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RESEARCH REPORT

Community-based environmental education in the fishing villages of Tuticorin and its role in conservation of the environment

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The coastal town of Tuticorin is situated in the southern part of the Gulf of Mannar Marine National Park on the Southeastern Indian coast. The four islands off the Tuticorin coast are fringed by corals reefs and seagrass beds. Destructive fishing methods including blast fishing, near-shore trawling, coral mining, sedimentation and pollution have, however, caused considerable damage to the coral reefs and seagrass beds, threatening the reef fisheries of the region. A significant portion of the fisher folk in the 23 coastal villages along the Tuticorin coast, due to low literacy levels and lack of other employment, is dependent on the dwindling fish catches in and around these reefs and seagrass beds. Crowded fishing grounds, increasing demand for fisheries' products and declining catches compel fishers to increase the use of more effective and destructive fishing methods. Adult education was introduced in five coastal villages (Rajapalayam, Siluvaipatti, Arockiyapuram, Tirespuram and Inigo Nagar) on the Tuticorin coast in 2007. Included in this adult education, environmental education practices, including conservation of natural resources, particularly coral reefs and seagrass habitats, its importance and role, the need for conservation and management, eco-friendly fishing practices and sustainable use of fishery resources, were taught to the fisher folk in all five coastal villages. The trained fisher folk play key roles in their respective villages in awareness creation about the conservation of natural resources. The campaign during International Year of the Reef in 2008 helped to make aware many people in the villages about the importance of corals and associated seagrass and other resources. As a part of mitigating climate change impacts and income generation, family members of the five villages were also taught and helped to increase plantation.

Introduction

The Gulf of Mannar (GoM) is one of the four major reef areas in India. The GoM is located at the southeastern coastal tip of India in the Tamil Nadu State, extending from Rameswaram in the north to Kanyakumari in the south. The 140 km GoM stretch, extending from Rameswaram to Tuticorin located between latitude 8°47' N and 9°15 N and longitude 78°12' E and 79°14' E, includes 21 uninhabited islands which are surrounded by coral reefs and seagrasses.

In September 1986, the Gulf of Mannar Marine National Park was declared, including all the 21 islands and the surrounding shallow coastal waters, covering an area of 560 square kilometers. The islands are grouped into four for management purposes, namely, Mandapam, Keezhakkarai, Vambar and Tuticorin groups. In 1989, the GoM was declared by the Government of India as a 'Marine Biosphere Reserve', covering an area of 10,500 square kilometers from Rameswaram to Kanyakumari. The GoM is influenced by seasonal monsoonal patterns – a southwest monsoon and a northeast monsoon. Narrow fringe reefs are located mostly at a distance of 100–350 meters from the islands at a depth between 0.5–4 meters, and patch reefs rise from depths of 2 to 9 meters and extend up to 1–2 kilometers in length, with width as much as 50 meters. The luxuriant seagrass beds are seen between the islands and mainland, mainly towards the shoreward side of the islands. There are 117 coral species (Patterson *et al*. 2008) and 13 seagrass species so far identified. The large areas of reefs along the GoM are generally in poor condition due to a number of destructive activities such as coral mining, dynamite fishing, near-shore trawling, push net and shore seine operations, and trap fishing, by several hundreds of people who live along the coast and depend on reef resources for their livelihood.

The Tuticorin coast is situated in the southern part of the Gulf of Mannar Marine National Park and is the most environmentally stressed coastal area as a result of various developmental activities and destructive fishing practices. Population increases, lack of other employment opportunities and low literacy levels have forced local villagers to depend mainly on the marine resources that can be harvested around the four coral, reef-fringed islands of the coast (Shantini *et al*. 2002, Patterson *et al*. 2008). Over-fishing and the use of destructive fishing methods have been prevalent for many years. Crowded fishing grounds, increasing demand for fisheries' products and declining catches compel fishers to increase the use of more effective and destructive fishing methods

(Samuel *et al*. 2002). Coral mining has been practised for the past several decades and many poor fisher folk are involved in this illegal practice for their daily livelihood (Patterson 2005). The subsequent reduction in the function of the reefs as natural barriers has led to increased beach erosion and transformation of the coast (Qazim 1999, Ramanujam & Sudarsan 2003). The industrial development along the coast, destruction of mangroves for saltpans and disposal of domestic sewage also pose considerable threats to the ecosystem functions of the reefs and the dependent coastal folk (Easterson 1998). Though the corals are protected under a scheduled list – under the Wildlife Protection Act 1972 – the coral mining continued until the 2004 Indian Ocean tsunami. As a result of the enforcement, along with various conservation initiatives and lessons learned through the tsunami, the mining has been completely stopped since 2005, but other destructive fishing practices near the reef areas are still continuing.

Self-help groups in the coastal villages

The fisherwomen in the villages are organised in Self-Help Groups (SHGs) that play a major role in saving and wise use of financial resources. The government is encouraging the formation of SHGs in order to create confidence and income opportunities among the women. In addition, women belonging to SHGs are empowered in social and economical domains and actively participate in decision making and planning processes, linking them with micro-enterprises and banking institutions (Patterson 2003). Community-based adult education has been introduced to the SHG women in five fishing villages (Rajapalayam, Siluvaipatti, Arockiyapuram, Tirespuram and Inigo Nagar) on the Tuticorin coast (see Figure 1) and the women's literacy levels have been enhanced due to this adult education (Patterson *et al.* 2008). Included in this adult education, environmental education was introduced in all the five target villages on the Tuticorin coast.

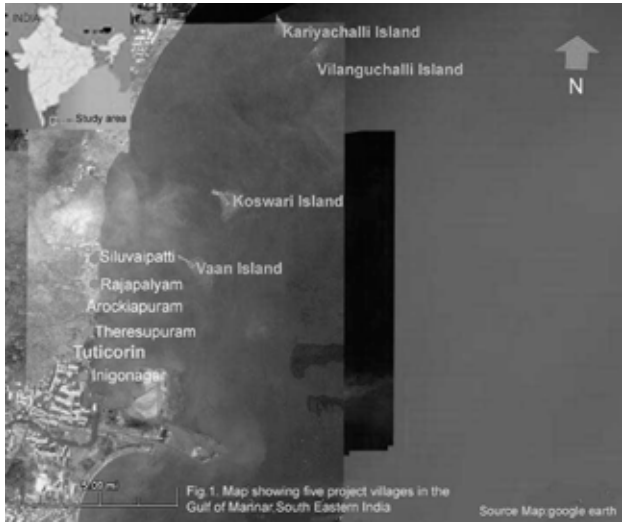

Figure 1

Adult and environment education

The Suganthi Devadason Marine Research Institute (SDMRI), in collaboration with the Coastal Ocean Research and Development in the Indian Ocean (CORDIO), East Africa and Nyköpings Folkhögskola in Sweden, initiated the information and communication technologies based activities among fisherwomen Self Help Groups in India, focusing on three major components – adult education, environmental education and computer education. The adult education concept has also been tried in other parts of the world as a contributor to national development in Southern Africa (Oduaran & Okukpon 2005), for healthy participative democracy in Scotland (Hammond 2006), and in adult education and training in Ireland (Morrissey & McNamara 2004). However, the aim of introducing the present adult education along with the provision of information and communication technologies in the five coastal villages on the Tuticorin coast of the Gulf of Mannar in the southeastern India was to empower the local fisherwomen Self-Help Groups in terms

of enhancing literacy and livelihood and to reduce pressure on the marine environment, in particular, the coral reef resources and economic vulnerability of these coastal communities.

Two coordinators (SHG members) from each village were selected and were given training in adult and environmental education and computer applications. After the training, each village was provided with information and communication technologies components (include computer, printer, mobile phone and internet). The coordinators have started training in their respective villages in adult and environmental education, and in computer training. Baseline information on literacy, occupation, awareness of natural resources and so on was collected before the start of the activities.

The beneficiaries from October 2007 to January 2009 in adult and environmental education numbered 240 fisherwomen and 44 fishermen in the five coastal villages. Through adult education, participants learned to use their signature by writing their names instead of by thumb impression, and started to read Tamil (the local language) and English words. Those who already knew how to write their names in Tamil learned to write them in English; they learned to read bus boards and started to travel alone; they learned simple mathematical calculations during their classes; and women participants are helping their children in their studies. After witnessing such improvements, more coastal women are becoming willing to participate in adult education activities.

Impact of environmental education on conservation and management

The environmental education component for the participants in the adult education program helped them to understand the need for cleanliness in their environment and conservation of natural resources, in particular corals, seagrasses and associated fishery resources. Level of awareness has been increased. Participants are well informed about the importance of corals, their ecological and

economic role and need for conservation; about global warming and its effects in particular on rising sea levels, impacts to marine resources such as corals and fisheries; and about effects of industrial and domestic pollution on the marine environment.

The general lack of knowledge among fisher folk about coastal ecosystems, their ecology and productivity makes them insensitive to the fragile balance in the ecosystem and unknowingly they are using destructive fishing methods to save time and effort (Patterson *et al.* 2002). A survey conducted in five other coastal villages on the Tuticorin coast during 2001, studying knowledge among fisher folk about the ecological significance of coral reefs, found that awareness was very poor. Twenty nine percent of the men and only three percent of the women were aware of the ecological importance of corals (Patterson *et al.* 2002). To address this, a series of awareness programs was conducted, primarily targeting the fisherwomen in view of their comparatively low awareness but also because they are often in a position to influence both active male fishers and children within their households. A survey in 2004 in the same villages indicated that there was considerable improvement in the awareness level among the fisher folk (Patterson *et al.* 2005), and in the aftermath of the 2004 Indian Ocean tsunami, there was a tremendous change in people's attitudes. The present approach through adult education is producing effective results and, in local awareness workshops, the villagers are able to speak about environmental protection and conservation.

When the present program started, some villagers believed that corals were stones of the sea. In the local language (Tamil), they are called 'pearly rocks', and in nearby Kerala State they are locally known as 'beach rocks'. During the environmental education component, the adults were informed that corals are live animals and that they play an important role in protecting coasts and in sheltering a variety of marine organisms, especially fish. They became more aware of

the significance of functional coral reefs for their livelihood. The coordinators informed the adults that 2008 was declared as the International Year of Reefs in order to increase focus on awareness efforts relating to coral reefs and the ecosystem services they provide.

The coordinators and trainees have become involved in the organisation of awareness campaigns and local workshops in their respective villages in conjunction with the International Year of Reefs 2008. The program includes group discussions and entertainment (songs, folk dances, drama, quizzes). The quiz program was conducted before and after awareness creation to assess villagers' knowledge and eagerness about corals. School children in the villages also participated along with their parents in the awareness campaign. The coordinators of the targeted five villages also participated in the awareness campaign through the National Broadcasting Corporation, such as narrating their experiences and roles in conservation through adult education and conservation related songs.

The threats posed by global warming to the reefs globally and locally were also highlighted, and the importance of afforestation to mitigate global warming was stressed. The trainees were encouraged to plant various saplings in their villages as a family initiative. In each village, more than 50 families have been involved in this venture and the number of families is increasing. Saplings of coconut, neem and other fruit-bearing saplings were distributed to the families in all five villages to mitigate the impacts of global warming, to help the fisher families to make additional income, and to make villagers aware of the importance of afforestation and green environment.

Conclusion

Environmental conservation is one of the priority areas for all governments, but the concept and program will impact locally only when there is sufficient education, awareness, understanding and interest among the people. The ongoing adult education

program on the Tuticorin coast enlightened the villagers about the importance of marine environment, in particular corals, seagrasses and fisheries, and of the need for protection and conservation for sustainable utilisation. The educated adult women have developed their confidence to propagate awareness initiatives on environmental conservation within their villages and also they are the key players to train their children in this direction. The afforestation efforts will also be more effective with support from the villagers, since the interest is developed within the families. We have learned through the project experience that the success of any conservation initiative depends on how we genuinely enhance levels of literacy and awareness among the community. More ongoing focus needs to be given on education and awareness for each member of the community which would bring tremendous success in all environmental conservation and management efforts.

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