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### The tsunami and a new chapter

M.S. Swaminathan

*The 2004 calamity marked the beginning of a new chapter in the lives of those who lost their homes, fish boats, and much else. Anticipatory action plans for managing the consequences of seawater intrusion in our coastal areas have become an imperative.*

The tsunami of December 26, 2004 was a terrible calamity resulting in serious loss of lives and livelihoods in the coastal areas of Tamil Nadu, Andhra Pradesh, Kerala, and the Andaman and Nicobar Islands. The response to this calamity was immediate from the Central and State governments, non-governmental organisations, bilateral and multilateral agencies, U.N. organisations, religious groups, and the media. In an article titled, "Beyond Tsunami: An Agenda for Action" in *The Hindu* of January 17, 2005, I outlined the immediate as well as the short and long term measures that should be taken for providing relief to the affected families, and for strengthening the coping capacity of the coastal communities in case of future tsunamis. I also indicated the steps needed to strengthen the ecological security of coastal areas, in order to ensure sustainable livelihoods for both the fisher and farm communities living along the coast. This agenda for action served as the basis for the tsunami recovery plans of many government and non-government organisations.

The tsunami served as a wake-up call for both government and community management of our coastal areas. Nearly 250 million people live within 50 km of the shoreline, in addition to about five million fisher folk. The fisher communities are, unsurprisingly, the most affected during tsunami, cyclonic storms, floods and tidal surges. Fisher families live on the coast but depend upon the sea for their livelihood. The tsunami underlined the need for an integrated approach to the management of the coastal zone.

The length of India's coastline ranges from 1962 km in the Andaman and Nicobar Islands, 1600 km in Gujarat, and 1076 km in Tamil Nadu, to 142 km in the Lakshadweep Islands. From 1991 the management of the coastal zone has been regulated through the Coastal Regulation Zone (CRZ) Notification under the Environment (Protection) Act, 1986. A Committee constituted by the Ministry of Environment and Forests in 2004 under my chairmanship examined the operational difficulties experienced in implementing the CRZ notification.

We recommended that, instead of regulating only the use of the landward side of the sea, we should take both the sea and land surface for sustainable and equitable management. The inclusion of the sea surface is important to prevent pollution, erosion, and salt water intrusion as well as for facing the challenge of sea level rise caused by global warming and climate change. In a

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draft notification issued for public debate by the Union Ministry of Environment and Forests on July 21, 2008, the coastal zone has been defined as "the area from the territorial waters limit (12 nautical miles measured from the appropriate baseline) including its sea bed, the adjacent land area along the coast and inland water bodies influenced by tidal action including its bed, up to the landward boundary of the local self government or local authority abutting the sea coast, provided that in case of ecologically and culturally sensitive areas, the entire biological or physical boundary of the area may be included as specified under the provisions of Environment Protection Act, 1986."

The bottom line of any Integrated Coastal Zone Management Strategy should be safeguarding the ecological security of coastal areas, the avoidance of sea pollution as well as unsustainable exploitation of living and non-living aquatic resources, protecting the livelihood security of fisher and farming communities, and the conservation of cultural heritage sites as well as migratory routes of birds and the Olive Ridley Turtle and other faunal breeding grounds.

The fisher families, whose only source of livelihood is living aquatic resources, are concerned that the draft Coastal Management Zone (CMZ) Notification of 2008, if implemented, will open the doors to depriving them of their housing sites and access to the ocean, because of the land grab tendencies among the rich. These are genuine concerns based on past experience. Therefore it will be desirable to enact legislation along the lines of the "Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006" to safeguard the interests and rights of fisher communities. This will ensure the long-term security of the sole means of survival for more than five million fishermen and women living near the sea.

In future, the greatest threat to coastal communities will come from a rise in sea level as a result of global warming. The President of Maldives, for example, has been highlighting the threat to the survival of his nation posed by a rise in sea level. We will face similar threats to the Andaman and Nicobar Islands, the Lakshadweep group of islands, and the coastal areas in the mainland, including cities like Chennai, Mumbai, and Kolkata. Recently, the Government of India launched a National Action Plan for Climate Change comprising eight Missions. Although a reference is made in the Plan to proactive action for preventing a serious loss of lives and livelihoods when the sea level increases in areas adjoining the oceans, it will be prudent to have a separate Mission for managing the consequences of sea level rise, because this will decide the future of nearly 250 million children, women, and men.

The mangrove and non-mangrove bioshields I recommended in *The Hindu* article of January 2005 have now become part of the National Disaster Management Plan. Because of the outpouring of support for post-tsunami rehabilitation from many donor agencies, non-governmental organisations could undertake several useful long-term measures. For example, scientists of the M.S. Swaminathan Research Foundation (MSSRF), Chennai have undertaken the restoration, rehabilitation, and creation of bioshields in Tamil Nadu and Andhra Pradesh, which will serve as effective speed breakers when a tsunami-like situation arises in the future. Over 200 hectares of bioshields have been raised in 18 villages in partnership with fishing communities. Further, a coastal farming system involving mangrove plantations and aquaculture is becoming popular. Mangroves are also very efficient in carbon sequestration, thereby contributing to the maintenance of carbon balance in the atmosphere.

The other post-tsunami initiatives of MSSRF scientists include the establishment of coastal biovillages, which can enlarge opportunities for sustainable livelihoods. For example, tsunami-affected fisherwomen were trained in a few villages in poultry farming, which has proved to be a highly remunerative occupation. Another programme involved the provision to the affected families of solar lamps to replace the smoky glow of kerosene lamps while going out in the sea.

During discussions with fisher families, a strong desire for opportunities for training in the science and art of sustainable fisheries was expressed. In response to this request, a Fish for All Research and Training Centre has

been set up at Poompohar with support from Tata Trusts. This unique field research and capacity building centre will impart training, based on the pedagogic methodology of learning by doing, to fisherwomen and men in a holistic manner, ranging from fish capture or culture to fish processing and marketing. Training in all aspects of sustainable fisheries covering conservation, capture, consumption, and commerce will be imparted. The Poompohar Fish for All Research and Training Centre is designed to foster a technological and management revolution in small-scale fisheries.

Another MSSRF initiative has been the establishment of computer-aided and internet connected Village Resource Centres (VRC) and Village Knowledge Centres (VKC). The VRCs established with the help of the Indian Space Research Organisation have satellite connectivity and teleconferencing facilities. VKCs and VRCs, managed by trained local women and men, provide demand driven and dynamic information. Synergy between the internet and mobile phones helps fishermen in catamarans to get the latest information on wave heights at different distances from the shoreline and on the location of fish shoals. This helps to allay fears and save time in fish harvest. Recent developments in Information and Communication Technologies have opened up uncommon opportunities for helping small-scale fishermen to practise safe and sustainable marine fisheries. This is one of the fascinating and meaningful applications of mobile phone technology.

Thus coastal bioshields, biovillages, and knowledge centres have become important tools for integrating ecological and livelihood security in a symbiotic manner in coastal areas. The proposal is, in cooperation with panchayati raj institutions, to train one woman and one man in every block as Climate Risk Managers; they should be well versed in disaster prevention, mitigation, and management. Coastal farm families were also affected by sea water intrusion as a result of the tsunami. For them, an agronomic rehabilitation package was introduced immediately.

MSSRF also initiated in 1991 an anticipatory research programme to meet the challenge of sea level rise, which involves the transfer of genes for seawater tolerance from mangroves to rice, pulses, and other coastal zone crops. This strategic research programme has led to the breeding of salt tolerant varieties of rice, which are undergoing tests as per prescribed regulatory procedures.

Impressive progress has been made by the State governments and non-governmental organisations in providing well-designed and hygienic homes to the affected families. The calamitous tsunami thus marked the beginning of a new chapter in the lives of those who lost their homes, fish boats, and much else. It is possible that global climate change will increase the frequency of such trials. Anticipatory action plans for managing the consequences of seawater intrusion in our coastal areas have become an imperative. At the same time, seawater is a valuable resource for raising salt tolerant trees and crop varieties and fish in suitable agro-forestry and sylvi-aquaculture systems. The 2004 tsunami has thus opened a new chapter in the lives of those who depend on the ocean for their livelihood as well as those who live near the sea and derive their income from a variety of opportunities, including farming, industry, and tourism.

*(The author, a distinguished agricultural scientist and food policy expert, is chairman of the M.S. Swaminathan Research Foundation and a Rajya Sabha M.P.)*

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