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MANAGEMENT AND MONITORING OF THE RED RIVER ESTUARY

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1. General description of the estuary:

Belonging to the Red River delta - one of the two largest deltas in Vietnam (the other is Mekong delta located in the south), the Red River Estuary is situated in the provinces of Nam Ha (formerly Ha Nam Ninh) and Thai Binh. There are two parts of the estuary. One part known as Xuan Thuy Reserve or Xuan Thuy Ramsar Site belongs to Xuan Thuy district of Nam Ha province, where there are islands of Con Ngan and Con Lu; this is the southern part of the Red River mouth. The other part belongs to Tien Hai district of Thai Binh province, where there are islands of Con Vanh, Con Thu, Con Den and Con Mo; this is the northern part of the Red River mouth which has not been included into the Ramsar site yet.

It is about 110 km southeast of Hanoi - the Capital of Vietnam; 45 km east-southeast of Nam Dinh Provincial Town. The region has an area of about 15,000 ha, the altitude of 0 to 3 m, and the wetland types of 02, 05, 06, 07, 08, 10, 11 and 19.

The estuary contains the last significant remnant of mangrove/mudflat ecosystem on the coast of Vietnam. The mangroves are undoubtedly of considerable importance in maintaining fisheries production in the area; they provide a valuable source of timber and fuelwood, and support a small honey industry. The mangroves also play an extremely important role in coastal protection in a region prone to typhoons. The estuary provides critical habitat for large number of migratory waterfowl, especially Ardeidae, Anatidae, shorebirds and Laridae, and is known to be frequented by at least seven Red Data Book species of birds (Penecanus crispus, Egretta eulophotes, Platalea minor, Tringa guttifer, Limnodromus semipalmatus, Eurynorhynchus pygmeus and Larus saundersi). The estuary also provides excellent potential for scientific research and conservation education.

The area can be divided into 3 major zones : 1. Land inside the sea dike; 2. Coastal marshes, mudflats and beaches beyond the sea dike; and 3. The islands in the estuary.

1. The area inside the sea dike includes raised land behind the dike, an elaborate network of canals and river channels with fringing marshes, sandy areas with human settlements, and large areas of agricultural land reclaimed by polderization.

2. The coastal zone consists of extensive intertidal mudflats, mangrove swamps, salt marshes and sandy beaches. Large part of the mudflats and mangroves have recently been impounded for shrimp ponds. Both accretion and erosion are taking place, but accretion is dominant, the rate of accretion being twice that of erosion. In recent years, accretion has resulted in the outward extension of the mudflats by about 500 - 600 m per year, and the level of the land outside the sea wall has risen by almost 10 cm per year. The maximum tidal range is approximately 4 m.

3. Several large, low-lying islands have been formed by accretion in the mouth of the river, the main ones being Con Ngan, Con Lu and Con Vanh. The fine deposits of silt on the landward, protected side of the islands have been colonized by mangroves, which currently cover some 3,000 ha. The exposed seaward side of the islands consists of sandy beaches.

2. Some physical characteristics of the estuary.

2.1. Climate:

It is the tropical monsoonal climate with a pronounced maritime influence. The winters are cool and dry with mean monthly temperatures varying from 16.3°C to 20.9°C and mean minimum temperatures from 14.4°C to 19.7°C . However, temperatures occasionally fall well below this, and an absolute minimum of -14.4°C has been recorded. Fine drizzle is frequent in early spring, after which temperatures rise rapidly to a maximum of 40°C in May. The summers are warm and very humid with average temperatures varying from 27°C to 29°C , and mean maximum temperatures from 31°C to 33°C .

2.2. Hydrology:

The average rainfall is 1,600 - 1,800 mm, 85% of which occurs during the rainy season in summer (from April to October). The Heaviest rainfall occurs in August and September; this combines with high river levels to cause extensive flooding throughout the Red River Delta.

It is a diurnal tide regime in the region with the tidal cycle of about 25 hours. The mean tide amplitude varying from 1.50 to 1.80 m, the maximum is 3.3 m and the minimum is 0.25 m.

The water salinity in the open sea is 31 to 34‰, but in the coastal zone it varies widely from 11 to 30‰ depending on places and the time of the year.

2.3. Winds:

The prevailing winds are north and east in winter, and east and southeast in summer. The mean velocity of the winds in winter is 3.2 to 3.9 m/s (in the land is 2.0 to 2.5 m/s), and in summer is 4 to 4.5 m/s (in the land is 2.3 to 2.6 m/s). Typhoons and tropical cyclones are frequent between July and October, and often cause considerable damage.

2.4. Principal vegetation :

The vegetation in the estuarine marshes includes *Phragmites* species, *Cyperus* species and algae such as *Rhizosolenia*, *Chaetomorpha*, *Clenophora*, *Enteromorpha*, *Oedogonium*, *Crispum* and *Gracilaria*. The natural mangrove vegetation of the region includes a variety of species such as *Sonneratia caeseolaris*, *Kandelia candel*, *Aegiceras corniculatum*, *Avicennia* species, *Rhizophora stylosa*, *Bruguiera gymnorrhiza*, *Acanthus ebracteatus* and *Derris trifoliata*. However, the natural mangrove forests have long been replaced by a much simpler planted community dominated by *S. caeseolaris*, *B. gymnorrhiza* and *Aegiceras corniculatum*.

2.5. Fauna:

The Red River Estuary is the most important staging and wintering area for migratory waterfowl such as ducks, geese and shorebirds in the northern part of Vietnam. Huge concentrations of birds occurred in the past, but numbers have declined sharply during the last decade due to excessive shooting, netting and trapping, the cutting of mangrove forests and generally high levels of human disturbance. Nevertheless, the estuary continues to be of great importance, and may still hold more than 100,000 birds between October and March or April. Over 21,000 waterfowl were recorded by Le Dien Duc and D.A. Scott during a brief survey of part of the region in March 1988, and at least 10,000 unidentified small shorebirds.

One hundred and fifty-six species of fishes are known to occur in the estuary. Ten species make up the bulk of the commercial catches, although about 40 species are of some economic value.

The benthic fauna includes at least 12 genera of Bivalva and two genera of Gastropoda. The most abundant shrimps are *Penaeus orientalis*, *P. merguensis*, *P. japonicus* and *Metapenaeus* species.

The estuarine system supports a rich and diverse zooplankton. A total of 185 species has been recorded, including 107 Copepoda, 14 Cladocera, 8 Siphonophora, 8 Chaetognatha, 6 Amphipoda, 6 Tunicata, 5 Protozoa, 4 Ostracoda, 3 Pteropoda-Heteropoda, 2 Rotatoria, 2 Cumacea, 1 Sergestinae, 1 Euphausiidae and 18 Nauplius. All are euryhaline and eurythermic species which have originated from tropical seas and have become adapted to the high fluctuations in salinity occurring in the estuary. During spring and early summer, the density of planktonic organisms varies over a wide range from 1,600 to 267,450 individuals per cubic metre (mean 15,470). The density decreases rapidly during the rainy season to a mean density of 8,170 individuals per cubic metre by the end of summer.

3. Exploitation and management of the estuary before joining the Ramsar Convention.

Because of the important role of the area in economic development of the localities, both Xuan Thuy District (Nam Ha province) and Tien Hai District (Thai Binh province) authorities have paid much attention to exploitation of this area since early 1980s. The main production activities in this area are: fishing (Fish production is estimated at 8,000 tonnes to 10,000 tonnes per year), aquaculture (shrimp production - at 6.8 tonnes in 1983 but in 1987 it reached 300 tonnes), agriculture (rice production is estimated at 30,000 to 40,000 metric tonnes per year), duck-raising, harvesting of rushes for weaving (mats, bags and carpets), collection of honey in the mangrove forests, hunting of migratory shorebirds ... making wetland area in this region reduced rapidly.

The main threat to the estuarine system is the construction of the sea dikes and reclamation of mangrove swamps and mudflats for agricultural land and shrimp ponds. Some 2,000 ha of mangrove forest have recently been cleared for shrimp ponds, and mangrove forest has also been cleared for the cultivation of rushes. The demands of the local people on the natural resources of the estuary are constantly increasing.

For example, the Xuan Thuy Development Project designed by the Xuan Thuy District People's Committee proposed that almost entire area of the wetlands be reclaimed for agricultural land and settlement. Reclamation would follow a traditional pattern which was very common in Ha Nam Ninh province at that time with the slogan: "The rice encroaches on the rush, the rush encroaches on the mangrove, the mangrove encroaches on the sea". It means that, first the conversion of mangrove area to shrimp ponds, then the conversion of shrimp ponds to rush fields, and finally the conversion of rush fields to rice paddies. The construction of shrimp ponds commenced in 1982, and by March 1989, almost all of the mature stands of mangrove on the mainland and Con Ngan island had been banded and

cleared for shrimp production (in 1987 the shrimp production here was 200 tonnes). Several of the inner ponds along the sea wall had been converted to rush fields (the production of rushes for weaving here was estimated at 16,000 to 20,000 tonnes per year), and a small settlement of about 135 houses had been established.

By the similar way, during the period from 1981 to 1991, the Tien Hai District of Thai binh province reclaimed 483 ha of the mudflats, 26 ha of the patures, and filled up 21 ha of the internal field ponds and lakes for rice production and other crops. At the same time, 738 ha of protected forest disappeared because of deforestation for fuelwood and aquacultural ponds. The settlemental land increased of 124 ha because of creation of two new economic zones called Dong Hai and Nam Phu.

However, by this time, the local authorities were becoming aware of several problems created by their rapid development of the region. Shrimp production was falling off steeply within only three or four years of pond construction, honey production from mangrove flows had declined sharply, siltation rates in the innermost ponds had decreased as they had become increasingly isolated from inflow of the silt laden estuarine waters, and coastal erosion was becoming a problem at the northern end of the two islands. A causeway linking the mainland to Con Ngan had cut off the flow of fresh water into southern areas, resulting in an increase in salinity. As a consequence, it was becoming less easy to flush out of areas scheduled for reclamation.

Now we can see many "white" ponds on the Con Ngan island which formerly were the high productive shrimp ponds, but after 3 or 4 years of production they became the empty ponds excepting water (the season why it is called white ponds).

However, the local authorities are trying to keep the high levels of shrimp production by a constant expansion of the new nutrient rich ponds. It is because of the new freezer plant which has been recently invested by the Xuan Thuy authorities in order to process the shrimps for export. However, this expansion has proceeded at the expense of the limited mangrove resources, and now there are no futher room for expansion except into the mangroves on Con Lu island. If Con Lu island continues to be used by the same way that took place in Con Ngan, every thing here should be damaged in the near future.

So, the Red River Estuary should urgently be managed and used wisely.

4. Management and monitoring of the Red River Estuary after joining the Ramsar convention.

Vietnam became the Fiftieth Contracting Party to the Ramsar Convention from 20 January 1989, and was the first country in South-East Asia to join the Convention.

Recognizing the important role of the Red River Estuary in socio-economical development of the country as well as for protection of international waterfowl in the seasonal migration, when deposited the instrument of accession to the Convention on 22 August 1988, the Government of Vietnam designated the Xuan Thuy part of the Red River Estuary for the List of Wetlands of International Importance. There was only the Xuan Thuy part designated as the Ramsar site because of some subjective and objective reasons, but at the same time it was intended to enlarge the site into the Tien Hai part of the Estuary when appropriate. That was the reason why we called the site as Red River Estuary Reserve when deposited the instrument of accession to the Convention.

Most the things mentioned hereafter relate to the Xuan Thuy part of the Red River Estuary.

Since the Red River Estuary became the first Ramsar site in Vietnam as well as the first Ramsar site in South-East Asia, the Government of Vietnam and other related international and non-governmental organizations have been paying much attention to wise use and wise management of the site in order to make a good example for other countries in the Region to join the Convention.

At very early step, by a request of the Government, the Xuan Thuy district People's Committee established a modest Management Board of the site. The Government provided some financial support relating to building up the site, such as surrounding the site with fences, upgrading the roads into the site, building headquarters for the Management Board etc.

In March 1989, with assistance of the Asian Wetland Bureau one training workshop on wetland and water bird assessment and management techniques was held in Xuan Thuy district. The workshop was attended mostly by the Xuan Thuy people who responsible directly or indirectly for management of the site; beside of that, representatives from some important wetland reserves in Vietnam, from the Office of the Council of Ministers, the Ramsar Convention Section, the Hanoi University (the Wetland and Waterbird Working Group) also attended the Workshop. The workshop devoted much focus on the management problems at Xuan Thuy Ramsar site and prepared a preliminary management plan for submission to the local authorities.

Under the guidance of the Government through the Ramsar Convention Section within the State Committee for Science (from the end of September 1992 renamed as the Ministry of Science, Technology and Environment), with technical assistance of the Wetland and Waterbird Working Group; the Management Board of Xuan Thuy Reserve within Xuan Thuy district People's Committee had prepared a so-called Economical-Technical Design (later on it should be developed as a Master Plan) for development and management of the reserve. This document was officially approved by the People's Committee of Ha Nam Ninh province (now is Nam Ha province) on 27 June, 1990.

From that time, much progress has been achieved. The former development plans which originally called for the conversion of almost area into rice paddies and settlements have been scaled down, a strict nature reserve of about 6,000 ha has been created (a part of Con Ngan island and the whole Con Lu island), market hunting of shorebirds has been terminated, and efforts are being made to prevent further degradation.

Some campaigns have been made to spread the significance of the preservation of the wetland ecosystems in the region to 340,000 people of Xuan Thuy district; some 70,000 school children of the district have been acquainted with the programme for conservation of the wetland resources and environment of the site.

An area of more than 750 ha has been re-planted by mangroves (mostly by *Kandelia candel*) in the strict nature reserve. These will much contribute to the maintenance of the ecological balance of the region.

However, on the other hand, the development outside the strict nature reserve has still proceeded unchecked since designation of the site. All significant stands of mangroves on the mainland and Con Ngan island have been banded for shrimp ponds and cleared for fuelwood, and a settlement inside the site has grown from a few wooden and thatch huts in early 1980s to hundreds of stone houses now. These do create many changes in the ecological character of the site. So, it is very urgent to address these problems.

The Government as well as the international and non-governmental organizations, like the Ramsar Convention Bureau, the International Union for Conservation of Nature and Natural Resources (IUCN) through its Wetland Programme, the Asian Wetland Bureau (AWB)... have had many meetings and discussions in order to find out the best way to make the site be wisely used and managed.

By a proposal of the Vietnamese Government to the Ramsar Wetland Conservation Fund, The Ramsar Standing Committee has approved a project "Support to a wetlands conservation programme in Vietnam" with a grant of SFR 32,000.00, excluding an amount of USD 10,000.00 from IUCN. A main part of

the project is devoted for the management activities at Xuan Thuy Reserve on replanting of mangroves in the degraded areas, improved policing of the areas of importance for migratory waterbirds, and development of a pilot shrimp pond to demonstrate how this activity can be pursued while maintaining natural mangroves rather than destroying them as is currently the case in the buffer zone at Con Ngan island.

A motorbike and a small motorboat were provided by the project to allow improved access to the areas where hunting has been carried out in the past.

The pilot shrimp pond should be modelled upon the successful shrimp ponds in Mai Po Reserve in Hong Kong and would be established using community labour. But this item now seems to have some difficulties in the local contributions, especially financial sources. This will involve construction of small dikes in order to close off an area within an existing shrimp pond and ensure that its management is independent from the present system of management which has led to degradation of some of the mangroves. But it is necessary to do very soon to demonstrate how shrimp production can be enhanced by careful management of water levels and by maintaining the mangroves within the pond.

In order to make a further step in wise use and wise management of the site, the Xuan Thuy district People's Committee organized a Workshop on Management of the Red River Estuary at Xuan Thuy district town on 22 - 23 July, 1992 to provide a forum for the related local authorities including those from Tien Hai district of Thai Binh province, to present what they did in the past and what they will do in the near future on the site, and then to discuss about the best way to use and to manage the site. The workshop was attended by more than 35 persons including representatives from the Ramsar Section, the Ministry of Water Resources, the Wetland and Waterbird Working Group as well as from IUCN and AWB. The representative of the Management Board of Xuan Thuy site presented some ideas that should be included into the Master Plan for development and management of the site. According to these, the site should be divided into 3 main parts : a). the part for intensive exploitation; b). the part for limited exploitation; and c). the conservation part.

All attended delegates of the workshop unanimously agreed that for wise use and wise management of the site, it is necessary to integrate measures to protect the site, to form a buffer zone, and plan and implement improvements in the design and management of adjacent areas converted to fish and shrimp ponds to provide food and employment for the local people.

The workshop also made some recommendations to the local and central governments, as well as to the related international and non-governmental organizations to have some measures and to provide the necessary guidance, assistance, support and cooperation for promotion of wise use and wise management of the site.

In order to promote wise use and wise management of the Red River Estuary, some measures should be taken, as follows:

- To promote further awareness of the local people about how important to maintain the wetland ecosystems in sustainable development of the region.

- To strengthen capabilities of the Management Board by providing technical assistance, equipment for management and protection of the site; training of the staff on the wise use techniques.

- To develop an integrated management plan (or master plan) for the entire site. This would involve the development of Con Lu island as a strict nature reserve, and sustainable utilization of aquatic resources (especially mangroves and shrimps) in the rest of the site.

- To undertake a feasibility study to determine the options for improving the management of the areas reclaimed for shrimp ponds and agriculture to provide improved conservation of the site as well as the adjacent areas.

- Step by step to re-plant mangroves on the degraded areas in order to maintain the ecological balance of the site and at the same time to improve aquaculture here.

- To provide financial and technical assistance for making some pilot shrimp ponds to demonstrate how shrimp production can be enhanced by maintaining the mangroves and the water regime within the ponds.

- To promote regional and international cooperation in research, management, utilization and protection of the site; especially cooperation with the neighbouring countries which have the similar conditions.

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