

Certain Problems and Prospects of Sustainable Fisheries: Some Solutions Including Indian Culture and Ethics

Pratibha Tripathi

Department of Zoology,
D.A-V. College,
Kanpur, Uttar Pradesh
India

Prabhat K. Bajpai

Department of Zoology,
D.A-V. College,
Kanpur, Uttar Pradesh
India

Abstract

The term "sustainable development" was first used by Brundtland Commission that defined the term as "...meets the needs of present without compromising the ability of future generations to meet their own need" and currently involves - Environment, Local People and Future- commonly abbreviated as **ELF**, and in this connection the carrying capacity is most important. The earlier available carrying capacity has drastically been curtailed due to the consequences of First and then in continuation the Second Industrial Revolution that increased the world population by 6 times and average per capita income by an average around ten times, but a heavy price has been paid in terms of depletion of natural resources and environmental degradation causing shrinkage of fish habitat by way of expanding water pollution from various sources contributed by large scale industrialization and urbanisation. The Real Problem is the sharply rising population of man, a devastating parasite on nature. As a solution the PROFISH programme of The World Bank on aquaculture is briefly discussed. The human attitude regarding the resource utilization is suggested to limit itself less than the nature's capacity to replenish the resources and the Ethics from ancient Indian literature viz. *Yajurved* and *Srimadbhagwatgita* are discussed briefly as a guide for conservation and sustainable fishery and livestock resources.

Key words – *sustainable development, Industrial revolution, PROFISH, World Bank, Ethics.*

Introduction

Sustainable development has been defined in more than one way, but a generalisation may be held to state – "The resource utilization pattern that simultaneously aims at the preservation of the environmental or say the resource availability so that it should continue to remain available for the coming generations as well." The term was first used by Brundtland Commission¹ that defined the term as "...meets the needs of present without compromising the ability of future generations to meet their own need."² the commission's report also emphasized the inter-linkages between economic development, environmental degradation and the population pressure.

The major steps in the evolution of the idea of sustainable development have been well reviewed by Jaishanker³. Now a day the concept is presented sometimes as a combination of Environment, Local People and Future- commonly abbreviated as **ELF**. When we talk about these three aspects the immediate demand rises for the consideration of carrying capacity of the **nature's system**, whether for a local issue or for the broader perspectives.^{4,5}

Therefore, the field of "sustainable development" as a concept includes environmental, economic and socioeconomic sustainability and here we are concerned with all these three aspects.

The Genesis of the Problems that Threaten the Sustainability.

The **Industrial revolution**, a period between 18th and 19th century, is marked with the major changes in agriculture, manufacturing, mining, transport and technology that profoundly influenced the culture and socioeconomic aspects across the occidental world and later the oriental also with its expansion. The industrial revolution was single major point in the history of world and with in the span of those two centuries - 1800 onwards, the *per capita* income of world population increased by ten-folds and the population itself increased more than six times⁶.

The first industrial revolution began in 18th century and continued into Second Industrial Revolution around 1850 and is known for steam engines followed by internal combustion engines, electric power generation

and popularization of usage of chemicals. Various historians opine differently regarding the precise chronology.

Therefore, **industrial revolutions** are regarded as most important events in the history of human race after the beginning of domestication of animals and plants⁷. These phases of industrial revolution have exerted profound and multifarious effects and those with the relevance to present context are :

1. Factories and Urbanisation
2. Population Increase.

With the growth of industry and urbanization man began to emerge as a parasite on Nature and beyond that like a parasite that is proven harmful and injurious to its host and hence is vulnerable to its termination due the loss of carrying capacity of the host. The urban and the rural regions can be compared in terms of the consumption of natural resources – the urban areas, especially the Metros or mega cities amount to be only 20% of the total population but consume 80% of natural resources and have a proportionate generation of various kinds of wastes as well. Now if the growth of the said developed part of the population keeps on going up at least a proportionate consumption of the natural resources, including food, livestock and fisheries will be inevitably escalated and then where the future will lie?

The most deteriorating influence of urbanisation and swelling population with reference to fishery resources are at least of two types⁸ –

1. Encroachment and even total eradication of water bodies of local significance due to expansion of land acquirement / reclamation that amount to the destruction of fish habitat in one way.
2. The heavy discharge of the polluting agents from urban areas and of agricultural run off or say leaching from the fields in other way.
 - a. Much is already known about the organic sewage discharge and its effects that pose a significant technical problem. The sewage generated from urban area has increases manifolds since 1947, when we were around 350 million only. Number of articles like plastic, bottles and many such other products are being discharged into lakes, rivers, streams and even in sea. Besides many other harmful chemical agents the detergents derived from petrochemicals have largely replaced the tradition animal or vegetable fat based soaps. The detergents contain phosphate and other chemicals that affect the health and reproduction of all kinds of aquatic life forms.
 - b. The other major aspect is agricultural run off. Leaching of agrochemicals, especially of nitrates and persistent pesticides, pollutes the ground water and consequent eutrophication can produce bad taste, odour, scum algae, growth of rooted plants and sharp reduction in the available oxygen even in deepest parts of the water bodies which is literally fatal to all aquatic fauna.
3. **Industrial Effluents** are largely contributed by the chemical industries, sugar mills, distilleries, tanneries and thermal power plants. Especially the small scale industries are the pollution

escalators as they do not have the treatment facilities.

The Global Program on Fisheries of PROFISH Vision of The World Bank⁹

The World Bank programme for sustainable fisheries is presented as “Strategic Vision for Fisheries and Aquaculture” and embodied various socioeconomic aspects including the present scenario and the plant, as a nut shell statement. The points contained in the draft require an intensive application of scientific principles and technological methods and their proper communication to the concerned human populace to achieve sustainability. The major points of the present concern are, as quoted from the draft –

1. The Situation

- Fish products are one of most widely traded foods; more than 37 percent of world fish production is traded internationally.
- The global fish trade value exceeds the value of international trade in all other animal proteins combined.
- Over 75 % of the world’s fisheries are fully used or overexploited.
- Habitat degradation is reducing carrying capacity and biodiversity.
- Aquaculture is the world’s fastest growing food production system, increasing at a rate of 8 percent annually – but there are some dramatic boom and bust cycles.
- One-half of all food fish supply comes from aquaculture.
- Potential net gains from good *governance of capture fisheries are of the order of US\$50 billion per year*; sustainable net benefits are estimated to exceed US\$100 billion per year.
- Good governance of inland and ocean resources will enhance food security, nutrition, biodiversity, gender equity and community resilience, and mitigate climate change.
- Future fish supplies will be dominated by aquaculture systems.
- Feed conversion rates for many farmed fish are more efficient than those of land-based animal production, and aquaculture is an efficient user of water.

1. The Mission

Poor governance and environmental degradation of fisheries habitat are primary causes of overexploited, unsustainable fisheries and poverty. Improved governance can result in sustainable wealth creation. With improved governance, thoughtful planning and access to information, technology and capital, aquaculture can overcome the problems related to fisheries.

PROFISH will therefore help design and implement good governance systems through World Bank investments and international partnerships.

PROFISH will provide information, knowledge products and expertise to help ensure that fisheries and aquaculture create sustainable wealth and reduce poverty.

3. Risk and Volatility to be Reduced

- Poor management is cause of economic and environmental risks for Fisheries, and communities that depend on them.

- High price and harvest volatility Fisheries and aquaculture are subject to; this undercuts food security, limits the industry's ability to obtain capital and impairs product development.
- Fisheries, and communities that depend on them, are on the front line of climate change and are highly vulnerable to sea-level rise.
- **Fishing is one of the world's most dangerous livelihoods.**
- Disease outbreaks can result in catastrophic loss in aquaculture.
- The safety of seafood consumption is a growing concern.
- Insurance for fishing vessels or aquaculture operations (and social security for fishermen) is poor or non-existent in developing countries.

The Real Threat and Possible Solution

We have just had a quick view of the some aspects of aquaculture policy and it sounds that it is a good solution to achieve sustained fisheries but certainly its limitation is the sustainability of commercial and cultured species. What about fish biodiversity? Environmental sustainability is the idea of keeping environment as pristine as naturally possible. Following patterns of usage are possible and practiced -

Table. 1 – Different extents of use of natural resources and their consequences.

Pattern of consumption	Consequence	Sustainability/ Acceptability
Exceeding capacity to replenish	Environmental Degradation	Not sustainable/ acceptable
Equal to capacity to replenish	Equilibrium	Steady state
Below capacity to replenish	Environmental renewal	Environmentally sustainable

The overgrowing population is the real threat and root cause of the reasons of encroachment of nature's wealth beyond its carrying capacity. A larger population has larger demand of overall development and hence overall destruction of natural wealth.

Science and technology have tremendously contributed both the sides of the situation - the destruction and conservation and certainly the present state of aquaculture and sustainable agriculture as such are the expression of the technological advancements and accumulation of scientific information in the respective fields. However, what more has to be done with an immediate and vehement effort is –

1. Intensive efforts to control population growth -
The current trend is that towns are growing to cities and cities are tending to go as mega cities, and as long as the population has a rising trend the situation can not be reversed. The **de-growth** of human population and its habitat with related paraphernalia are the points that invited an immediate attention of science and technology.
2. Detoxification of environment by phasing out the identified agents.

3. Device ways for protecting local aquatic resources and already existing fish habitats with their expansion and possibly for creating new ones.

Besides the modern approach and efforts there are some virtues in the storage of ancient India to guide the conduct of human attitude to nature, as discussed in the following passage, so that the third situation given in Table 1. that insures sustainability will prevail itself without much stress.

The Ethical Guidelines from Ancient India:

The given discussion is taken from a paper "The Biodiversity and Its Conservation: Certain Examples from Ancient Indian Literature"¹⁰

Yajur-Ved verse XVIII. 9 reads

May my vigour and my pleasantness, and my milk and my
sap, and my butter and my honey, and my meal in company
and my drinking in company, and my ploughing
and my husbandry, and my superiority and my pre-
eminence prosper by *yajna*.

Srimadbhagwatgita III. 14 and 15

All beings or life forms (*bhutani*) depend on sustenance that is produced due to rains, the rains are the consequence of *yajna* and *Yajna* is cumulative out come of your deeds.

By way of explanation it can easily be sought that from primary producers to top consumers all depend on the rains, little or sufficient. The deeds (right and wrong) are guide by *Vedas* and *Vedas* are the divine documents, therefore, all pervading-omnipresent is always established in the deeds of *Yajna*.

Ishopnishat (40th book of Yajur-Ved and last book of entire Vedic collection)

I verse – This all is a dwelling of God, wherever the creation can be conceived even in the least, in other words God is in it and it is in God. Enjoy that is renounced or spared by God or say the Nature i.e. below the capacity of nature to replenish. Whose wealth is this? No individual owns it. Therefore, the verse in other words warns to use the surplus and not the nature's capital.

Conclusion

The *Vedic* system also indicates that possibly there were more of community activities rather than being limited to one family (*Yajur-Ved XVIII.9*), therefore, individual capitalisation should either not have been the practice or at least community interest held a priority over family interest. Besides these the statement of *Gita* indicates that the over all activities of individual were significant, because ultimately *Yajna* decides the fate of the fauna. Here it is worth mentioning that Monier Williams gives that in *Vedic* context *Yajna* means "worship, devotion, prayer, and praise, act of worship or devotion". Another synonym of *Yajna* is *makh*, and Williams translates it as "jocund, cheerful, sprightly, vigorous, active" state and act. While considering the etymology, Apte's dictionary records that *Ma* stands for *Shiva* (benevolent), water, happiness and welfare and *Kha* stands for act and knowledge. Thus *Yajna* does not stand for only offerings and oblations and sacrifices to fire, but in original sense it represents the

disciplined life style inspired by devotion, worship that may bring happiness and prosperity to community by enjoying what has been renounced by the Creator or in the present context renounced or easily spared by the nature and not the exploitation as opposed to philosophy of industrial revolution that nature is for use of man. Thus conclusively the Indian traditional wisdom with reference to **sustainability** compels us to differentiate between "to use" and "to usurp" and forbids us from over exploitation of natural resources and also directs to think for betterment of community or of all human race rather than gathering individualised riches. However, the current situation demands the realisation of *Vedic* lessons and to follow the following prayer.

*Om yatoyatsamihase tato no abhayankuru
Shannahkuru prajabyobhayannh pashubhah Yajur-
Ved XXXVI. 22.*

(From whatsoever trouble thou desirest, give us safety thence./ Give to our people happiness and security to our beasts (fauna).

Reference

1. United Nations. (1987). "Report of the World Commission on Environment and Development." *General Assembly Resolution 42/187*, 11 December 1987. Retrieved: 2007-04-12
2. Smith, Charles; Rees, Gareth (1998). *Economic Development*, 2nd edition. Basingstoke: Macmillan. ISBN 0333722280.
3. Jaishanker, R. (2010) *Cultural empathy: the key to sustainable development*. *Sci. & Cult.* 76 (3-4), pp 126-127.
4. Stivers, R. (1976). *The Sustainable Society: Ethics and Economic Growth*. Philadelphia: Westminster Press
5. Daly, H. E. (1973). *Towards a Steady State Economy*. San Francisco: Freeman. Daly, H. E. 1991. *Steady-State Economics* (2nd ed.). Washington, D.C.: Island Press.
6. Maddison, Angus (2003). *The World Economy: Historical Statistics*. Paris: Development Centre, OECD. pp. 256–62, Tables 8a and 8c..
7. McCloskey, Deidre (2004). "Review of *The Cambridge Economic History of Modern Britain* (edited by Roderick Floud and Paul Johnson), *Times Higher Education Supplement*, 15 January 2004.
8. edugreen.teri.res.in/explorewaterpollu.htm - Cached.
9. <http://siteresources.worldbank.org/EXTARD/Resources/336681-1224775570533/PROFISHVision.pdf>
10. P. K. Bajpai (2008). *The Biodiversity and Its Conservation: Certain Examples From Ancient Indian Literature*. *Proc. Internatl. Conf. Biodiv. Conserv. & Mgt.*, 2008: 555 -559.

(This was an invited paper and was orally presented before the Section of Animal, Veterinary and fishery Sciences in the 99th session of Indian Science Congress Association held at KIIT, Bhubaneswar.)