India & China, the number of women involved in the fishery and related business is quite high.

As the table above depicts, an average of 46% of women are directly or indirectly benefited from the fish trade. Thus it also help in women empowerment and establish a social; equality. Summary This is why you would observe that the 1st Avatar of Vishnu as per Hindu culture was "Mathsya" or the fish. The life on earth began from water and the ancient science is still relevant.

Table: share of women in total fisheries workforce (fulltime and part-time; fishing and postharvest activities) in selected BNP case study countries.

Country/ case study	Total workforce	Percentage women
Bangladesh	3250000	5%
Brazil	430000	13%
Cambodia	1640000	57%
China	12080000	22%
Ghana	370000	40%
India	10000000	72%
Mozambique	260000	4%
Nigeria	6500000	73%
Senegal	130000	9%
Total / average	34660000	46%
Source : BNP case studies		



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