

Mangrove Forests and Shrimp Culture in Ngoc Hien District, Minh Hai Province, Vietnam

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Vietnam has one of the highest rates of deforestation in the world. The annual rate of deforestation is 3,500 ha or 5.8 %. Vietnam also has a very high population growth rate of 2.1 % per year, which is seen as a major cause of environmental degradation in Vietnam.

The Ngoc Hien district of Minh Hai Province in the Mekong Delta of southern Vietnam is very rich in mangrove and marine resources. Despite the wealth of the natural resource base in Ngoc Hien district, however, there are some severe environmental problems. These problems are due, in part, to increasing population growth, economic changes within Vietnam, and ineffective resource management and policies. Using Ngoc Hien district as an example, we studied the relationship between natural resources and socioeconomic conditions in Vietnam and the need for improved and sustainable resource management.

Located between the South China Sea and the Gulf of Thailand, Minh Hai Province has rather different natural resource characteristics from other areas in the Mekong Delta. The land area of Minh Hai province is relatively young, being built up from alluvium from the Mekong Delta. The east coast of Minh Hai has irregular semidiurnal tides with large amplitude (over 3 m). The west coast has diurnal tides, with a spring tide amplitude of 1-1.5 m. This characteristic is very important in determining the currents of rivers and canals, as well as the alluvium transport in the area. Alluvium is transported from the east coast to the west coast to expand the Delta.

The network of canals and rivers in Ngoc Hien district is very dense and is favorable for inland navigation. This water network not only carries seawater, alluvium and aquatic organisms into the mangrove forest, but increases the ecosystem's bio-

logical productivity.

Vietnam has approximately 252,500 ha of remaining mangrove forests. Natural forests make up the largest proportion of these forests, followed by forest shrub and plantation. Mangroves of Vietnam are divided into four zones. Zone 4 is the area where conditions are most favorable for mangrove growth. Mangroves here are abundant not only in the number of species but also in the types of communities and succession. Minh Hai province, located within Zone 4, has 77,682 ha of mangrove, the largest of any province in Vietnam. Ngoc Hien district has the most mangrove of any dis-



A mangrove forest cleared for shrimp pond construction.
ICLARM PHOTO

trict in Minh Hai Province.

The mangrove forest and marine resources serve as a major source of livelihood for the residents of Ngoc Hien district. The rivers and canals make it possible to move products easily to larger population centers in the Mekong Delta. Despite the abundance of natural resources, the residents of Ngoc Hien district are poor and have a low standard of living. A high population growth rate and relatively high illiteracy rate have resulted in increased pressure being put on the natural resource

base of the district and poor resource management.

After independence in 1975, all natural resources including mangrove forests belonged to the central Government. This centralized, top-down management, however, did not prevent mangrove destruction which has become an increasing problem since 1983. During the 1980s, policies of the Government were to encourage the production of more food. This increase in production brought about conflict with management of natural resources, especially for mangroves in Ngoc Hien district.

Although the Forestry Administration in the Ngoc Hien district had strong leadership and authority for management, mangrove destruction continued at an increasing rate. Due to high potential profits, shrimp growers were attracted to the district. The construction of shrimp ponds was undertaken by both residents of the district and immigrants. Statistics show that the annual immigration rate to the district during the 1980s was 4.5%. Besides private individuals and companies, several government institutions and military units cleared thousand of hectares of mangrove to culture shrimp. By 1988, more than 900 households illegally settled in mangrove forests for shrimp farming. By 1993, the number of households illegally located in mangrove forest had

risen to 6,815. These households occupy approximately 20,000 ha of mangrove for shrimp culture.

As a result of increased population growth, the attraction of high profits from shrimp culture, and ineffective mangrove forest management, a number of serious environmental problems exist in Ngoc Hien district. Mangrove forest destruction has led to a decrease in both the quantity and quality of mangroves. In 1991, only 25% of the original mangrove forest in the district remained. The destruction of mangrove due

to the construction of shrimp ponds rivals only the period of chemical spraying during the war with the USA from 1966 to 1975. During that period approximately 44,918 ha were destroyed. From 1976 to 1980, 24,700 ha were replanted in the district.

As a result of haphazard development of shrimp ponds within the mangrove forest, water movement has been reduced, resulting in a decrease in the quality of mangrove and in the amount of mature forest. Cutting of mangrove for charcoal and firewood has reduced the number of mature and large *Rhizophora* and *Bruguiera* trees.

Reforestation has been very slow.

The loss of mangroves has increased shoreline erosion in the northeast section of the district due to greater wave action from the sea. The mangrove deforestation and the construction of embankments for shrimp ponds has slowed the process of shoreline accretion, especially in the southwestern section of the district. The reduction in water exchange due to shrimp pond construction has led to an accumulation of toxic chemicals in the soil and the pro-

duction of pyrites.

Mangrove deforestation, decrease in water quality and increased exploitation of terrestrial and aquatic wildlife has led to a decline in biodiversity in the area. It has been reported that many plant, animal and aquatic species, such as the brackishwater crocodile and mangrove monkey, have either disappeared or have greatly declined.

An improved management strategy is needed to reverse the environmental degradation ongoing in Ngoc Hien district. It is recommended that the mangrove areas be zoned into three districts. This includes: Zone 1-Specialized mangrove lands consisting of protected forest; Zone 2-Mangrove-shrimp land consisting of limited construction of shrimp ponds and mangrove reforestation; and Zone 3-Shrimp culture lands consisting of only shrimp ponds.

In addition to zoning, several other management actions are recommended. There is a need to increase education and training of residents to improve knowledge of environmental conservation. Extension ser-

VICES for farmers are needed to improve resource management and farming systems methods. Increased taxation of shrimp ponds will reduce the number of shrimp ponds. People should participate more in resource management through farmer groups, youth unions and other organizations. **G**

Further Reading

- Binh Cao Thang. 1993. Sustainable development of shrimp-forest system in Ngoc Hien, Minh Hai, Vietnam. Asian Institute of Technology, Bangkok.
- Phan Nguyen Hong and Hoan Thi San. 1993. Mangroves of Vietnam. International Union for the Conservation of Nature, London.
- Myers, N. 1992. Tropic forest degradation. *The Environmentalist* 12(1).

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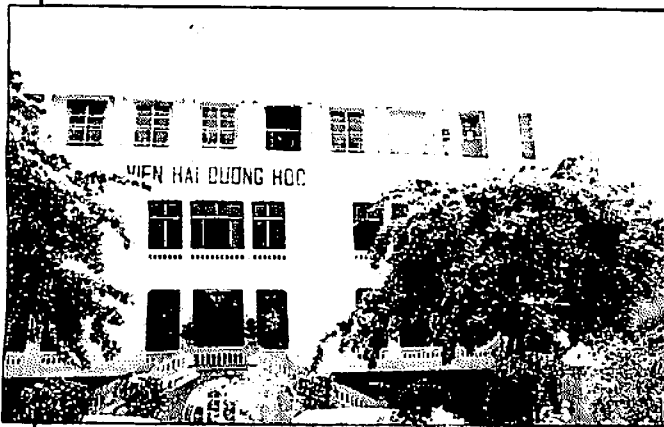
Vietnam's Institute of Oceanography

Vietnam's Institute of Oceanography is situated on the coast of Nha Trang in an imposing four-storey structure built by the French Government in 1923. The ground floor is a museum open to the public, containing a cross-section of marine life of Vietnam. The outer walls house cabinets of dried and pickled organisms, while the central area has live displays in small aquaria.

Above the displays is the Institute proper, housing Departments of Physical Oceanography, Marine Chemistry and Environment, Marine Geology and Marine Biology. There are branches of the Institute in Haiphong and Hanoi, as well as permanent oceanographic stations at Dason, Cau da (adjacent to the headquarters building), Cangio and the Spratly Islands. The Institute's oceanographic vessel sank in 1982 and researchers now rely on ship time on navy vessels.

The staff number 180, led by Director Dr. Vo Van Lanh.

As mentioned in our last issue (*Naga*, July 1994, p. 21), the Institute has a valuable library that is being destroyed by book-eating pests and staff have appealed for help to prevent further deterioration and to restore the book collection.



Headquarters of the Vietnam Institute of Oceanography near Nha Trang.

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