3. *Wildlife Reservation and Protection Act, B.E. 2535 (1992)*

This act repealed and replaced the old Wildlife Reservation and Protection Act, B.E. 2503 (1960). Only the Royal Forest Department (RFD) was responsible for the old Wildlife Law. However, both RFD and the Department of Fisheries (DOF) are responsible for the current Wildlife Reservation and Protection Act, B.E. 2535 (1992). This is because the definition of wildlife in this act includes aquatic animals, and the DOF is responsible for aquatic animals and crocodiles, whereas the RFD is responsible for terrestrial animals and birds.

This act creates two lists of endangered species: (i) the list of reserved species notified by royal decree, and (ii) the list of protected species notified by ministerial regulation. The act prohibits hunting, possessing, breeding, trading, importing and exporting any species on these two lists. However, if some species can be bred in captivity until the second generation of offspring animals; trade, possession, export and import of such species shall be allowed pursuant to CITES regulations. Therefore, this act also creates another list of captive breeding species notified by ministerial regulation. Examples of endangered species bred in captivity include crocodiles, pythons, Asian bony tongue fish, etc.

4. *National Environmental Quality Promotion and Preservation Act, B.E. 2535 (1992)*

This act has been revised and replaced the old act of 1975. The Ministry of Science, Technology and Environment (MOSTE) is responsible for this law. Upon the enactment of this law in 1992, MOSTE was also restructured by dividing environmental agencies into three agencies: (i) Office of Environmental Policy and Planning (OEPP), (ii) Pollution Control Department (PCD), and (iii) Department of Environmental Quality Promotion (DEQP).

The Ministerial Regulations of Article 55 of this act sets quality standards for discharged industrial waste water, but does not include waste water discharged from aquaculture. This act requires environmental impact assessment (EIA) for large-scale projects. Furthermore, Articles 43, 44 and 45 of this act empower the minister of MOSTE to proclaim ministerial regulations determining "environmentally protected areas" and "pollution control areas" in addition to regulating the activities in such areas. However, it lacks enforcement because MOSTE has inadequate staff in the provinces. Normally, provincial police and various provincial government offices are relied upon for enforcement.

This act could serve as a legal instrument to protect wetlands by designating wetlands as "environmentally protected areas" whether private wetlands or public wetlands. The "environmentally protected areas" can be established by ministerial regulation. Furthermore, restricted activities within "the environmentally protected area" can also be proclaimed by ministerial regulation as well. It can be concluded that these provisions are more flexible and applicable to wetland management and conservation in comparison to other legal instruments. However, the enforcement of this act relies on competent officers of other governmental line agencies such as the Police Department, Royal Forest Department, Department of Fisheries, Royal Thai Navy, Harbour Department, etc.

5. *Navigation in the Thai Waters Act, B.E. 2456 (1913 revised in 1992)*

This was enacted in 1913 but it has been revised several times, and the latest is No. 14 in 1992. The Department of Harbour, Ministry of Transportation and Communication is responsible for this act. The main objectives of the act are to regulate navigation and water transportation in the Thai waters, regulate the construction of vessels, including fishing vessels, register all vessels, and issue licenses to vessel officers. In addition, it also prohibits the disposal of wastes into the watercourse either from the vessels or from land-based sources.

Article 117 prohibits the construction of anything over the water or under the water without prior permission from the Harbour Department. The construction of commercial ports, fishing ports, marinas, piers must be done only after obtaining permission from the Harbour Department.

In relation to coastal aquaculture, the Department of Fisheries must seek approval from the Department of Harbour before granting permission for reserved fisheries, for coastal stationary fishing gear, cage culture and shellfish culture. Likewise, the Department of Harbour must seek approval from the Department of Fisheries before granting permission for the construction in water courses or action which may cause alternation of water courses.

In relation to wetland management, this act regulates the construction or encroachment of public wetlands both inland and coastal. Moreover, the act also prohibits the disposal of waste into wetlands in order to prevent pollution and contamination.

6. National Reserved Forest Act, B.E. 2507 (1964)

This act aims to protect reserved forests and natural resources within reserved forests. Previously, an intensive survey was carried out over a very long period of time, to identify the area of intended reserved forest before a Ministerial Regulation was proclaimed designating a national reserved forest. The enactment of National Reserved Forest Act in 1964 aimed to change such procedures by requiring advanced notification of designation of areas intended as reserved forest. Any person who is not satisfied, is entitled to challenge by petition to the Head of District Office within 90 days from the effective date of the Ministerial regulation. In practice, however, there are many villagers who occupy and utilise areas of reserved forests. In this regard, this act recognises the preoccupation right and utilisation right only to persons who have land title deeds issued by the Department of Lands pursuant to the Land Code, B.E. 2497 such as Chanode, N.S.3, S.K.1, etc. These procedures also applied to mangrove reserved forests. Therefore, there are several villagers who still have preoccupation and utilisation rights in the mangrove reserved forests, which they can use to legally exploit mangrove forests depending on the mangrove zones classified by cabinet resolutions.

7. National Park Act, B.E. 2504 (1961)

This act aims to protect natural resources and environment within national park areas similar to that of the National Reserved Forest Act. However, national park is supposedly more protected than national reserved forest because the National Park Act does not allow any utilization within national park areas. The main objective of the act is to maintain the natural resources within National Parks intact for education and aesthetic interests of the public. Marine national parks and national parks along the coasts automatically protect mangrove forests. Presently, there are many marine and coastal national parks along the coasts of Thailand. Although strictly speaking, they are legally protected, there are still many illegal encroachments and utilisation in national parks. Examples include several illegal shrimp farms in Khao Sam Roi Yot National Park, in Prachuap-khirikhan province.

Wetlands situated within national parks are automatically protected. The national park can be established by royal decree. Currently, Thailand has established 102 national parks, which include 81 terrestrial national parks and 21 marine parks covering an area of 52,149.12 square kilometres equivalent to 9.82 percent of the total land area of the country. The government is preparing to establish another additional 36 national parks covering an area of 18,150.543 square kilometres (Royal Forest Department, 2001).

8. Town Planning Act, B.E. 2518 (1975)

This act has been revised three times, the third time in 1992. This act empowers a competent authority namely the Town and Country Planning Department, Ministry of the Interior, to classify an area as an industrial zone, commercial zone, residential zone, agricultural zone and so on. However, it should be noted that such zoning is based on environmental concerns and purposes.

Before designating town and country planning in any area, a public hearing shall be organised according to Article 19 of the act. All stakeholders in that area will attend the public hearing. In addition, every five years there will be an evaluation of such proclamation of town and country zoning for public evaluation pursuant to Article 26.

In coastal areas, the provincial authority can proclaim town and country planning within its territory. The provincial public works officer and the local government are the competent officials of this act.

9. Building Control Act, B.E. 2522 (1979)

The Minister of Interior executes this act. The act empowers the local government to be the competent officer of this act. The local government includes the Provincial Administrative Organization, Municipality, Tambol Administrative Organization, Bangkok Metropolitan, and Pattaya.

The Minister of Interior proclaims the ministerial regulation in any locality and the local government issues the by-law for its own purposes pursuant to the ministerial regulation. This act can be a useful legal instrument to control building in coastal areas.

10. Tambol Administrative Organization Act, B.E. 2537 (1994)

This act is also executed by the Ministry of Interior. The main objective of this act is to decentralise the administration to the sub-district level (Tambol). The Tambol Administrative Organization (TAO) committee is comprised of elected local people. The TAO has the duty and responsibility to conserve the natural resources within its territory, and also has the duty to formulate its annual development plan and issue regulations to direct activities within its territory.

The TAO is financed from two sources: (i) collecting taxes from activities within its territory, and (ii) annual budget provisions from the central government. The act stipulates that the fisheries tax, and other taxes generated from the utilisation of natural resources within its territory will be given to the TAO. For example, the Department of Fisheries currently collects a fisheries tax and gives such tax to the TAO. Likewise, Royal Forest Department collects entrance fees for national parks and gives such fees to the TAO.

In relation to wetland management, the TAO could conserve wetlands by establishing local committees to manage wetlands located in its territory. In addition, the TAO can also collect taxes from the utilisation of such wetlands. The TAO also can play an important role in community-based management of wetlands and other natural resources.

11. Provincial Administrative Organization Act, B.E. 2540 (1997)

After the enactment of the Tambol Administrative Organization Act, B.E. 2537 (1994), the Provincial Administrative Organization Act, B.E. 2540 (1997) was enacted to be compatible. This Act empowers the Provincial Administrative Organization (PAO) to formulate provincial development plans, coordinate and cooperate with TAOs, allocate budgets to TAOs, and to protect and conserve natural resources and environment in its territory.

The PAO can help conserve wetlands in coastal areas based on its development plans. As mentioned earlier, the Provincial Administrative Organization is authorized as the competent official of several laws such as the Building Control Act, B.E. 2522 (1979).

3.2 International Agreements Relevant to Wetland Management

Thailand is a contracting party to many international agreements relevant to wetland management such as the Ramsar Convention, CITES, Convention on Biological Diversity (CBD), World Heritage Convention. The details of them can be shown as follow:

- The Convention on Wetlands of International Importance, Especially as Waterfowl Habitat;
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
- The Convention Concerning the Protection of the World Cultural and Natural Heritage;
- The Convention on the Conservation of Migratory Species of Wild Animals;
- The UN Convention on the Law of the Sea, 1982 (UNCLOS);
- The Convention on Biological Diversity, 1992.

3.3 Review of Policies and Cabinet Resolutions on Wetland Management in Thailand

3.3.1 Policy Framework

- National Economic and Social Development Plan No. 9 (2002-2006);
- Wetland Policy and National Sub-Committee on Wetland Management (NCWM);
- Policies, Measures and Plans on Wetland Management for 1998-2002;
- Strategic Measures on Conservation of Wetlands of National and International Importance (Cabinet Resolution in August 1, 2000);
- The National Wetland Management Plan for 2003-2007.

3.3.2 Cabinet Resolutions Relevant to Coastal Wetland Management

There are many Cabinet Resolutions relevant to wetland management (focused on coastal area, mangrove and beaches) including:

3.3.2.1 On June 27, 1979, the Cabinet passed the resolution "the Recommendations of the National Mangrove Resources Committee on the Protection and Conservation of Mangrove Resources".

3.3.2.2 On August 19, 1980, the Cabinet passed the resolution "the Measures for Mangrove Exploitation".

3.3.2.3 On June 29, 1982, the Cabinet passed the resolution "the Measures for the Use of Mangrove Area by the Government Sector".

3.3.2.4 On May 1,1984, the Cabinet passed the resolution "the Recommendations from the 4th Seminar on Mangrove Ecosystems". The resolution includes three recommendations. The Cabinet has also empowered the Ministry of Agriculture and Cooperatives.

3.3.2.5 On December 15, 1987, the Cabinet passed the resolution "the Classification of Mangrove Area Utilization in Thailand".

The Cabinet has agreed to adopt the resolution proposed by the Ministry of Agriculture and Cooperatives concerning the classification of mangrove area utilisation in Thailand. The mangrove area utilisation in Thailand will be grouped as conservation and economic zone. Mangrove Economic Zone covers a total area of 3,297.70 square kilometres which is divided into two categories as zone A and B. Thus the classification of mangrove area utilization will be as: (i) mangrove conservation zone, (ii) mangrove economic zone A, and (iii) mangrove economic zone B.

3.3.2.6 On August 1, 1989, the Cabinet passed the resolution "the Reservation and Protection for Mangrove Areas in Surattani Province and Nakhon Si Thammarat province"

3.3.2.7 On February 6, 1990, the cabinet passed the resolution "Resolving the Mangrove Encroachment in Eastern Thailand".

3.3.2.8 On February 27, 1990, the Cabinet passed the resolution "the Recommendation From the 6th Seminar on Mangrove Ecosystem".

3.3.2.9 On June 4, 1991, the cabinet passed the resolution "the Urgent Measures for Coastal Resources Concerning Mangrove and Corals"

3.3.2.10 On July 23, 1991, the Cabinet passed the resolution "the Study Report on the Present Situation of Mangrove and Coral in Thailand".

3.3.2.11 On February 17, 1992, the Cabinet passed the resolution "the Resolution of the National Environment Board on the Policy, Measure and Working Plan for Coastal Resources and Environment Management of Thailand".

3.4 Review and Analysis of Institutional Framework

3.4.1 Government Line Agencies

According to the Constitution of 1997, the system of Thai government is organised at two levels as the central government and local government. The central government is the largest public sector body. Previously, the Thai government was made up of 15 Ministries. Recently, the Parliament has passed two bills, namely the Public Administration Act, B.E. 2545 (2002) and the Restructuring Governmental Ministries, Offices and Departments Act, B.E. 2545 (2002) which came into force on October 3, 2002. This has resulted in a restructuring of the government into 20 Ministries:

Office of the Prime Minister, Ministry of Defence, Ministry of Finance, Ministry of Foreign Affairs, Ministry of Education, Ministry of Culture, Ministry of Tourism and Sports, Ministry of Agriculture and Cooperatives, Ministry of Transportation, Ministry of Information and Communication Technology, Ministry of Commerce, Ministry of the Interior, Ministry of Justice, Ministry of Labour and Social Welfare, Ministry of Science and Technology, Ministry of Natural Resources and Environment, Ministry of Public Health, Ministry of Industries, Ministry of Energy Development and Ministry of Social Development and Human Security.

The policy of restructuring the government is to group the organisations with similar work functions into the same Ministry. However, many government organisations still want to retain authority, manpower and budget. Therefore, they retain some work functions. This has created duplication of work and overlapping power with the newly established government organisation. It will take time to resolve these issues.

Apart from the duplication of work and power among government agencies, there are also the legal problems.The government has to review and revise many laws that are implemented by the government agencies.

There are several Ministries involved in wetland management. They are:

3.4.1.1 Ministry of Natural Resources and Environment

The Ministry of Natural Resources and Environment (MONRE) was established by combining various departments of the Ministry of Agriculture and Cooperatives (MOAC) and Ministry of Science, Technology and Environment (MOSTE). The Ministry of Natural Resources and Environment is comprises of several departments that deal with wetlands. The core agencies are as follows:

Department of National Park, Wildlife and Flora
This Department is divided from former Royal Forest Department (RFD). It takes around 70 percent of the work from the former Royal Forest Department. This Department enforces two pieces of legislation, namely the Wildlife Reservation and Protection Act, B.E. 2535 (1992) and the National Park Act, B.E. 2504 (1961). All wetlands situated within protected areas such as national parks, wildlife sanctuary areas and non-hunting areas are under the responsibility of this department. This department is also responsible for all marine national parks .The Director General of the National Park, Wildlife and Flora Department is responsible for the protection and management of wetlands in protected and conservation areas, the protection of wetland flora and fauna and the principal training of wetland managers and rangers.

Department of Marine and Coastal Resources
This department was established by transferring some work dealing with marine and coastal resources from the Department of Fisheries, Department of Land Development, and Royal Forest Department. This department enforces several pieces of legislation such as the Fisheries Act, B.E. 2490 (1947), the Wildlife Reservation and Protection Act, B.E. 2535 (1992), the National Reserved Forest Act, B.E. 2507 (1964). All wetlands within mangrove forests and beaches are the responsibility this department.

Office of Natural Resources and Environment Policy and Planning
This office was formerly called the Office of Environmental Policy and Planning (OEPP). Under the new ministry, It has been renamed the Office of Natural Resources and Environment Policy and Planning (ONEP). Its tasks are the coordination and co-operation with numerous governmental and non-governmental agencies. This office is also responsible for the formulation of wetland policy and planning, both inland and coastal, the co-ordination of regulations, guidance, monitoring and evaluation of reports on the implementation of national policy on the management of wetlands. In addition, it also holds responsibility for the training programmes on wetlands management, the establishment of "environmentally protected areas", and the focal point for the Ramsar Convention in Thailand.

Department of Pollution Control
This department was transferred from the Ministry of Science, Technology and Environment. It is responsible for controlling pollution from all sources including inland and coastal. This department enforces the National Environmental Quality Promotion and Preservation Act, B.E. 2535 (1992). This department is also responsible for the determination of water quality standards for both freshwater and coastal water, establishing "pollution control areas", and monitoring, control and surveillance of water quality.

Department of Water Resources
This Agency (formerly called the Office of Rural Development) was transferred from the Ministry of the Interior and combined with some units of the Royal Irrigation Department and Office of the National Water Resources Policy Committee. This agency will have overall responsibilty for inland reservoir, wetlands and 25 river basins in Thailand.

3.4.1.2 Ministry of Agriculture and Cooperatives

Many tasks of the Ministry of Agriculture and Cooperatives have been transferred to the Ministry of Natural Resources and Environment especially natural resources and environment aspects. However, this transformation is not yet complete. This can be observed by the duplication of work and overlap of power between several agencies. It requires time to readjust. Currently, several agencies within the Ministry of Agriculture and Cooperatives still retain the work and legal power with regard to wetland management. The core agencies dealing with wetland management include the following:

Royal Forest Department
The Royal Forest Department (RFD) has transferred 70 percent of its work to the Department of National Park, Wildlife and Flora and 10 percent of its work on mangrove to the Department of Marine and Coastal Resources. Currently, it retains around 20 percent of work mainly outside protected areas. This department is responsibile for production forests and their influence on wetlands systems, and enforcement of the Forest Act, B.E. 2484 (1941) and the National Reserved Forest Act, B.E. 2507 (1964).

By the end of 2003, the government had proclaimed the Royal Decree to transfer RFD to the Ministry of Natural Resources and Environment. Currently, the Ministry of Natural Resources and Environment is working to resolve the overlap and duplication of authority, manpower and budget allocations between the Department of National Park, Wildlife and Flora and the Royal Forest Department.

Department of Fisheries
The Department of Fisheries (DOF) has the responsibility for aquatic species conservation and wetlands (as fish habitats) protection. It has transferred some work on marine and coastal resources to the Department of Marine and Coastal Resources. However, it still retains the same work on marine and coastal resources with it. Thus, there is a duplication of work and overlapping of legal power with the Department of Marine and Coastal Resources. This department enforces the Fisheries Act, B.E. 2490 (1947).

Department of Land Development
The Department of Land Development has the responsibility for technical guidance in the management of wetlands and the use of soil associated with the use of water. It provides the technical information on management of coastal wetlands.

Royal Irrigation Department
The Royal Irrigation Department has the responsibility to regulate the water utilisation, to provide water support to farmers and other water users and to construct the irrigation infrastructure.

3.4.1.3 Ministry of the Interior

This ministry has the responsibility for the co-ordination and guidance for provincial government and local government, which is responsible for activities related to planning, implementation and control of the wetland management at provincial and local levels. However, there is one agency dealing directly with the implementation of wetland management.

Department of Land
The Department of Land enforces the Land Code, B.E. 2497 which is responsible for directing the allocation of land for each individual according to the national and regional land use plans and legal requirements. The issuance of land title deeds in coastal areas must be controlled.

3.4.1.4 Office of the Prime Minister

National Economic and Social Development Office
This office is responsible for co-ordinating and planning government programmes and finance concerned with the management of the wetlands and their resources.

3.4.1.5 Ministry of Tourism and Sport

Tourism Authority of Thailand (TAT)
This office is responsible for developing tourism in wetlands, including coastal wetlands such as mangrove forests, beaches, etc. It also formulates the National Tourism Plan, promotes tourism in coastal areas, enhances eco-tourism for coastal areas.

3.4.1.6 Ministry of Public Health

This ministry is responsible for establishing the standards of public hygiene closely associated with water quality and waste disposal. Also responsible for the raw materials, including water, their processing and quality control procedures used for manufacturing medicine.

3.4.1.7 Ministry of Industries

This ministry is responsible for providing information on quality standards of raw materials and regulating the water discharged from the industries to wetland resources.

3.4.1.8 Ministry of Transportation

Marine Department
This department is established by the combination of the Harbour Department and the Office of Mercantile Marine. This department enforces the Navigation in Thai Waters Act, B.E. 2456. It is responsible for regulating navigation in Thai waters and protecting the watercourses. Therefore, by virtue of the act this department also regulates construction in coastal areas, and controls the disposal of waste into coastal area.

3.4.2 Local Government Organization

The local administrative system of Thailand can be classified as: (i) Provincial Administrative Organization (PAO), and (ii) Tambol Administrative Organization (TAO).

3.4.2.1 Provincial Administrative Organization (PAO)

The Provincial Administrative Organization (PAO) is established by the Provincial Administrative Organization Act, B.E. 2540. Every province has one Provincial Administrative Organization that has the responsibilities to co-ordinate with other governmental organisation and other local administrative organisation such as Tambol Administrative Organization (TAO). PAO also has the duty to protect and conserve natural resources and environment in its territory. In this respect, PAO is also responsible for protecting and conserving wetlands in its territory.

3.4.2.2 Tambol Administrative Organization (TAO)

The Tambol Administrative Organization (TAO) is established by the Tambol Administrative Organization Act, B.E. 2537. It is also responsible for wetland management in its territory. Currently, TAO plays an essential role in protecting and conserving wetlands because the people residing in the village usually utilise wetlands for their livelihood. Therefore, the loss of wetlands would have a direct effect on their quality of life.

Weaknesses
Within its legal framework, Thailand has many pieces of legislation protecting wetlands. The legal mechanism for protecting wetlands could be more effectively applied by establishing protected areas such as National Parks, wildlife sanctuary areas, non-hunting areas, aquatic sanctuary areas, and environmentally protected areas according to the management plan and relevant legislation. Thailand has adequate laws in place for establishing protected areas. Furthermore, many pieces of law also protect endangered species within wetlands and protected areas. And, the laws restrict some activities which may cause degradation to wetlands.

The constraints of legal protection, however, arise from fragmented laws, overlapping jurisdiction in some areas, ineffective law enforcement, lack of compliance, and centralised power. Although wetlands within the protected area system are considered well protected and remain in good

condition, the government should establish many more coastal protected areas, set the programme to enhance compliance, allocate sufficient budget resources for law enforcement, and increase public participation for wetland management and conservation.

Within its institutional framework, the policy of the present government to reform governmental agencies came into effect on October 3, 2002. However, there are still many problems among various ministries, especially ministries involved in natural resources and environment. The two core Ministries are the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Cooperatives. Several departments under these two ministries still duplicate work, have unclear duties and authority, overlapping authorities, and lack of co-ordination and co-operation. In fact, the old ministries and departments have tendency to retain their powers and budget, and do not want to transfer them to other ministries.Therefore, there is an urgent need for the government to consider additional changes in its institutional framework.

Suggestions

Within the legal framework, the government should speed up its review and make any necessary changes in the legal framework to accommodate the implementation of wetland management and law enforcement by various government agencies. While the process of amending laws in Thailand usually takes long time, this particular legal review should take priority. With regard to wetland conservation, there will be a strong link to institutional arrangement of governmental organisation. Therefore, the mandate and responsibilities of government agencies should be made clear first. Then, the legal framework can be reviewed and revised accordingly. Furthermore, the manpower and budget could be more effectively allocated with a clear mandate. The fragmentation of laws is not harmful as long as the laws are not contradictory. Likewise, overlapping duties and power of various governmental agencies can tolerated if there is good inter-agency coordination and co-operation.

Constitutionally, the management of coastal wetlands is the responsibility of the government and should be governed by laws and regulations of various governmental agencies. Basically, wetlands within the protected area system are protected by laws and managed by government. However, wetlands outside protected areas are normally managed by communities or private enterprises. In this connection, Tambol Administrative Organization (TAO) could play an essential role in strengthening local community participation in managing and conserving coastal wetlands. Moreover, the establishment of community-based management also could contribute to the effective coastal wetland management. In this respect, TAO can issue regulations compatible with its needs. Apart from that, local communities can also set the rules as part of the social order within its locality to manage and conserve coastal wetlands.

4. BIODIVERSITY IN NOTABLE WETLANDS OF THE GULF OF THAILAND

Literature reviews were carried out for 13 notable wetlands in the Gulf of Thailand. The review further confirmed these13 wetlands as important habitat for wildlife, particularly globally threatened species as identified by the IUCN Red List. Of the total 48 threatened species (that include 34 species of birds, 7 species of mammals, 3 species of fish and 4 species of vascular plants) of flora and fauna found in these wetlands, three species were classified as critically endangered, 5 species was listed as endangered, 16 species were categorized as vulnerable while 24 species were classified as near threatened.

One wetland site was found to support threatened species of all four IUCN Red List categories and the highest number of threatened species. This was Pak Panang Bay with 19 threatened species of Flora and Fauna (three critically endangered, one endangered, seven vulnerable and eight near threatened species). Khao Sam Roi Yot National Park was found to contain no critically endangered species but, nevertheless, supports 18 other threatened species (two endangered, eight vulnerable and eight near threatened species), and Thale Noi Wildlife Non-hunting Area, where Thailand's first Ramsar site is located, was found to contain no critically endangered species and endangered species but, nevertheless, supports 16 other threatened species (5 vulnerable and 11 near threatened species).

In addition to accommodating threatened species, these 13 wetlands were found to play an important role in providing shelters and feeding sites for many migratory birds. Up to only 178 migratory bird species were recorded in the wetlands.

The largest number of migratory bird species were recorded in Khao Sam Roi Yot National Park, with 154 species. In addition, 144 species of resident birds and 17 species of birds with both residential and migratory populations, were also found in the national park. Common migratory birds found in the 13 wetlands include Common Kingfisher (*Alcedo atthis*), Barn Swallow (*Hirundo rustica*), Common Sandpiper (*Actitis hypoleucos*) and Chinese Pond Heron (*Ardeola bacchus*). Phru To Daeng Wildlife Sanctuary was identified as the site with the highest number of resident bird species (at least 164 species). Therefore, it could be concluded that each wetland is important for different groups of animal and plant species.

4.1.1 Birds

Of the approximately 978 species of birds found in Thailand (Bird Conservation Society, 2004), no less than 486 species were recorded in the 13 wetlands, accounting for 49.69 percent of the total. These include 178 migratory species, 289 resident species and 19 species of partially migrating birds.

Of 486 bird species, 34 species were identified under IUCN Red List. 3 endangered species were identified, which are, Greater Adjutant (*Leptoptilos dubius*) of Khao Sam Roi Yot National Park, Nordmann's Greenshank (*Tringa guttifer*) of Khao Sam Roi Yot National Park, Thale Sap Wildlife Non-hunting Area and Pattani Bay and Black-faced Spoonbill (*Platalea minor*) of Pattani Bay.

Seven species of birds were found distributed in 12 of the 13 wetlands. Five of them, which are Greater Coucal (*Centropus sinensis*), Spotted Dove (*Streptopelia chinensis*), Scarlet-backed Flowerpecker (*Dicaeum cruentatum*), Common Myna (*Acridotheres tristi*) and Large-billed Crow (*Corvus macrorhynchos*) were recorded at every site except Don Hoi Lot, while another two species, Collared Kingfisher (*Halcyon chloris*) and Brahminy Kite (*Haliastur indus*), were documented in all the sites except Phru Kan Tulee.

4.1.2 Mammals

Of the approximately 292 mammal species found in the country (OEPP, 2002b), at least 100 species were documented in the wetlands, accounting for 34.24 percent.

Otter Civet (*Cynogale bennetti*) of the Phru To Daeng Wildlife Sanctuary was the only endangered species found, while four other species were identified as vulnerable. These species are Pig-tailed Macaque (*Macaca nemestrina*) which was found in the Phru To Daeng Wildlife Sanctuary, Thung Kha-Savi Bay, Pak Phanang Bay and Phru Kan Tulee; Smooth-coated Otter (*Lutrogale perspicillata*) which was documented at the Thale Noi Wildlife Non-hunting Area, Phru To Daeng Wildlife Sanctuary and Pak Phanang Bay; Stump-tail Maeaque (*Macaca arctoides*) of the Mu Koh Chang National Park and Fishing Cat (*Prionailurus viverrinus*) of the Thale Noi Wildlife Non-hunting Area. Two near threatened species were also identified.

From a study of nine sites (Thale Noi Wildlife Non-hunting Area, Mu Koh Chang, Khao Sam Roi Yot National Park, Phru To Daeng Wildlife Sanctuary, Mu Koh Ang Thong National Park, Welu Estuary, Thung Kha-Savi Bay, Pak Phanang Bay and Phru Kan Tulee), Crab-eating Macaque (*Macaca fascicularis*) was identified as the most common found to be present in eight sites with the Mu Koh Chang National Park as the exception.

4.1.3 Reptiles

Of the approximately 318 reptile species found in the country (OEPP, 2002b), at least 101 species were documented in the wetlands, accounting for 31.76 percent.

At present, the status of reptiles in Thailand is categorized at national level according to OEPP (1997). 2 endangered species were recorded in the wetlands, including the Green Turtle (*Chelonia mydas*) and Hawksbill turtle (*Eretmochelys imbricata*) which were found in the Mu Koh Ang Thong National Park.

4.1.4 Amphibians

Of the approximately 122 amphibian species found in the country (OEPP, 2002b), at least 44 species were documented in the wetlands, accounting for 36.06 percent from a study of nine sites.

At present, the status of amphibians in Thailand is categorized at national level according to the OEPP (1997). Two vulnerable species were recorded in the wetlands.

4.1.5 Fish

Of the approximately 2,279 species of fish found in the country (OEPP, 1997), at least 454 species were documented in the wetlands, accounting for 19.92 percent.

A couple of vulnerable species were recorded in the wetlands, including Zebra Shark (*Stegostoma fasciatum*) found in the Thung Kha Bay-Savi Bay and Seahorse (*Hippocampus kuda*) in the Welu River Estuary. Near threatened species include Bluespotted Ribbontail Ray (*Taeniura lymna*) found in the Mu Koh Ang Thong National Park. Species richness was found to be highest at the Pattani Bay with 215 species.

4.1.6 Plants

Of the approximately 10,000-15,000 vascular plant species (Tree, mangrove plant, aquatic plant) found in the country (Pengklai, 2003), at least 517 species were documented in the wetlands.

All three critically endangered species, *Dipterocarpus grandiflorus*, *Parashorea stellata*, *Shorea farinosa* and one vulnerable species, *Shorea leprosula* were found in the Pak Phanang Bay whereas the species richness was found to be highest at the Thale Noi Wildlife Non-hunting Area with 260 species.

4.1.7 Seaweed and Seagrasses

Of the approximately 63 species of marine algae found in the country (Lewmanomont and Ogawa, 1995), at least nine species were documented in the wetlands, accounting for 14.28 percent and out of the 12 species of seagrasses found in the country, five species were documented in the Pattani Bay, accounting for 41.66 percent.

4.1.8 Plankton

At least 266 phytoplankton species were recorded in the wetlands including the Welu River Estuary, Ban Don Bay, Khao Sam Roi Yot National Park, Thale Noi Wildlife Non-hunting Area, Phru To Daeng Wildlife Sanctuary, Thung Kha-Savi Bay, Pattani Bay and Pak Phanang Bay. 94 zooplankton species were documented in the Thale Noi Wildlife Non-hunting Area, Pattani, Phru To Daeng Wildlife Sanctuary, Thung Kha-Savi Bay and Pak Phanang Bay.

Phytoplanktons were categorized in seven families which were Cyanophyceae (26 species), Chlorophyceae (83 species), Chrysophyceae (four species), Dictyochophyceae (two species), Euglenophyceae (six species), Bacillariophyceae (120 species), and Dinophyceae (25 species). Species richness of phytoplanktons was found to be highest at the Welu River Estuary with 103 species.

Zooplanktons were classified in 14 phylum which were Protozoa (18 species), Rotifera (13 species), Cnidaria (one species), Ctenophora (one species), Chaetognatha (one species), Bryozoa (one species), Platyhelminthes (one species), Nematoda (one species), Annelida (two species), Arthropada (36 species), Mollusca (two species), Cirripedia (two species), Echinodermata (three species), and Chordata (three species). Species richness of zooplanktons was found to be highest at the Pak Phanang Bay with 69 species.

4.1.9 Insects

Of the approximately 3,867 insect species found in the country (Hutacharern and Tubtim, 1995), at least 74 species were documented in the wetlands, accounting for 1.91 percent. Species richness of insects was found to be highest at the Thung Kha-Savi Bay with 37 species while the lowest was recorded at the Thale Noi Wildlife Non-hunting Area with 21 species.

Other groups of organisms

Of the approximately 861 decapod (shrimp, lobster and crab) species found in the country (Naiyanetr, 1998), at least 133 species were documented in the wetlands, accounting for 7.66 percent. Species richness of decapods was found to be highest at the Thung Kha-Savi Bay with 78 species.

Of the approximately 534 mollusc (shellfish and squid or cuttlefish) species found in the country (Suvatti,1938), at least 36 species were documented in the wetlands, accounting for 6.74 percent. Species richness of mollusc was found to be highest at the Pattani Bay with 14 species.

At least 173 benthos species were documented in the wetlands of Pattani Bay, Phru To Daeng Wildlife Sanctuary and at Pak Phanang Bay. Species richness of benthos was found to be highest at the Pattani Bay with 149 species.

At least 61 species of invertebrates were documented in only three wetlands: Don Hoi Lot, Thung Kha-Savi Bay and Pattani Bay. Species richness of benthos was found to be highest at the Pattani Bay with 50 species.

Table 2 illustrates Number of Flora and Fauna Found in each of the 13 Wetlands Identified; Table 3 shows Number of Flora and Fauna Found in 13 Wetlands and Identified as Globally Threatened under IUCN Red List.Table 4 shows types of Bird Species Found in 13 Wetland sites Identified.

Table 2 Number of Flora and Fauna Found in each of the 13 Wetlands Identified.

No.	Groups	Welu River Estuary	Don Hoi Lot	Koh Chang National Park	Ban Don Bay	Khao Sam Roi Yot National Park	Thale Noi Wildlife Non-hunting Area	Thale sap Wildlife Non-hunting Area	Phru To Daeng Wildlife Sanctuary	Mu Koh Ang Thong National Park	Thung Kha Bay-Savi Bay	Pattani Bay	Pak Phanang Bay	Phru Kan Tulee	Total number of flora and fauna in 13 wetlands
1	Birds	74[25, 33]	18[3, 4]	72[7]	46[33]	315[6]	202[2]	143[17]	194[20]	53[22]	115[26, 33]	93[33]	226[30, 33]	47[32]	486
2	Mammal	8[25]	-	22[7]	-	14[5]	7[2]	-	61[20]	16[22]	19[26]	-	53[30]	16[32]	100
3	Reptiles	1[25]	-	30[7]	-	35[6]	28[2]	-	50[20]	14[22]	29[26]	-	52[30]	25[32]	101
4	Amphibians	-	-	12[7]	-	21[6]	12[2]	-	17[20]	5[22]	7[26]	-	20[30]	7[32]	36
5	Fishes	52[33]	3[3]	11[7]	35[33]	34[6]	30[2]	106[16, 19]	42[21]	75[22]	86[26, 33]	215[8, 9, 33]	140[29, 30, 33]	29[32]	454
6	Plants	60[33]	-	-	39[33]	134[6]	260[2]	25[15, 16]	14[21]	18[33]	43[26, 33]	95[12, 33]	122[30, 31, 33]	35[32]	517
7	Seaweeds and Seagrasses	-	-	-	-	-	-	3[16]	-	-	-	13[8, 13]	-	-	14
8	Phytoplankton	103[24]	-	-	69[23]	17[5]	65[1]	-	35[21]	-	14[26, 28]	73[10]	91[30]	-	266
9	Zooplankton	-	-	-	-	-	27[1]		18[21]	-	55[26, 28]	41[8, 11, 14]	69[30]	-	94
10	Insects	-	-	-	-	30[6]	-	21[17, 18]	-	-	37[26]	-	-	-	72
11	Decapods (Shrimp, Lobster and Crab)	25[33]	12[3]	-	9[33]	20[6]	2[2]	-	-	-	78[26]	36[9, 33]	42[29, 30, 33]	-	133
12	Molluscs (Shellfish and Squids)	-	10[3]	-	-	4[6]	3[2]	-	-	-	12[26, 27]	14[9, 33]	2[29, 30]	-	36
13	Benthos	-	-	-	-	-	-	-	4[21]	-	-	149[8, 14]	20[30]	-	173
14	Invertebrates	-	5[3]	-	-	-	-	-	-	-	6[26]	50[8]	-	-	61

Sources of Data

[1] *OEPP (1999c)*
[2] *OEPP. (2000)*
[3] *Sukprapapond (1994)*
[4] *OEPP (1996b)*
[5] *OEPP (1996a)*
[6] *OEPP (1999b)*
[7] *Forest Land Resources Division (n.d.a)*
[8] *Intarasuk (1999)*
[9] *Haochareon et al. (1997)*
[10] *Leangtuwapraneet et al. (1998a)*
[11] *Leangtuwapraneet et al. (1998b)*
[12] *Chanchula.andBenjama (1995)*
[13] *Reongchoy and Leangtuwapraneet (1998)*
[14] *Intanai (1993)*
[15] *Atanmas and Jitpukdee (n.d.)*
[16] *Leknim (1997)*
[17] *Thailand Institute of Scientific and Technological Research (1982)*
[18] *Wattasit and Chuseang (1987)*
[19] *Chunhapran and Sritakol (1997)*
[20] *Pitayakajornwut (editor) (1996)*
[21] *Tancharanukit and Wongrat (1990)*
[22] *Forest Land Resources Division n.d.b)*
[23] *La-ongsiriwong et al. (1997)*
[24] *Sungjampa (2003)*
[25] *Kasetsart University (2000)*
[26] *Jun-aad et al. (n.d.)*
[27] *Awakiet (1983)*
[28] *Sumpawapol and Intara-augsorn (2001)*
[29] *Sritakol et al. (2003)*
[30] *Royal Irrigation Department (1996)*
[31] *Kaewwongsri and Bumrungrat 1997)*
[32] *OEPP (2002a)*
[33] *OEPP (1999a)*
[34] *Data Updated and revised by Sonjai Hawanon, Sanid Aksornkaew and Nopparat Bumroongrug (2004)*

Table 3 Number of Flora and Fauna Found in 13 Wetlands and Identified as Globally Threatened under IUCN Red List.

Wetlands	Birds				Mammals				Fish				Plant				Subtotal				Total
	CE	EN	VU	NT	CE	EN	VU	NT	CE	EN	VU	NT	CE	EN	VU	NT	CE	EN	VU	NT	
Welu River Estuary	-	-	1	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	2	1	3
Don Hoi Lot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wetlands in Mu Koh Chang National Park	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	1	1	2
Ban Don Bay	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3
Wetlands in Khao Sam Roi Yot National Park	-	2	7	8	-	-	-	1	-	-	-	-	-	-	-	-	-	2	7	9	18
Wetlands in Thale Noi Wildlife Non-hunting Area	-	-	3	6	-	-	2	1	-	-	-	-	-	-	-	-	-	-	5	11	16
Wetlands in Thale Sap Wildlife Non-hunting Area	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	3
Phru To Daeng Wildlife Sanctuary	-	-	2	7	-	1	2	2	-	-	-	-	-	-	-	-	-	1	4	9	14
Wetlands in Mu Koh Ang Thong National Park	-	-	-	1	-	-	2	1	-	-	-	1	-	-	-	-	-	-	2	3	5
Thung Kha Bay-Savi Bay	-	-	1	3	-	-	1	1	-	-	1	-	-	-	-	-	-	-	3	4	7
Pattani Bay	-	2	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	3	6
Pak Phanang Bay	-	-	3	6	-	-	4	2	-	-	-	-	3	1		-	3	1	7	8	19
Phru Kan Tulee	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	1	1	2
Total of Flora and Fauna for each Group	**-**	**3**	**10**	**21**	**-**	**1**	**4**	**2**	**-**	**-**	**2**	**1**	**3**	**1**	**-**	**-**	**3**	**5**	**16**	**24**	**48**
Total Grand	**34**				**7**				**3**				**4**				**48**				

Remark : CE = Critically Endangered EN = Endangered
VU = Vulnerable NT = Near Threatened

Table 4 Types of Bird Species Found in 13 Wetland sites Identified.

Wetlands	Types			Total of Bird species
	Migratory bird (species)	Resident bird (species)	Migratory and Resident bird (species)	
Welu River Estuary	21	48	5	74
Wetlands in Thale Noi Wildlife Non-hunting Area	60	128	14	202
Don Hoi Lot	12	6	0	18
Wetlands in Khao Sam Roi Yot National Park	154	144	17	315
Wetlands in Mu Koh Chang National Park	10	56	6	72
Pattani Bay	43	46	4	93
Wetlands in Thale sap Wildlife Non-hunting Area	63	72	8	143
Phru To Daeng Wildlife Sanctuary	21	164	9	194
Wetlands in Mu Koh Ang Thong National Park	13	40	0	53
Ban Don Bay	12	32	2	46
Thung Kha Bay-Savi Bay	33	74	8	115
Pak Phanang Bay	84	127	15	226
Phru Kan Tulee	6	37	4	47

5. ECONOMIC VALUATION OF WETLANDS

5.1 Economic Valuation of Wetlands

The identified wetlands under the UNEP-GEF project area are 13 sites (Table 5). They are Wetlands in Thale Noi Wildlife Non-hunting Area, Don Hoi Lot, Wetland in Khao Sam Roi Yot National Park, Wetland in Mu Koh Chang National Park, Pattani Bay, Wetland in Thale Sap Non-hunting Area, Saiburi River, Wetland in Phru To Daeng Wildlife Sanctuary, Wetland in Mu Koh Ang Thong National Park, Ban Don Bay, Welu River Estuary, Thung Kha Bay-Savi Bay, Pak Phanang Bay and Phru Kan Tulee.

The main direct use of wetland type "lagoon" is for fishery, aquaculture, agriculture, aquatic plant, water supply, transportation, recreational and tourism purposes, as well as education and research (8% each).

Table 5 Percentage of 13 Wetlands Classified by Type and Direct Use Value.

Wetland Type	Direct Use Value																			
	Fishery		Aquacul-ture		Agriculture		Aquatic Plant		Fuel wood and Timber		Herbal medicine		Water supply		Transport-ation		Recreation/ Tourism		Education/ Research	
	Site	%	Site	%	Site	%	Site	%	Site	%	Site	%	Site	%	Site	%	Site	%	Site	%
Lagoon	1	7.69	1	7.69	1	7.69	1	7.69	0	0	0	0	1	7.69	1	7.69	1	7.69	1	7.69
Tidal Flat	7	53.85	6	46.15	6	46.15	3	23.07	8	61.54	1	7.69	5	38.46	4	30.77	8	61.54	7	53.85
Peat and swamp	3	23.07	2	15.38	3	23.07	2	15.38	3	23.07	2	15.38	3	23.07	1	0	3	23.07	3	23.07
Estuary	5	38.46	6	46.15	6	46.15	3	23.07	6	46.15	0	0	5	38.46	4	30.77	6	46.15	6	46.15
Mangrove	6	46.15	5	38.46	6	46.15	3	23.07	7	53.85	1	7.69	5	38.46	3	23.07	7	53.85	7	53.85
Others	2	15.38	2	15.38	2	15.38	2	15.38	2	15.38	1	7.69	2	15.38	1	7.69	2	15.38	2	15.38
Total	24		22		24		14		26		5		21		14		27		26	

Note: percentage calculated from 13 Wetlands

The main direct use of wetland type "tidal flat" is for recreation and tourism (62%), fuel wood and timber (62%), followed by fishery (54%) as well as education and research (54%), aquaculture (46%), agriculture (46%), water supply (38%), transportation (31%) and aquatic (23%) respectively.

The main direct use of wetland type "peat and swamp" is for fishery, agriculture, fuel wood and timber, water supply, recreation and tourism as well as education and research (23% each).

The main direct use of wetland type "estuary" is for aquaculture; agriculture, fuel wood and timber, recreation and tourism as well as education and research (46% each) followed by fishery and water supply (38% each).

When considering the indirect use of the selected wetlands under the UNEP-GEF, it is found that all wetlands under the project area provide the indirect use value of flood control. The other indirect use values are nutrient retention (85%), groundwater recharge (85%), shoreline stabilization (69%), and salt water intrusion (46%).

5.2 Potential Economic Use of Wetlands under the Project Area

The past and current status of the use of wetlands would be useful to estimate the future potential use on those pieces of wetlands. Based on the available secondary data, a summary of impact causes and effects are formulated. When looking into the impact effects occurred from the use of wetlands, the main effect is the impact to the environment. The past use of wetlands has affected the deterioration of environment and ecosystems. In addition, damage to wildlife and plants were found. Reduction of species of birds and fish were also reported. Forestland degradation was also noticed.

Ecotourism is reported as a future potential use of some wetlands such as wetland in Thale Noi Wildlife Non-hunting Area. Fishery, aquaculture and agricultural activities are found to have future potential utilization in many wetlands such as wetlands in Phru To Daeng Wildlife Sanctuary (Phru To Daeng Swamp Forest). However, the benefits from the economic use of wetlands need to be

quantified in order to compare with the alternative options. Pearce and Turner (1990) stated that given the general, on-going loss of wetlands and the uncertainties surrounding the precise magnitude and significance of wetland services and functions, a comparison between the development benefits for the use of wetlands and the preservation benefits derived from wetland conservation is required. A safe minimum standard rule for this comparison is available.

In conclusion, the past and current use of wetlands in the Gulf of Thailand has produced environmental degradation. Hence, policy related to environmental improvement is required not only for the conservation but also for the preservation of future use. Nevertheless, according to the on-going development projects in this area, a wise or sustainable use of wetlands under the project area must be encouraged.

6. PROPOSED STRATEGIC PLAN FOR WETLAND MANAGEMENT IN THE GULF OF THAILAND

To solve these problems, proposed strategic plan which is consisted of vision, missions, strategic goals, objectives, strategies and measures are needed to be set up as follows;

6.1 Vision

"Wetlands in the Gulf of Thailand were preserved, conserved and rehabiltated by integrated wetland management with participation of all stakeholders, in order to enable sustainable use of the ecosystem".

6.2 Missions

1. Preserving, conserving and rehabilitating natural resources and environments of wetlands in the Gulf of Thailand.
2. Enabling sustainable utilization of natural resources of wetlands in the Gulf of Thailand in accordance to their carrying capacities.
3. Promoting the responsible agencies in order to reduce conflicts derived from utilisation of natural resources in wetlands among stakeholders.

6.3 Strategic goals

1. Formulation of a plan on integrated management of important wetlands with participatory processes.
2. Establishment of responsible agencies and community networks for wetland conservation.
3. Study and Prioritization of wetlands in the Gulf of Thailand in accordance to their potential and conditions.

6.4 Objectives

1. To develop programs to strengthen knowledge and understanding of central and local administration as well as communities on conservation and wise use of wetlands.
2. To promote public participation in planning for preservation, conservation and sustainable utilisation of wetlands.
3. To support establishment of responsible agencies and community networks for wetland conservation and utilisation.
4. To develop and promote establishment of wetland information center in pilot area to demonstrate, provide training on, and exchange knowledge on wetland management to relevant personnel for further adoption in the field.
5. To revise, assess and re-prioritise different types of wetlands in the Gulf of Thailand, in order to obtain baseline information for administering wetland management.
6. To develop systems for participatory monitoring and assessment of wetland management, with mechanisms for information dissemination.

6.5 Strategies and measures

The above objectives are to be realized with the following 5 strategies.

Strategy 1:
Preservation, Conservation and Rehabilitation of Wetland Ecosystem with participation process, consisting of the following measures.

1.1 Formulation of management plans for wetlands of different significance in order to enable effective conservation and wise use: Pilot sites are to be selected to represent each type of wetland in undertaking management actions. These include identification of their actual boundaries and buffer zones, appropriate land-use zoning in the wetlands and adjacent areas and regulating certain potentially problematic activities, like eco-tourism, with community participation.

1.2 Promoting traditional management, conservation, rehabilitation and sustainable use of freshwater wetland ecosystems of local communities: Swamp forests have continued to be lost through conversion of the forests into farmlands, sedimentation, and forest fire during dry seasons. To rectify this situation, community operated pilot projects on traditional wetland management would reveal effective and practical means for conservation of the freshwater wetlands. Activities that generate income from appropriate use of wetland resources, are also to be promoted.

1.3 Promoting traditional management, conservation and rehabilitation of coastal wetland ecosystems of local communities: Coastal wetlands, including rocky shores, beaches, mudflats and saltwater lakes, have deteriorated due to the increase in tourists' waste and wastewater discharge from upstream areas. Development of community operated pilot projects on wetland management and promotion of environmentally sound utilisation of wetland resources among coastal communities, are to be implemented to solve this problem.

1.4 Participatory monitoring and inspection of wetland utilisation: Wetland protection volunteers are to be organised to monitor, inspect and assess whether wetland conservation is carried out in accordance to the existing policies, measures and plans. The volunteers also will be responsible for coordinating management as well as conducting monitoring and surveillance of potentially harmful activities in the wetlands.

Strategy 2:
Building Awareness on Importance and Values of Wetlands. Enhancing knowledge and awareness of the general public and those involved in wetland management from both public and private sector at national and local levels, on value and importance of wetlands is urgently needed. This can be achieved with the following measures.

2.1 Campaigning for better awareness and wider understanding of value and importance of wetlands and necessity of their sustainable use: The campaign is to be conducted with continuous public relations activities at national and local levels. These activities would include publication of newsletters, pamphlets, posters and other user-friendly documents; organising exhibitions, radio/television programmes; producing documentaries and delivering updated news and information through the Internet. Additional campaigning activities are to be organised for the youth, such as slogans, painting and photo competitions and youth camps.

2.2 Establishing natural study centres and providing non-formal education at importance wetlands: Natural study centres, are to be established at a number of important wetlands to enhance capacity in information dissemination to students and interested public. The centres are to be capable of producing their own publications and equipped with several learning facilities such as natural trails, training rooms and exhibition halls. It is also expected that the centres could produce their own experts and conduct public relations activities with local communities.

Strategy 3:
Strengthening capacity of institutions and their personnel on conservation and sustainable use of wetlands. With the current involvement on wetland management by various groups including public officials at central and local levels, academics, local communities and NGOs, strengthening of their

capacity, including enhancing multi-discipline knowledge on wetlands, is crucial to ensure a common understanding and to reduce conflicts in management. This can be realized with the following measures.

3.1 Promoting creation of networks for exchanging knowledge, news and information between public agencies and communities and between communities themselves: This is to be achieved by informing the public of the government's policies and plans at both regional and local levels, and through their participation in review and assessment of wetland conservation. Networks for exchanging knowledge on conservation and sustainable use of wetlands among community leaders between those in the same province and between provinces are also to be organised.

3.2 Organising training courses, meetings and seminars on wetland conservation and regulations related to wetlands: Training is to be provided for public servants at central and local levels, those from private sector and communities, focusing initially on wetlands of international and national importance.

3.3 Develop curricula on wetland management: This includes development of curricula on wetland management for local schools, with the primary aim of enhancing awareness on importance of wetlands. Other associated activities are to be consisted of organising training and field trips for personnel to built their skills in providing formal and non-formal education on wetlands and in working with public and private organisations (from both central and local level) on wetland management activities. Student and teacher handbooks on wetland conservation are also to be published.

Strategy 4:
Building better databases for wetland management with research and studies, consisting of the following measures.

4.1 Promoting and supporting surveys, studies and research on status and utilisation of wetlands: These research and studies are aimed to classify and formulate management plans for wetlands in the Gulf of Thailand as well as to prioritize, revise and reorganise geographical information systems (GISs) of the wetlands.

4.2 Gathering ecological and natural resources information of important wetlands in each category: This action, including waterfowl surveys in important wetlands, assessment of fish status, inventories of plant and animal species in important swamp forests and studies of invasive alien species, is to be conducted to review the conservation of each wetland site.

4.3 Conducting feasibility studies on possible revision of existing laws and regulations related to wetland management plans: These studies could reveal more effective means for wetland protection under the exiting administrative frameworks.

4.4 Supporting economic valuation of wetlands: Determination of actual value is to be conducted for wetlands at all levels.

4.5 Promoting establishment of networks among wetland researchers. Networks are to be created to enable exchange of information between organisations involved in wetland management, domestically and internationally. A centre for co-ordinating database networks may also be established to facilitate information exchange between networks.

Strategy 5:
Promoting international co-operation on conservation and sustainable use of wetlands, with the following measures.

5.1 Promoting co-operation with international organisations: This includes exchanging news, information and experience on conservation and sustainable use of wetlands through networks and web sites among groups of countries such as those in South China Sea and Mekong River.

5.2 Promoting national profile on wetland conservation in global forums: National profile on conservation can be enhanced by organising international seminars, participating in international meetings and arranging field trips overseas.

6.6 Indicators of Success

1. Formulation of conservation and sustainable use plans for at least 5 important wetlands.
2. Substantial dissemination of technical information on wetlands, including inclusion of wetland contents in school curricula.
3. Establishment of at least 5 community networks for conservation and sustainable use of wetlands.
4. Establishment of at least one wetland information center in order to provide systems for monitoring and assessing wetlands in the Gulf of Thailand.
5. Completion of survey, review and assessment of wetlands situation in the Gulf of Thailand
6. Prioritisation of wetlands in the Gulf of Thailand and a list of potential inductees in the Ramsar Convention's list of wetlands of international importance (Ramsar site).

6.7 Processes for ensuring successful adoption of the proposed action plan

1. Creating understanding about work plans, measures and projects of the action plan among relevant organisations.
2. Supporting participation of local administrations, such as provincial committees, in implementing activities with communities.
3. The National Committee on Wetland Management, under the National Environment Board, becoming a focal point in making policies on preservation, conservation and utilisation of natural resources and environments in wetlands.

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NATIONAL REPORT

on

Wetlands in the South China Sea

VIET NAM

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1. INTRODUTION

Viet Nam is situated in a central position within the Southeast Asia region. Mainland Viet Nam is located between the latitudes of 23°22'N in the Dong Van Highlands (Lung Cu Commune, Ha Giang Province) and 8°37'30" N in the Ca Mau Cape; longitudinally from 102°10'E at Mount Pulasan (A Pa Chai Commune, Lai Chau Province) and 109°24'E at the Hon Gom Peninsula (Khanh Hoa Province). The coastal co-ordinates have not been precisely determined because there still have been no officially agreed and ratified agreements between the countries lying around the East Sea (South China Sea). The mainland surface area is approximately 330,991km^2, while the territorial waters and economic executive zones cover an area of approximately 1,000,000km^2.

2. COASTAL WETLANDS AND DISTRIBUTION

2.1 Estuaries

Estuarine areas are widely distributed throughout the coastline of Viet Nam from the north to the south, and include more than 100 large river estuaries. On average, for every 20km of coastline there is an estuary (Table 1). They are dynamic entities, continually changing and differing from one another in their nature and evolutionary pathways.

The characteristics distinguishing estuarine areas from coastal zones are the prevailing geomorphologic processes at work. The formation of estuarine areas relies upon interaction between sea and river activities. The hydrologic system and the water quality change seasonally, correlating with the volume of river water. The geographical limits which determine the extent and size of the estuary are determined by a variety of criteria, the two most important are: The upper limit of the estuarine area, which correlates to the highest monthly average tide level in the year; The lower limit, defined as that part of the continental shelf which during the lowest tide is submerged to a depth no greater than 6m (according to the salinity the width is greater, but the depth is also 6m).

Table 1 Area of some estuaries in Viet Nam.

Zone	Name of estuary	Area	Author
Northeast Bac Bo	Bach Đang Estuary Tien Yen – Ba Che Estuary Dam Ha – Ha Coi Estuary Ha Long Estuary ***Total square of river mouths***	80.358 ha 31.268 ha 42.971 ha 10.707 ha ***197.238 ha***	(Nguyen Duc Cu, 1996)
Bac Bo Delta Plain	Thai Binh River mouth Red River mouth	17.000ha 100.000ha	(Le Dien Duc,1998)
Estuary in coastal Trung Bo region		125.000ha	(Nguyen Chi Thanh, 2003)
Dong Nai Estuary		10.000 – tidal flat; 75.000ha – coastal tidal flat	(Nguyen Chi Thanh, 2003)
West Nam Bo regions		899.251ha	

Estuarine areas and coastal tidal flats of the Red River system extend from Do Son to Lach Truong for about 145km. This width of the system identified from the national dyke to the line of mean sea level can reach 15km at Ba Lat, but 500m at the Van Ly Shore. The total area of the tidal flat is 452,000ha, of which there are 188,000ha (41.6%) of the high tidal flats and a further 264,000ha (58,4%) of low tidal flats (*Nguyen Chu Hoi et al., 1996*).

Estuarine areas and coastal tidal flats of the Mekong System: The estuary of the Mekong River is the largest deltaic estuary in the country. It extends along the coast from the Dong River Estuary to the Long Phu area; a distance of is about 200km. The total area of the natural tidal zone is about 600,000-800,000ha, of which 70-80% are high tidal flats, with the remainder low tidal flats.

An important feature of the Mekong Estuarine area is its natural development despite the absence of a sea dyke separating the rice fields from the sea. During the rainy season the estuarine area extends its area 40-60km^2, across the rice plains, flooding the area for 4-5 months/year and for 7-8 months/year, 20-30km^2.

Estuarine areas and coastal tidal flats of central Viet Nam are a section of coast line characterised by short and steep river systems, and lies within the shore zone influenced by tectonic uplifting. As a result, the surface areas of deltas are small. The Ma River and Ca River Estuaries have rather high tidal amplitude of 2.8-3.6m, and a non-uniform daily tidal system that forms a rather large tidal flat. The surface area of the Ma River estuarine tidal flat is about 2,000-3,000ha, and for the Ca River about 1,000-2,000ha.

Funnel-shaped estuarine areas
These areas are funnel-shaped in morphology and develop contrary to the processes of accumulation-erosion to form deltaic estuarine types. Funnel-shaped estuarine areas tend to encroach toward the mainland. Throughout Viet Nam the following typical funnel-shaped estuarine areas can be found.

East Bac Bo funnel-shaped estuarine area and coastal tidal flats include small estuarine and tidal zones that extend from Mong Cai to Yen Lap along the East Bac Bo coast (Cua Luc, Tien Yen, Ha Coi and Ka Long). The total area of high tidal flats occupies approximately 40,000ha and well-developed mangrove forests found there are believed to be the best intact examples in the North coast. The total surface of the low tidal flats is about 20,000ha.

Funnel-shaped estuarine area and coastal Tidal flats of the Bach Dang River lies to the north of the Red River Deltaic Estuary, extending from Do Son Township to Yen Lap and including Pha Lai – Ben Trieu. The submerged shore zone extends from the basic shoreline to a depth of 10m and runs from seaward of Hon Dau Island to southwest of Cat Ba Island.

The Thai Binh River system flows into an area that includes both the Lach Tray and Cua Cam Estuaries. The total estuarine area is approximately 95,000ha including high tidal flat with mangrove forest, low tidal flat without mangrove forest and the submerged tidal zone.

Funnel-shaped estuarine area and coastal tidal flats of the Dong Nai River (East Nam Bo Region) is the largest funnel-shaped estuarine area in the country, having a total estuarine area of about 120,000ha. Of this area, 75,000ha consist of high tidal flat with mangrove forest, low tidal flat without mangrove forest, and the remaining 35,000ha, is a dense tidal channel network.

Estuarine areas in lagoons
The tidal estuarine areas between the cities of Hue and Nha Trang influence considerably the ecological environment of coastal lagoons. The size of the estuarine tidal flats depends on the height of water within the lagoon when it is closed or upon the tidal amplitude of the sea when it is open.

2.2 Inter-tidal forested wetlands

These wetlands are distributed in almost all lowland areas of the Mekong River plain (and, before 1940, within small marshlands of the Red River delta), and in a small number of other locations. According to national surveys up to the year 2001, the area of mangrove forest in Viet Nam is only 155,200ha. Statistical data in 1995 showed that the Province of West Nam Bo has the highest potential area of muddy sand flats in inter-tidal zone (Table 2).

In his Doctoral Thesis of Phan Nguyen Hong (*1995*) divided the mangrove forests in Viet Nam into 4 main regions:

- Northeast Coast (from Mong Cai to Do Son Cape). Formerly, along this section of coast the mangrove forests were rather well developed, especially in the north where there were large tracts of land with a variety of mangrove species, including: Mangrove (*Rhizophora stylosa)*, Bruguiera (*Bruguiera gymnorhira)*, *Candelia candel*, and Aegyceras (*Aegyceras corniculatum*). At present, the mangrove forest has been severely degraded by excessive exploitation and in some places only small trees or shrubs still exist. In some locations, the mangrove forest has been replanted; but recently it has been destroyed for construction of shrimp-culture lakes.
- Coastal area of the Bac Bo Plain (from Do Son Cape to Lach Truong). Mangrove forests have only occurred in estuaries (Kien Thuy, Tien Lang – Hai Phong) with brackish-water trees, such as Cypress (*Sonneratia caseolaris)*. In this region exclusively mangrove forests have been planted to protect sea dykes (Thai Thuy, Tien Hai – Thai Binh and Xuan Thuy – Nam Dinh). During recent years, much forest area has been destroyed for the construction of aquaculture lakes.

Table 2 Surface potentialities of muddy sand flats in Inter-tidal zone (unit:ha).

No.	Locality	Potential	Potential square
	Bac Bo Provinces	**84.502**	**49.100**
1	Quang Ninh	28.000	20.00
2	Hai Phong	13.000	11.400
3	Thai Binh	15.252	6.270
4	***Nam Ha***	22.650	8.570
5	Ninh Binh	5.600	2.860
	Trung Bo Provinces	**33.155**	**19.714**
6	Thanh Hoa	11.996	7.990
7	Nghe An	3.974	1.974
8	Ha Tinh	9.000	6.337
9	Quang Binh	2.335	2.233
10	Quang Tri	1.880	1.180
11	Thua Thien Hue	4.000	
	SouthTrung Bo Provinces	**21.780**	**16.162**
12	Quang Nam – Da Nang	9.360	6.260
13	Quang Ngai	4.819	2.407
14	Binh Đinh	2.747	2.647
15	Phu Yen	1.000	1.000
16	Khanh Hoa	1.046	1.040
17	Ninh Thuan	400	400
18	Binh Thuan	2.408	2.408
	East Nam Bo Provinces	**23.510**	**10.564**
19	Ba Ria – Vung Tau	10.160	4.064
20	Dong Nai	2.350	500
21	Ho Chi Minh City	11.000	6.000
	West Nam Bo Provinces	**467.480**	**278.858**
22	Long An	34.574	13.400
23	Tien Giang	8.100	6.295
24	Ben Tre	33.156	32.643
25	Tra Vinh	109.00	38.935
26	Soc Trang	470.600	27.200
27	Minh Hai	197.050	151.685
28	Kien Giang	28.000	8.700

- Coastal area of central Viet Nam (from Lach Truong to Vung Tau). In general, natural conditions here are unfavourable for the development of mangrove forests. Along the coast there are no mangrove forests, other than within estuarine areas, on some peninsular (Cam Ranh, Quy Nhon) or on some salt-water lakes, such as Lang Co and others.
- Nam Bo Coast (from Vung Tau to Ha Tien). In this region the mangrove forests are well developed with an abundant variety of species and large tree sizes (some of which reach 30-40m high). Previous exploitation of this area has been at a tolerable level. Almost all mangrove species of South East Asia exist here with the most widespread being: Bruguiera (*Bruguirea cylindrical)*, Mangrove (*Rhizophora apiculata)*, White Avicenne (*Avicennia alba)*, Avicenne (*A. officinalis)*, White cypress (*Sonneratia alba)*, Cypress (*S. ovata)*, closer to the mainland Sour cypress (*S. caseolaris)*, Nipa (*Nypa fruticans*) and other species of brackish-water environments. In some places Nipas grow or are planted in large fields.

2.3 Coastal brackish/saline lagoons

A lagoon is a body of water separated from the sea by a barrier (sand bar or coral reef) and opened to the sea by one or more entrances.

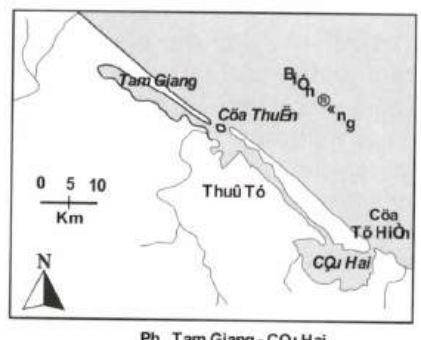
In Viet Nam, typical coastal lagoons are concentrated along the coastline of central Viet Nam and extend from Thua Thien Hue to Ninh Thuan. This stretch of coastline includes 12 lagoons, resulting in a density of one lagoon per 50km of shoreline.

Lagoon and wetland types are of a variety of different sizes (Table 3), depending on the prevailing hydrologic system, regional geography and geology. The Tam Giang – Cau Hai Lagoon system constitutes an area of approximately 216km^2, the smallest is the Nuoc Man Lagoon at Quang Ngai Province (2,8km^2), and the remainder have an average area of between 15-30km^2 (Table 3). If one excludes the sand barriers located on the outside of lagoons, the total area of the 12 coastal lagoons of central Viet Nam coast is about 447.7km^2 (Figure 1).

Table 3 Surface and size of coastal lagoons in Trung Bo.

Lagoon	Geographic coordination	Square (km^2)	Size (km)		Shape (m)	
			Length	Width	Media	Maxi-mum
Tam Giang – Cau Hai	$16^0 16' – 16^0 43' N$ $107^0 19' – 107^0 55' E$	216	68	2-10	1,6	4
Lang Co	$16^0 12' – 16^9 16' N$ $108^0 01' – 108^0 E$	16	6,1	4	1,2	2
Truong Giang	$15^0 25' – 15^0 33' N$ $108^0 01' – 108^0 05' E$	36,9	14,7	4	1,1	2
An Khe	$14^0 42' – 14^0 44' N$ $109^0 03' – 109^0 00' E$	3,5	2,9	1,1	1,3	2
Nuoc Man	$14^0 17' – 14^0 42' N$ $109^0 03' – 109^0 12' E$	2,8	2,3	1,2	1,0	1,6
Tra O	$14^0 17' – 14^0 14' N$ $109^0 14' – 109^0 08' E$	14,4	6,2	2,1	1,0	1,6
Nuoc Ngot	$14^0 10' – 14^0 14' N$ $109^0 09' – 109^0 12' E$	26,5	8,5	3,1	0,9	1,4
Thi Nai	$13^0 44' – 13^0 55' N$ $109^0 12' – 109^0 19' E$	50	15,6	3,9	1,2	2,5
Cu Mong	$13^0 13' – 13^0 38' N$ $109^0 12' – 109^0 19' E$	30,2	17,6	2,2	1,6	3,5
O Loan	$13^0 13' – 13^0 38 N$ $109^0 15' – 109^0 23' E$	18	9,3	1,9	1,2	2
Thuy Trieu	$12^0 41' – 12^0 47' N$ $109^0 19' – 109^0 23' E$	25,5	17,5	3		
Nai	$12^0 16' – 12^0 27' N$ $109^0 09' – 109^0 17' E$	8	6	3,5	2,8	3,2

Source: Dang Trung Thuan (2000) – Study on the Tra O Swamp wetland area with the aim to restore the aquatic product resource and sustainable development of the area around lagoon.



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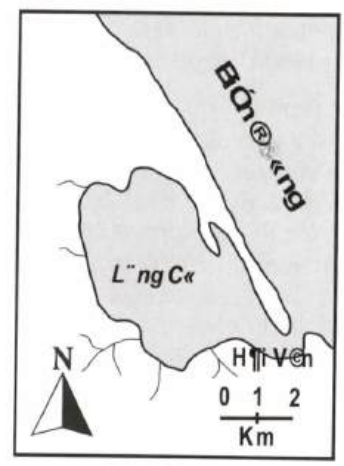

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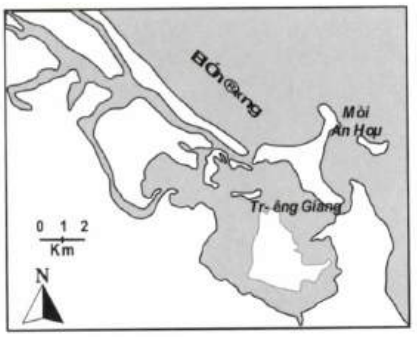

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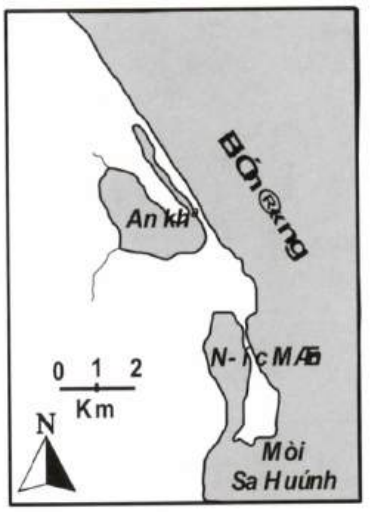

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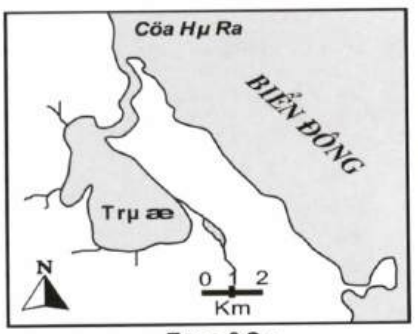

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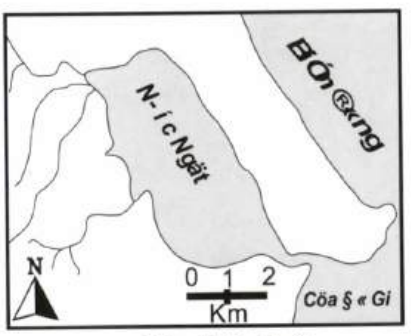

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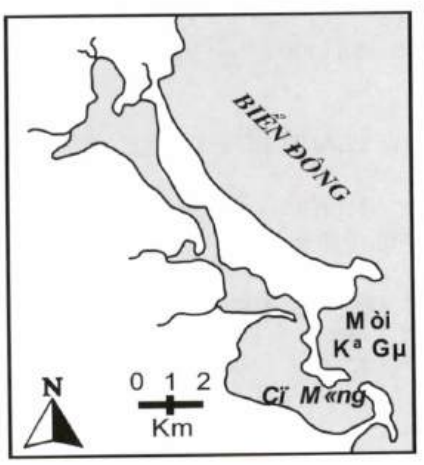

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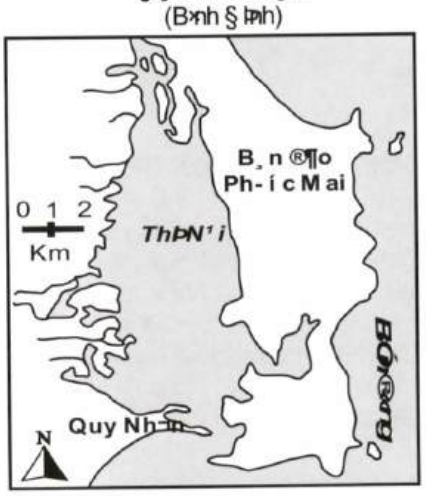

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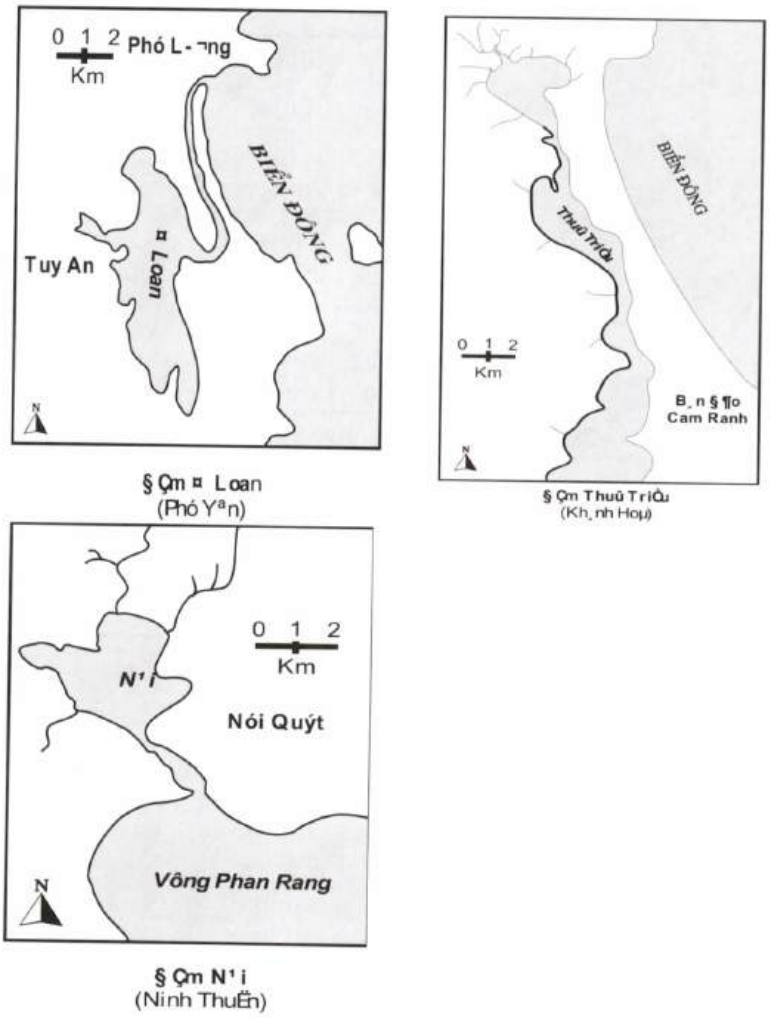

Figure 1 Area and distribution of coastal lagoons in the central Viet Nam.

3. ECONOMIC EVALUATION OF COASTAL WETLAND SITES

The methods used for economic evaluation of certain Viet Nam coastal sites were selected based on an assessment of site characteristics and considering global practice. This is the first time that this approach has been used in Viet Nam for economic evaluation on selected wetland sites (Bach Dang Estuary – Table 4; Van Uc Estuary – Table 5; Ba Lat Estuary – Table 6; Kim Son Tidal Flat – Table 7; Tam Giang – Cau Hai Lagoon – Table 8; Thi Nai Lagoon – Table 9; Tien Estuary – Table 10; Southeast Ca Mau Tidal Flat – Table 11) in Viet Nam. The economic evaluation results for each demonstrated site are presented in the tables below:

Table 4 Economic evaluation wetland of Bach Dang Estuary.

Direct value	Low value		High value	
	Estimated value (VND)	in US$*	Estimated value (VND)	in US$*
Timber	65,840	4.30	74,500	4.87
Fuelwood	28,000	1.83	32,500	2.12
Indirect value				
Aquaculture	5,625,000	367.65	6,432,000	420.39
Marine product collection**	850,000	55.56	1,150,000	75.16
Medicinal plants	n/a	n/a	n/a	n/a
Tourism	12,400	0.81	15,600	1.02
Environmental value				
Stabilizing micro-climate, improving air quality, water quality, preventing the site from storm surge, etc.	n/a	n/a	n/a	n/a
Total Economic Value (+) (per ha)	6,581,240	430.15	7,704,600	503.57

Table 5 Economic evaluation wetland of Van Uc Estuary.

Direct value	Low value		High value	
	Estimated value (VND)	in US$*	Estimated value (VND)	in US$*
Timber	85,250	5.57	92,450	6.04
Fuelwood	46,500	3.04	52,400	3.42
Indirect value				
Aquaculture	8,530,000	557.52	9,520,000	622.22
Marine product collection**	1,564,000	102.22	1,645,000	107.52
Medicinal plants	14,200	0.93	15,600	1.02
Tourism	9,800	0.64	11,200	0.73
Environmental value				
Stabilizing micro-climate, improving air quality, water quality, preventing the site from storm surge, etc.	n/a	n/a	n/a	n/a
Total Economic Value (+) (per ha)	10,249,750	669.92	11,336,650	740.96
Estimated TEV				

Table 6 Economic evaluation wetland of Balat Estuary.

Direct value	Low value		High value	
	Estimated value (VND)	in US$*	Estimated value (VND)	in US$*
Timber	103,620	6.77	108,200	7.07
Fuelwood	82,500	5.39	86,400	5.65
Indirect value				
Aquaculture	13,500,000	882.35	15,000,000	980.39
Marine product collection**	2,640,000	172.55	2,860,000	186.93
Honey	112,000	7.32	132,000	8.63
Medicinal plants	15,600	1.02	18,500	1.21
Tourism	12,000	0.78	15,000	0.98
Environmental value				
Stabilizing micro-climate, improving air quality, water quality, preventing the site from storm surge, etc.	15,100,000	986.93	16,400,000	1,071.90
Total Economic Value (+) (per ha)	31,565,720	2,063.12	34,620,100	2,262.75
Estimated TEV	254,475,574,524	16,632,390.49	279,099,283,577	18,241,783.24

Source: Adapted from Birdlife International (2003), Adger & Tri (1997).

Table 7 Economic evaluation wetland of Day Estuary (Kim Son Tidal Flat).

Direct value	Low value		High value	
	Estimated value (VND)	in US$*	Estimated value (VND)	in US$*
Timber	105.200	6.88	112.400	7.35
Fuelwood	74.500	4.87	80.420	5.26
Indirect value				
Aquaculture	10.560.000	690.20	11.260.000	735.95
Marine product collection**	1.256.000	82.09	1.450.000	94.77
Medicinal plants	12.500	0.82	13.500	0.88
Tourism	14.500	0.95	16.400	1.07
Environmental value				
Stabilizing micro-climate improving air quality water quality. preventing the site from storm surge. etc.	n/a	n/a	n/a	n/a
Total Economic Value (+) (per ha)	12.022.700	785.80	12.932.720	845.28

Table 8 Economic evaluation wetland of Tam Giang – Cau Hai Lagoon.

Direct value	Low value		High value	
	Estimated value (VND)	in US$*	Estimated value (VND)	in US$*
Timber	n/a	n/a	n/a	n/a
Fuelwood	n/a	n/a	n/a	n/a
Indirect value				
Aquaculture	16,850,000	1,101.31	18,450,000	1,205.88
Fishing	14,260,000	932.03	16,740,000	1,094.12
Marine product collection**	n/a	n/a	n/a	n/a
Tourism	15,200	0.99	18,500	1.21
Environmental value				
Stabilizing micro-climate, improving air quality, water quality, preventing the site from storm surge, etc.	n/a	n/a	n/a	n/a
Total Economic Value (+) (per ha)	31,125,200	2,034.33	35,208,500	2,301.21
Estimated TEV		0.00		0.00

Table 9 Economic evaluation wetland of Thi Nai Lagoon.

Direct value	Low value		High value	
	Estimated value (VND)	in US$*	Estimated value (VND)	in US$*
Timber	n/a	n/a	n/a	n/a
Fuelwood	n/a	n/a	n/a	n/a
Indirect value				
Aquaculture	8,452,000	552.42	10,520,000	687.58
Organized Fishing	5,200,000	339.87	6,345,000	414.71
Marine product collection**	n/a	n/a	n/a	n/a
Tourism	16,450	1.08	17,500	1.14
Environmental value				
Stabilizing micro-climate, improving air quality, water quality, preventing the site from storm surge, etc.	n/a	n/a	n/a	n/a
Total Economic Value (+) (per ha)	13,668,450	893.36	16,882,500	1,103.43
Estimated TEV				

Table 10 Economic evaluation wetland of Tien Estuary.

Direct value	Low value		High value	
	Estimated value (VND)	in US$*	Estimated value (VND)	in US$*
Timber	145,600	9.52	158,200	10.34
Fuelwood	86,500	5.65	92,000	6.01
Coal	n/a	n/a	n/a	n/a
Indirect value			0	
Aquaculture	21,450,000	1,401.96	22,480,000	1,469.28
Organized fishing	16,500,000	1,078.43	18,200,000	1,189.54
Marine product collection**	4,850,000	316.99	6,270,000	409.80
Tourism	160,000	10.46	220,000	14.38
Environmental value			0	
Stabilizing micro-climate, improving air quality, water quality, preventing the site from storm surge, etc.	n/a	n/a	n/a	n/a
Total Economic Value (+) (per ha basis)	43,192,100	2,823.01	47,420,200	3,099.36

Table 11 Economic evaluation wetland of Southwest Ca Mau Tidal Flat.

Direct value	Low value		High value	
	Estimated value (VND)	in US$*	Estimated value (VND)	in US$*
Timber	123,500	8.07	138,800	9.07
Fuelwood	124,300	8.12	145,000	9.48
Coal	56,200	3.67	75,000	4.90
Indirect value			0	
Aquaculture	19,394,000	1,267.58	22,459,000	1,467.91
Organized fishing	28,485,000	1,861.76	32,031,000	2,093.53
Marine product collection**	9,495,000	620.59	12,677,000	828.56
Tourism	2,456,000	160.52	2,761,000	180.46
Environmental value				
Stabilizing micro-climate, improving air quality, water quality, preventing the site from storm surge, etc.	n/a	n/a	n/a	n/a
Total Economic Value (+) (per ha basis)	60,134,000	3,930.33	70,286,800	4,593.91

Source: Adapted from Dang Trung Tan (2000).
*Note: * Unorganised fishing and marine product collection conducted by household members occasionally or seasonally.*
*** Currency exchange rate: September 2002, US$1= VND15,300.*
(+) TEV is estimated on the basis of total area of the identified wetland site.
n/a: not available.

4. THREATS TO COASTAL WETLANDS IN VIET NAM

4.1 Population pressure and poverty

Population growth creates increasing pressure on natural resources, both in the Red River and Mekong Deltas, and in some delta wetland areas suitable for agriculture.

A growing population demands increased production and processing of resources, which discharge a great volume of wastes, including toxic substances, into the environment.

The impact of population growth on natural resources is also reflected in the process of product consumption that results in the disposal of many artificial materials such as packages, cans, waste food, broken appliances, and so on, into the environment.

Interaction between humans and the natural environment is also evident in the process of distribution and circulation of products. In addition to environmental pollution at the production and consumption locations, the environment is also gravely threatened with degradation by the circulation, transport and distribution processes of materials collected from the natural environment.

The population in Nghia Hung District, Nam Dinh Province continues to grow and is causing increasing pressure on marine resources. The average agrarian land area per labourer for communes in Nghia Hung District is 25.3sq.m. This area is sufficient to sustain food production, but not for economic development. Another adverse trend is that farmland is shrinking due to rapid population growth and changes in the use of land, so that people cannot rely on agriculture to improve their life.

Since the moved towards a market economy, coastal economic regions have found that aquaculture and aquatic products can be successfully exploited for export. There has been widespread strong development of shrimp culture swamps since the late 80s, plus the spreading of enclosing nets along the coastal regions in the Red River Delta since the middle of the 1990s. Thousands of hectares of mangrove-forest have been destroyed and hundreds of hectares of tidal flats dug up, and contaminated, with disastrous effect on the natural processes of the mangrove forest ecosystem. Especially, irregular land sales, have given rise to fractious disputes over ownership so that resources management becomes even more complex.

Aquaculture and fishing activities are highly attractive because the market demand for marine products is growing. According to one survey, the average income for a labourer from aquaculture and natural resources exploitation is the highest amongst occupations in the locality (income is VND30,000-50,000/capita/day). At present, a large and growing number of people in a district participate in aquaculture, resources development and other relevant activities (such as procurement, transport and constructing swamps service).

Hence, the demographics as expressed through the economic system range of activities (natural resources development, production, processing the materials into products, then distribution, consumption) affect the environment greatly. In each stage of the production cycle, people dispose wastes into the environment. Waste disposal becomes an environmental problem, especially as toxicity increases along with the industrialisation process.

4.2 Imports of alien plant varieties and consequences

Up until 2002, 114 alien aquatic species have been imported into Viet Nam, of which ten were brackish fishes, five were shrimps and sea crustaceans, four molluscs, 15 salt water algae. In general, this has increased Viet Nam's aquatic product output, but there are negative effects on local gene fund preservation.

Polygamy leads to a decrease in pure bred local animal communities:

- Import of animals is likely to introduce some diseases
- Import of many new varieties may threaten local varieties already at risk.
- Invasion by alien botanical species may threaten local fauna and flora communities. For instance, in the Mekong delta plain, penetration by *Eichhornia crassipes* forms thick mats on the water surface, preventing light from penetrating underwater, competing with most other aquatic plants, and choking rivers and canals.

In 1980s, *Mimosa pigra* seeds were carried by the Mekong from Thailand to Viet Nam where they dispersed broadly in agricultural land areas and became a danger because they could stand long flood conditions, they developed strongly, overcoming common crops and the natural weed food of some rare wild animals, and also inhibited the water supply systems of the agricultural land areas. Yellow snails *Pomacea sp.*, shortly after being imported into Viet Nam, created a plague, causing serious destruction of paddy fields in many agrarian places, including brackish areas.

Lack of knowledge and awareness of people
Although Viet Nam's government issued Decree No. 109/2003/ND dated 23/9/2003 regarding preservation and sustainability of agricultural land, in reality, competent agencies do not have sufficient resources to implement the decree, and few people are aware of the new decree's content. Thus agricultural land in general, and coastal, riverside agricultural land in particular, remain under much economic, and population pressure and are exposed to potential threats.

Based on survey, statistics, and assessments of major threats to coastal tidal agricultural land, Nguyen Duc Cu (1997) has ranged of the level of threats in a raking from 1 to 15 and determined the influence of the threats for each study area (Table 12). In addition, the war effect (toxic chemicals and bombs) is still also considered as one of the main threats to the coastal wetland.

Table 12 Inventory, assessment of threats to agricultural land in coastal regions and north-eastern islands in Viet Nam.

No.	Region	Threatens to tidal wetland														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Bach Dang	+	+	+	+	+	+	+		+	+	+		+	+	+
2	Ha Long Bay			+	+			+	+	+	+		+			
3	Cua Luc Bay		+	+	+	+		+		+				+	+	
4	Tien Yen-Ba Che		+	+	+	+	+	+	+			+		+	+	
5	Đam Ha-Ha Coi		+	+	+			+	+			+		+	+	
6	Ka Long						+									

Note: 1. Agricultural land reclamation; 2. Sea fish cultivation swamp embankment; 3. Mangrove deforestation; 4. Over-exploitation of sea products; 5. transportation; 6. erosion; 7. shrimp farming; 8. Fishing with explosives and electric nets; 9. Ground grading; 10. Fishing with toxic chemicals; 11. Construction of water reservoirs; 12. Exploitation of shell flats, sandbanks; 13. Duck farming; 14. Water bird hunting; 15. Construction of salt fields. Source: Nguyen Duc Cu, (1997).

Based on different sources it has been summarized an assessment of some major impacts of natural agricultural land change to other natural resource types. The findings apply not only to the present, but are predicted to continue unless an effective remedy can be found (Table 13).

Table 13 Prediction of potential consequences when agricultural land is lost or replaced.

The change of wetland type	Natural resource	Status of Resource	
		Current	Future (non-improving)
Coastal wetland: – Increase in agricultural area – Increase in aquaculture area. – Increase in salt marsh area – Reduction in mangrove area.	Land	Serious erosion in coastal zone Increasing the area of depleted land, salinized land	Continue to be erosed Continuous increase in degraded land, salinized land. Decline of mangrove forest
	Quality of water	Salinization	Polluted by chemical waste (source from agriculture, industry)
	Biodiversity of mangrove ecosystem	Bio-degradation in coastal zone	High potential trend to further degradation.
	Bio-diversity characteristic of inland and marine ecosystem	Degradation	Degradation trends Non-existence of various land based and aquatic species.

Natural disasters such as storms, floods, erosion, drought, and sea level rise threaten both the coastal wetlands and local people.

A prolonged drought in late 2003 and early 2004 dried up reservoirs, ponds, rivers, and underground water, so that not only ten thousands of hectares of winter-spring and spring-summer crops lacked water but salinity penetration also increased. In the Go Cong coastal district, salty water intruded into fields 30-40 days earlier than in 2003. Over 80% of the people in communes along West Vam Co River suffer serious shortage of water for production and daily activities. According to a notice from the metrological service, in Ben Tre, the highest salinity measured in Giao Hoa – An Hoa is 3-4g/l, in Ham Luong River (in Phu Khanh) 5-7g/l; and in Co Chien River (in Huong My) 8-10g/l). The salinity situation is predicted to be even more serious in March 2004.

Ten thousand shrimp cultivation swamps along the shore also lack fresh water to flush salinity from their waters.

The existence of many fresh water animals is threatened and some protective *Sonneratia caseolaris* forests along the Tra Vinh, Ben Tre, Kien Giang coastlines are beginning to die due to excessive salt.

Results of research under Viet Nam – Netherlands Program "Assessment of the coastal vulnerability" warn that if the present deforestation continues, the sea level will rise by 1m and about 40,000km^2 of the Vietnamese coastal zone will be entirely flooded, of which 90% is in the Mekong Delta Provinces.

5. WETLAND MANAGEMENT

5.1 Overview on the wetland management in Viet Nam

5.1.1 Current status of wetland management in Viet Nam

System of state management bodies at central level

The basic for identifying the competence and responsibilities of the government in management and conservation of wetland is stipulated under Article 9, Provision 7 (stating the implementation of policies on protecting, improving, reproducing and effectively utilising resources) and Article 10, Provision 5 of the Law on Governmental Organization (No. 32/2002/QH-10, dated 25/12/2001) which was promulgated pursuant to the State President's Decree No. 04/2002/L-CTN dated 7/1/2002. Accordingly, government "shall determine the concrete policies on environmental protection, improvement and conservation; centrally steer the resolution of environmental degradation in focal areas; monitor pollution; provide rescue and remedies in case of environmental incidents".

Ministries and Ministry-level bodies affiliated with the government are responsible for exercising governmental functions in specified areas. Under Article 2 of the Prime Ministerial Decision No. 845/TTg, dated 22/12/1995 on the adoption of the Action Plan for Biodiversity, central-level bodies are responsible for wetland management as follows: The Ministry of Natural Resources and Environment (formerly, the Ministry of Science, Technology and Environment) acts as a linking body, holding major responsibilities in wetland management; the Ministry of Plans and Investment is responsible for capital investment in the wetland management; the Ministry of Agriculture and Rural Development, the Ministry of Fisheries, National Centre of Natural Sciences and Technology, the Ministry of Education and Training and State Committee of Mountainous areas and Ethnic Minorities.

Article 38 of the Law on Environmental Protection sets out the administrative system for managing the environment in general and the wetlands in particular:

"The Government shall exercise unified State management of environmental protection throughout the country. The Ministry of Natural Resources and Environment shall be responsible to the Government for exercising the function of State management of environmental protection. All ministries, ministry-level agencies and other Government bodies shall, within the scope of their respective functions, powers and responsibilities, co-operate with the Ministry of Science, Technology and Environment in carrying out environmental protection within their sectors and in establishments under their direct supervision. The People's Committees of provinces and cities directly under the Central Government shall exercise their State management function for environmental protection at the local level. The Provincial Department of Natural Resources and Environment shall be responsible to the People's Committees of provinces and cities directly under the Central Government, for environmental protection in their localities."

The Law on Environmental Protection thus is the legal authority for Viet Nam's system of environmental and wetland management at both central and local levels, and is the source mandating collaboration among these bodies (Figure 2).

The establishment of a ministry with focal authority in natural resources and environment reflects both the Viet Nam Communist Party and the national Government viewpoints towards the sustainable development of natural resources and environmental protection. On the other hand, this demonstrates to the implement the Polit bureau's Directive No. 36/CT-TW, dated 25/6/1998 on intensifying environmental protection activities in the period of industrialisation and modernization. It's a fact that government currently attaches due attention to enhancing wetland management through the functions of ministries and ministry-level agencies.

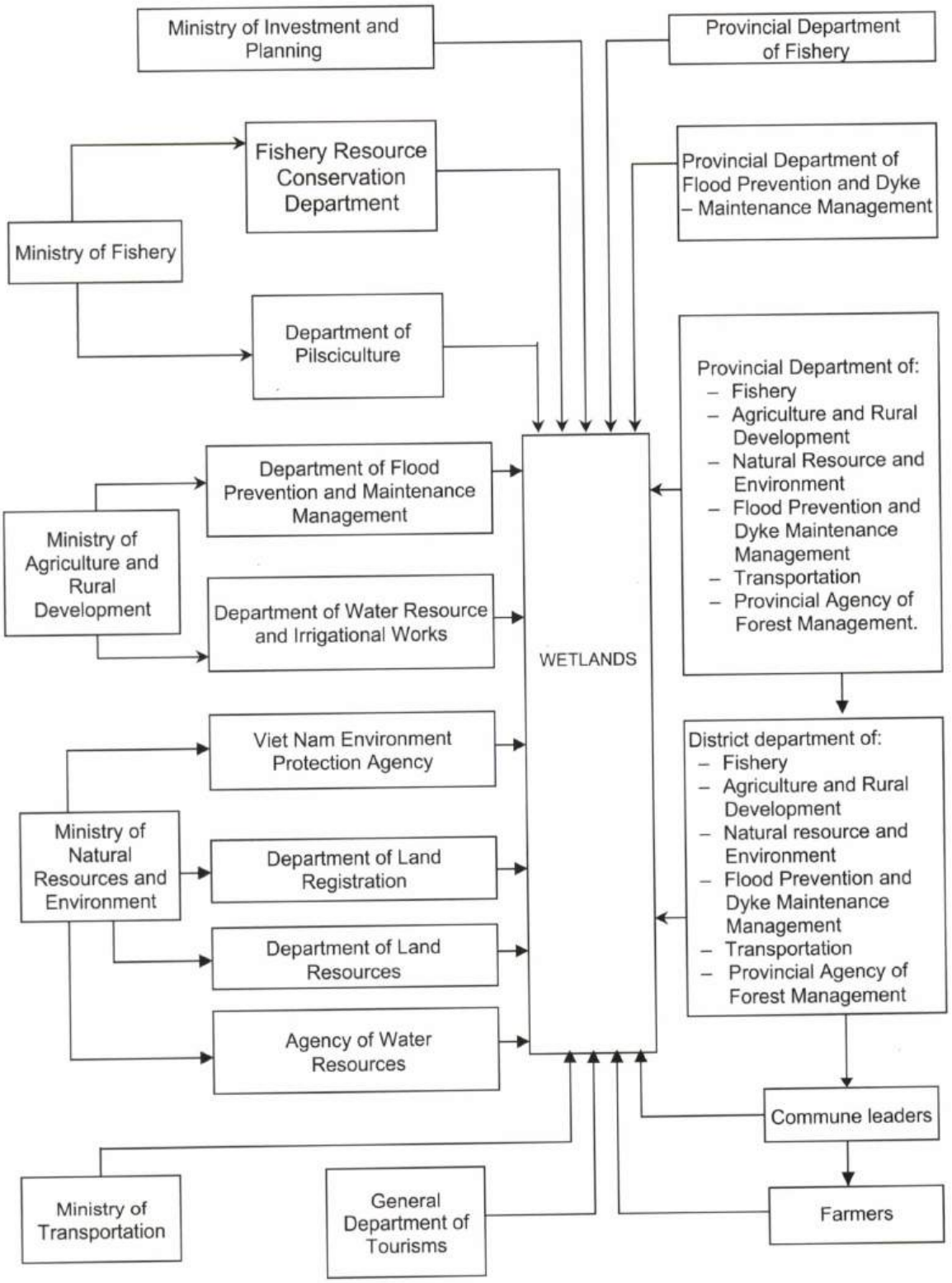

Figure 2 Institutional framework of Viet Nam wetland management.

Ministries and Ministry-level agencies

The Ministry of Natural Resources and Environment (MONRE) is the central body with primary responsibility for wetland management.

Under the Governmental Decree No. 91/2002/ND-CP, dated 11/11/2002 (hereafter, "Decree No. 91/2002"), on functions, liabilities, competence and organisation of MONRE, the Ministry acts as a governmental body exercising the state function in management of land, water, mineral resources,

environment, hydrographic meteorology, land map and survey throughout the country; state management of public services and represents the ownership of state shares in enterprises operating in the field of land, water, mineral resources, environment, hydrographic meteorology, land map and survey in accordance with the applicable laws.

The MONRE has reorganized and consolidated its structure in accordance with Decree No. 91/ND-CP as follows: Department of Land, Department of Land Registration and Statistics, Department of Environment, Department of Environmental Impacts Evaluation; Department of Hydrographic Meteorology, Department of Law Enforcement, Office of Environmental Protection, Office of Water Resource Management and other departments, offices, centres, institutes.

The MONRE's responsibilities and the authority include:

1. Submitting regulations and legal and policy opinions in respect of Ministry functions such as land, water, mineral resources, environment, hydrographic meteorology, land map and survey; Promulgating legally normative documents within the scope of the Ministry's functions and mandated authority;
2. Organizing and steering the implementation of the adopted documents, projects and strategies;
3. Promoting international co-operation in the areas of management functions;
4. Conducting and supporting scientific research;
5. Exercising state management over the operation of non-governmental organisations and associations within mandated functions; and
6. Discharging other duties for which it is responsible in specified areas of land, water, mineral resources, environment, hydrographic meteorology, land map and survey.

This comprehensive list, abstracted from the regulations promulgated pursuant to Decree No. 91/2002, clearly constitutes sufficient legal authority for the MONRE to discharge its responsibility for wetland management. It replaces the regulations of Governmental Decree No. 22/CP, dated 22/5/1993 (hereafter, "Decree No. 22/CP, 1993"), on the liabilities, competence and structural organisation of the Ministry of Science, Technology and Environment (authority for wetland management over the last ten years), with regulations that more clearly and specifically describe the MONRE's natural resource and environment management MONRE responsibility and authority. It is a more transparent legal ground for the establishment of a management system to effectively organise and manage wetland areas. As discussed above, the MONRE is responsible for state wetlands management. However, the MONRE is a newly-born organization and is still in the process of structural consolidation, so wetlands management has for the last ten years has been entrusted to the Ministry of Science, Technology and Environment (MSTE) and the Environment Department. Pursuant to the Decree No. 22/CP, 1993, the MSTE is responsible for environmental protection, specifically including:

1. Formulating and drafting environmental policies, legal documents, and standards, and submitting them to the government for enactment;
2. Organising the implementation of national projects on environment and sustainable development approved by the government;
3. Monitoring the adherence of major socio-economic development projects to environmental protection requirements before submission to the government for approval; and
4. Providing local agencies with guidelines on skills for environmental management and protection.

The Environment Department (now, the Viet Nam Environmental Protection Agency (VEPA)) is responsible for the following wetland management functions:

1. Studying projects, policies and laws applicable to wetlands environmental protection;
2. Studying, listing and mapping wetland areas;
3. Establishing, developing and managing the wetlands surveying system;
4. Conducting training and education to enhance the awareness of protection and intelligent utilisation of wetland; and
5. Developing international relations in the field of wetland conservation.

The Environment Office has a vice-chairman responsible for wetland management and conservation issues, using human resources from the Natural Conservation Office and related organisations. In 2001, the Environment Office in collaboration with agencies such as the Forest Control Office and FIPI of the Ministry of Agriculture and Rural Development, and supported by IUCN, published "Wetlands of high value of biodiversity and environment in Viet Nam" including 68 wetlands sites with information about current management information on them.

Listing, locating and identifying objects to be conserved is the first step in the process of major wetlands planning at national level. There remain numerous wetlands yet to be listed. It is necessary to position these wetlands on maps, draft statutory management authority applicable to them, and submit "The system of wetlands" to the Government for approval.

Over the past years, the MSTE has, through the Environment Department, effectively discharged its responsibility as a national linking body in implementing the Convention on Biodiversity and the Ramsar Convention. The MOSTE had major responsibilities for wetland management and has actively co-ordinated actions with other ministries and agencies, such as the Ministry of Agriculture and Rural Development; the Ministry of Fisheries; the General Department of Land Survey (now part of MONRE) and provincial Departments of Science, Technology and Environment (now Administrative MONRE).

Ministry of Agriculture and Rural Development (MARD) is a governmental body responsible for state management of agriculture, forestry, irrigation and rural development. This includes drafting legal documents on forest management and protection (including wetland nature reserves parks), drafting plans for the development and management of nature reserves and national parks for government's approval or ratifying such projects submitted by localities; managing scientific research, and the applying technological advances to protecting conservation parks' ecology. These examples make it clear that many wetlands (or parts of wetlands) have been planned and classified pursuant to or consistent with laws on forest protection and improvement and that the MARD has had a considerable role in wetland conservation. This is especially so in respect of mangrove forest ecology and certain species of birds. In MARD's management structure, the Forestry Control and Forestry Development Departments are involved in wetlands planning, consulting policies on forest protection and development, flora and fauna conservation, and overseeing the wetland natural conservation parks planned as part of the "particular-purposed forest system", which was submitted by MARD to the Government and approved in 1997. It includes some wetland conservation parks such as Xuan Thuy and Tien Hai. Integrated in the Forestry Control Department's structure, the Environmental and Natural Conservation Division is responsible for assisting the department to exercise its forest biodiversity management and conservation function.

Ministry of Fisheries *(MOFI)* is charged with managing fisheries, a mandate which includes aquaculture, and the exploitation, processing, protection and development of fishery resources (under the Decree 50/CP, dated 21/6/1994). MOFI is responsible for drafting legal documents, policies and projects on fishery development and protection, including wetlands (because applicable laws define wetlands as places which "have water surface available for aquaculture"), for the Government approval. The function of MOFI in protecting and developing fishery resources also involves many other wetland-conservation organisations concerned with biodiversity because MOFI development policies typically have impacts on the biodiversity of wetlands and, in particular, changes to the living environment of water birds. Over-exploitation of fishery resources leads to the pollution and degradation of wetlands and the diminution of water bird food sources. MOFI's functions involve the management of wetland exploitation and use, rather than their conservation. At present, MOFI entrusts the management and protection of fishery resources to the Department of Fishery Resources Management and Protection.

Ministry of Culture and Information (MOCI) manages culture and information involving the conservation and preservation of historic, cultural and environmental relics. (Decree 81/CP, dated 8/11/1993). Under the Decision dated 08/2001, the Prime Minister charged MOCI with "directly managing and organizing the establishment of nationally-classified and internationally-recognised cultural, historical and environmental forests". MOCI entrusts the Department of Conservation and Museums with assisting the Minister in this function. Currently, Viet Nam possesses about 33 cultural-historical-environmental relics, primarily cultural-historical ones. In practice, some wetlands, like Ho Lac (Dac Lak), are placed under the management of Forest Management Board.

General Department of Tourism *(GDT)* exercises state management over tourist activities nationwide (Decree 20/CP, dated 27/12/1992). Among its functions, GDT is responsible for providing guidelines on hotel skills, planning for tourism development, particularly ecotourism, which closely involves the management of wetlands. On 22/6/1993, the Government issued the Resolution No. 45/CP on renovating the management and developing tourism industry. In line with this resolution, Prime Ministerial Decision No. 307/TTg dated 24/5/1995 approved the master plans for tourism development from 1995 to 2000. In addition, ordinances on tourism passed by National Assembly's Standing Committee have improved the party and state's policy and legal framework in management of tourism. Actually, the party and state have taken the sound approach of combining tourism development and environmental protection in an eco-tourism programme, thereby introducing opportunities to tap into wetlands potentials. However, it is essential that GDT work closely with MONRE to set forth appropriate management policies over wetlands, and to avoid their over-exploitation and degradation.

Ministry of Planning and Investment *(MPI)* (pursuant to Decree 175/CP, dated 1/11/1995) is a governmental body, which acts as a general advisor on national strategy and socio-economic development planning, exercises state government management of domestic and foreign investment, and assists the government to co-ordinate and regulate major national economic development objectives. The functions of MPI include domestic and foreign investment project evaluation; serving as a linking body in co-ordinating, managing and utilising ODA (Official Development Assistance); and co-operating with the Ministry of Finance to draft and submit for Government approval plans to allocate the state budget and revenue to ministries, ministry-level agencies and localities. MPI also is responsible for wetlands investment projects. In essence, it is the responsibility of MPI to integrate national policies on wetlands development into the general national strategy of socio-economic development, so that wetlands are utilised in the most "intelligent" manner, contributing to national development.

Ministry of Finance is a governmental body responsible for exercising unified state management over finance, accountancy and state budget through out the country (Decree 178/CP, dated 28/10/1994). The Ministry of Finance responsibilities include the guidelines pursuant to which provincial People's Committees estimate annual state budgets; co-operating with the Ministry of Planning and Investment to establish financial plans, socio-economic development projects and annual infrastructure building projects; exercising unified management and steering over tax and fees collection for state budgets; organising the allocation of expenditures from state budget; distributing investment capital for infrastructure building and granting preferential credits for state development projects; unifying management of state-owned capital assets and resources; inspecting real assets of all public institutions and financial partners of the State; and drafting legally normative financial documents. The Ministry of Finance is jointly responsible with the Ministry of Planning and Investment for reviewing investment projects and budgeting for wetland development. The General Department of Taxation, the State Treasury, and the State Financial Inspection are bodies integrated into the Ministry of Finance's structure, and maintain close professional relations with wetland conservation commissions.

Other Ministries: The decision of Prime Minister No. 845TTg of December 22, 1994 on the bio-diversity action plan has expressly made several other ministries responsible for certain aspects of wetlands management as follows:

"Ministries of Education and Training, of Labour-War Invalids and Social Welfare, of Health, Committee for Ethnic Minorities & Mountainous Areas, in their socio-economic programmes, must give much priorities to fields and areas in connection with biodiversity protection, as well as take the initiative to work with Ministry of Natural Resources and Environment and Ministry of Planning and Investment on mutually concerned issues". In practice, many ministries have co-ordinated their biodiversity protection efforts, and have designated wetlands as a specific field. As one major example, the Ministry of Education and Training, which has extended environmental education programmes to schools and tailored them to different grade levels, is an excellent example. Nevertheless, there are few Ministerial programmes specifically emphasising wetlands. For example, neither the Ministry of Communication nor Transport (responsible for managing the utilisation of waterways and wetlands in river and coastal areas), nor the Ministry of Industry (which, through the Corporation of Electricity and Power manages "hydroelectric lakes", which are artificial wetland lakes) offers such a programme.

It is remarkable that the responsibility for management of wetlands areas viewed as special natural resources – is fragmented among a multitude of governmental organisations, with each body concerned only with an ambiguous aspect of this resource. For example, the Ministry of Agriculture & Rural Development is responsible for forest management in wetland areas, pursuant to the Law on Forest Protection and Development. Yet, the Ordinance on Aquatic Resources Protection and Development makes the Ministry of Fisheries responsible for managing aquatic resources in wetland areas. Thus, each lawfully could act on the same wetland area. Likewise, "salty wetlands" are administered by the Ministry of Agriculture and Rural Development, while other ministries are responsible for wetland areas such as ponds and lakes. In sum, ministerial spheres of authority and responsibility in respect of wetland management are indistinct, a major issue.

The system of local management bodies

The local executive function is reposed in People's Committees at different levels. Under the Law on the Organization of People's Council and People's Committee, the People's Council, the local state power body, is organised into three administration units of different levels: province, district and commune. The People's Committee is elected by the People's Council, and is its executive body.

The duties of the People's Committee include building the plan for socio-economic development, the budget, and the reserved fund for the localities to be presented and approved by the People's Council; promulgating procedures to implement the Resolution of the People's Council on socio-economic development and issuing proposals to re-construct a proper organisation of local bureau, including demarcation of local administration borders. Those duties are prioritised pursuant to People's Committees principles.

In sum, the provincial People's Committee is the local management body with authority over wetlands, and it supplies guidance to the Department of Natural Resources and Environment, Department of Agriculture & Rural Development, Department of Aquatic Products, Department of Planning & Investment, and to the People's Committee at different levels (district and commune).

The provincial People's Committee is assigned the following missions: Designing the programmes to manage and conserve local wetlands, in accordance with the local strategy for socio-economic development; promulgating policies and regulations on wetland management in conformity with local socio-economic conditions, to promote the wise use of wetlands; planning and managing wetlands within the province and delegating certain authority to agencies directly under the province; managing vital wetland areas as ratified and authorised by the government; co-ordinating with People's Committee of provinces contiguous to wetland areas under its authority; Working with specific wetland management agencies, such as the Ministry of Natural Resources & Environment, the Ministry of Agriculture & Rural Development, and the Ministry of Fisheries; conducting inquiries and inspections concerned with the protection and conservation of wetlands in local territory.

Provincial People's Committees are responsible for wetland conservation, for conducting scientific research, and for funding these efforts from the local budget, but may work with a "Wetland Management Board", an advisory organisation directly under the authority of the provinces. In many provinces, wetland planning is being co-ordinated with forest planning, Management Boards are being established to assist in such efforts, and in designing "green tourism" wetland development projects.

The most significant and predictable problems on the provincial path to managing and cultivating wetlands are money: the limited provincial budgets typically can't afford any significant investment in the region.

"Provincial Concerned Services" are specialised agencies, which implement the state management mission within the province. They are the right hand of both the District and the Commune People's Committees in wetland management. The Department of Natural Resources & Environment (formerly, the Department of Science, Technology & Environment) is responsible for wetland environmental quality and natural resources; the Department of Agriculture & Rural Development/Agency for Forest Control is responsible for forest management in natural sanctuaries (it has statutory authority and responsible for particular-purposed forests); Service of Fisheries is in charge of aquatic cultivation and commercial fishing (in a few provinces and cities which are the primary responsibility of Service of

Agriculture & Rural Development); Service of Culture and Information is charged with managing historical and cultural monuments and the environment, including wetland areas; Service of Land & Land Survey (currently part of Service of Natural Resources & Environment) deals with land management, of which wetland is an important component; Service of Planning & Investment and Service of Finance are concerned with investment and budgets for wetland management and conservation activities; and district level and communal People's Committees.

Department of Natural Resources & Environment (formerly The Department of Science, Technology & Environment): Documents stipulating DONRE function and duties are written in general terms and emphasize provincial environment management, but they do not adequately detail that Department's wetland management and conservation mission. The Law on Environmental Protection makes the DONRE responsible to the Provincial People's Committee for environmental protection within the province. In fact, DONRE activities are far more extensive and include the following wetland management programmes:

1. Joint responsibility with the Departments of Agriculture, Fisheries and Land as consultants to provincial People's Committees in the promulgation of documents dealing with wetland management (such as reviewing local wetland projects, and particularly the adequacy of coastal wetlands environmental protection);
2. Plan for managing and protecting the wetland environment and natural resources.
3. Use funds from the Department's budget to conduct or commission basic research on and surveys of the environment (including land, water, flora and fauna), to acquire data useful in sanctuary planning and the management, protection, conservation and sustainable development of wetland areas; and
4. Enforce provincial wetland sanctuary conservation laws.

The DMRE's Department of Land Administration, currently a component of Department of Natural Resources and Environment) is concerned with land use planning and investment for wetland nature reserves. It drafts the procedures for land registration, silviculture land allocation, and grants the silviculture land-right certifications for Board of Particular-purposed Forest Management (wetland areas). The Department of Land Administration has in fact emphasised general land management, and thus silviculture land management usually reverts by default to the Agency for Forest Protection.

The Department of Agriculture & Rural Development/Agency for Forest Control is the authorised agency at the local level with responsibility for aiding the provincial People's Committee with agriculture & rural development matters, including managing, protecting and developing wetland sanctuary forests (Circular 94-2001/TT-BNN-TCCB). The Agency for Forest Protection is assigned the following wetland management tasks: Enforce forestry law; create and implement plans, policies and proposals to protect local forests; manage the development of forest resources as well as silviculture land use; provide concrete and professional guidance to the Wetland Board of Management and the Division of Forest Protection directly under the Board, pursuant to the statutory mandate for particular-purposed forest management. In some provinces, the Agency for Forest Protection directly manages wetland sanctuaries or national parks located in wetland areas. In such circumstances, this agency creates different Management Boards to execute the mission.

The Department of Planning & Investment has helped to appraise projects investing in provincial wetland areas, to manage the distribution of fundamental construction capital, and co-ordinating with the Service of Finance to allocate the planned budget among various on-going activities and programmes in wetland areas.

The Department of Finance, in co-ordination with Department of Planning & Investment, presides over the allocation of budget spent for on-going programmes of wetland sanctuaries; follows up and manages capital of all kinds (including assets and national natural resources within such sanctuaries); jointly appraises investment projects, and has primary financial management responsibility for wetland sanctuaries. In addition, The Service of Finance specializes on financial inspection within wetland nature reserves.

Other provincial-specific department tend to fulfil tasks concerning local wetland management tasks assigned by provincial People's Committees or, under certain forms of international co-operation, participate as a direct partner in a project.

State management body at district level

The District People's Committee has legal responsibility for the following tasks: Create an in-district wetland management and development plan; develop lists of proposed wetland sanctuaries and present them to the Provincial People's Committee for approval Communal People's Committees in respect of wetland protection and development schemes and plans; allot land (based on specific functions of the wetlands) under the decision authority for the district level; form Boards of Management to work on in-district nature reserves, ranked for particular-purposed forests and buffer zones.

District levels appear weak in respect of their function as national scientific-technological & environmental agencies responsible for wetland management. In most localities, these functions, though important, are allocated among different local specific branches. Thus, at the local levels, the national wetland management function is mainly assumed by two district-level People's Committee's assistants: the Office for Agriculture & Rural Development (assisting district-level People's Committees with the national forest management function) and the Office for Land Survey (assisting district-level People's Committees with the state management function in land, including silviculture land). Personnel organisation problems in the two offices have inhibited their effectiveness in assisting district-level People's Committee to discharge their national wetland management responsibilities.

State management agencies at communal levels

At present, the communal People's Committee's responsibilities in wetland management include: managing and planning for communal wetland protection and development; setting up projects of land-allocation for households in buffer zones, managing buffer zone exploitation, raising awareness and guidance of wetland protection for local people on wetland sanctuaries; identifying forest and silviculture land areas; keeping records of wetland development; co-ordinating with Forestry Control and other relevant organisations to protect the wetlands; educating, mobilizing and instructing people; and imposing financial penalties on law violators.

In fact, the above missions, although mandated by law, are beyond communal authorities' capabilities. Communes in regions possessing wetland sanctuaries historically have taken sound measures to protect the wetlands (in the way of forest protection), but most of the communal cadres have a pay roll and significant difficulties are still related to personnel. Most of the cadres, whose professional competence is not quite satisfactory, are under the People's Council and Committee's tenure.

The salient features of the national wetland

To sum up, the system of state management bodies supervising wetland, though organised from centre down to local levels, is still mutating as experience suggests more efficient approaches to management structure, functions, and duties, and the development of managerial competence. The salient features of the national wetland management system in Viet Nam can be summarised as follows:

Several ministries and agencies at the central and local levels responsible for wetland management discharge their functions without integrating coastal and wetland areas. There is at present no effective contact or co-operation between ministries and agencies in wetland management. This leads to two major questions in current wetland management situation: (1) Is it wise to establish a body taking responsibility for wetland management, protection and conservation or, (2) Would developing a suitable system between indicated agencies and departments in wetland joint management, exploitation, protection and conservation be preferable?

National wetland management systems in Viet Nam are decentralized. In the north of Viet Nam, the national wetland management system is organised in 3 levels: ministerial, provincial, and district. In the south, Viet Nam aqua-silvicultural farms belonging to the Ministry of Agriculture and Rural Development are allocated to local farmers, who individually use and manage wetlands and coastal forests.

Viet Nam uses a "top down" approach to management. Most of decisions concerning policies, strategies are imposed by the central government on local government. Moreover, there is no community participation in implementing decisions that sometimes are inefficient and inappropriate. Community-based management is an approach that has just recently emerged and is not yet firmly established. It expands local roles in wetland management, an urgent need. However, there is not yet efficient cooperation between central and local government or among local governments. Although there are a number of community-managed wetlands (such as lakes, lagoons, and estuaries) managed by communities, despite this experience communities have been effective only in managing exploitation, but in not raising public awareness of the need for wetland protection and conservation.

Viet Nam's national system of Viet Nam land, water, and coastal forest management has helped to order land use systematically; however, it still suffers from manager and stakeholder ignorance of wetland functions and importance. This has led to poor wetland planning and use decisions and ineffective strategy. Moreover, decentralization of management is unclear, because decisions on interest and responsibility of management levels are ambiguous and overlapping. This causes overlap of different plans by different authorities on some wetland areas and inadequate attention to others. Transferring management responsibility also has caused adverse effects, such as a puzzling loss of natural resources; for example, the Dam Doi wetland. It was transferred through five services between 1975 and 1985 and each transfer was accompanied by the loss of more natural resources. Lack of planning or inconsistent planning in wetland use is also a reason for the low effectiveness in wetland management, besides leading to environment conflicts over wetland utilization and resulting in the loss of natural resources. Insufficient planning may result from insufficient regard to and adjustment for regional conditions (natural, social and economical). Wetland management planning sometimes creates a conflict with local demands. Ineffective co-operation between different organisations charged with wetland management may result decisions based on incomplete information, as well as overlap in wetland planning. There are few experienced experts and officers, and no research and management team available to link community with wetland managers, and so benefit from their indigenous knowledge which could supplement the world's scientific and technical advances and experiences. Top-down approach to wetland management does not meet communities' expectations. In the traditional top-down approach to wetland management, senior managers tend to impose their decision on junior management levels without understanding communities' expectation. This method does offer the advantage of quick decision-making and clear lines of authority and responsibility, but a bottom- up approach or community-based management is preferred. The new management direction is combining the top-down, bottom up, and sectoral approaches. This results in decisions based on Vietnamese laws and according to the expectations of all management levels, from central government to stakeholders. In general, management systems have paid inadequate attention to facilities and human resources and to the people who work with wetlands and their conservation.

An overall assessment of Viet Nam's management and sustainable use of its wetlands Viet Nam indicates several shortcomings; specifically, Viet Nam needs:

1. An empowered competent and capable agency to manage wetland and implementing Ramsar Convention;
2. A management mechanism to co-ordinate overlapping organizational functions (e.g., ministries, agencies, provincial people's committees and other levels of local authorities and professional bodies);
3. A strategy for wetland management protection and sustainable development;
4. Systematically trained, qualified, capable personnel in management and implementation of works relating to wetland;
5. More effective communication of wetland issues.

5.1.2 Suggestions to enhance wetland management

National strategies, plans and action programs should be established and implemented

It is essential to build national strategies, action plans and action programmes on wetlands for the basis of the following principles: Those strategies and plans must guarantee the targets of conservation and sustainable development for the sake of national interest and local people's livelihood. They must be designed for the whole nation, together with local-level policies and plans in

conformity with practical situation in each locality and consistent with the national-level ones. They must be comprehensive enough to cover all kinds of wetlands and wetland areas in Viet Nam, including coastal wetlands, inland wetlands, natural and man-made wetlands and the wetlands in Red River delta, Mekong delta and highland region. It is important to integrate the professional management policies of governmental bodies in different fields (such as Ministry of Natural Resources & Environment, Ministry of Agriculture & Rural Development, Ministry of Fishery, General Department of Tourism) in the national wetland strategies, action plans and programmes for management, conservation, utilisation, rehabilitation and development of wetlands towards a unified national policy. Great emphasis must be laid on constructing a law based on sustainable economic activities (eco-tourism, eco-agriculture, and eco-aquaculture) in line with wetland protection and conservation. Above all, a sound supporting mechanism, particularly a financial one, a clear roadmap for the effective implementation of such strategies, plans and programmes.

Enhancement and enforcement of the wetland management institutions

Wetland management institutions must be enhanced and enforced in the following ways: Legal institutions regulating wetland management system developed synchronously at all levels, including responsibilities and rights of state bodies. It is necessary to establish a National Steering Committee (or a National Steering Council) on wetlands that should be run under the Prime Minister's direction and headed by a Vice Prime Minister. There should be established a Regulation Management Committee, an inter-sector agency whose responsibility is collaboration and co-ordination for wetland management with participation by related line ministries such as Ministry of Natural Resources and Environment (a Vice-Minister should be Vice-chairman), MARD, Ministry of Fishery, Ministry of Culture and Information, Ministry of Investment and Planning, Ministry of Finance, Ministry of Justice, Ministry of Education and Training and other agencies. A team of specialists should be established to help the committee.

The competence of wetland management agencies should be increased through development of a framework. Specialised wetland management units from the Ministry of Natural Resources and Environment, other ministries, and relevant central government bodies should be assigned clear authority and responsibility. It is particularly important to strengthen district level agencies and committees, which participate in direct management of wetland areas. Increased emphasis on education and training will assist progress toward these objectives. Careful planning is an essential part of managing a system of wetland reserves. Finally, it is strongly recommended that a management model for wetland reserves corresponding to actual Viet Nam conditions be created.

Implementation of wetland management supporting measures

The following wetland management supporting measures are recommended: Dissemination of information intended to educate the average citizen about wetland functions, values, conservation techniques and sustainable use; strengthening incentives and support policies to better local peoples' quality of life and to facilitate the community's participation in effective wetland management and sustainable use under the Ramsar Convention; providing financial support for sustainable wetland uses; establishing a wetland conservation fund; Seeking financial support from agricultural taxes, profits from tourism, and other services.

Strengthening wetland management conservation and utilization measures

Consolidation of wetland management, conservation and utilisation measures must be accomplished in different ways, such as establishing a management and action system for conservation of the high-valued wetland areas which have been confirmed by the Viet Nam Environment Protection Agency (VEPA); following-up on policy implementation and activities concerned with wetland protection and sustainable use (this responsibility should be assigned to local agencies); developing plans for wetland rehabilitation and providing incentives, technical support, and preferential loans for fresh water sources protection and improvement; encouraging development of ecological models and environment-friendly use for coastal and marine sea-aquaculture; enforcing strict compliance with wetland conservation and sustainable use laws, including prosecution of criminal acts to the full extent of the law.

Conservation, sustainable use planning coastal biodiversity

Generally, a socio-economic master plan for the management of coastal ecosystems is necessary to promote biodiversity conservation and sustainable utilisation. It should individually consider development activities such as agriculture, salt marsh, waterway traffic, tourism, especially aquaculture, and fishery planning, so as to methodically promote management objectives such as the natural recovery capability of each type of aquatic or land resource. Conservation and sustainable use of biodiversity should be the objectives and the community-based, ecological approach method should be used. It will be necessary to develop and implement models of sustainable utilization of coastal biodiversity.

The planning and development of aquaculture models are based on following principles: Keeping ecological balance within the area (the ratio of aquaculture area and area of natural coastal wetland should be optimal); ensuring conservation and improvement of important functions and values of coastal wetland; ensuring sustainable use of wetland resources and a sustainable livelihood for local people.

When developing planning for wetland management areas, natural reserves, and artificial breeding flats: Natural reserves include zones prohibiting all exploitation, or limiting exploitation. They often are created where aquatic species concentrate for delivery, immature animals congregate year round, or at certain periods in certain places; for instance, oyster breeding ground, natural crab, shrimp enclosures. Construction of such reserves has great significance for the protection and sustainable development of aquatic resources in particular and in general as a management approach to estuarine and coastal wetlands.

Developing and implementing resources management statute

The enactment of the Decree-law on aquatic resources protection is of crucial, strategic significance in coastal wetland area wetlands management. It authorizes regulation of the working relationship between responsible administrative bodies, State budget expenditures for aquatic and wetland resource management, and registering piscicultural activities (including fisheries, aquaculture, aquatic resource research) with the provincial Aquatic Resources Protection Division. Piscicultural data such as species identification and habitat, swamp number and location, and culturing activities assist administrative authorities with information helpful to making numerous decisions, including adjusting commercial trade activity, introducing or transferring environment-based aquaculture models and management methods of wetland areas, and striving for environmental protection consistent with producing a high and stable income.

Finally, effectively enforcing laws prohibiting destructive fishing practices (such as using electrical pulses, dynamite, chemical substances, and small-mesh fishing nets) is a matter of utmost urgency. That work will be carried out best with active participation of relevant agencies, departments and local authorities and communities.

Gradually transferring rights to water surface use and marine development

Instruction No. 64 of the government on agricultural land allocation sets out legal rights and duties in respect of water rights and marine development transfer. The transfer of water surface use right to organisations and individuals for aquatic products exploitation, culture, protection and development can provide important benefits to society. The transfer of water surface use rights to local fishermen raises unique issues which require distinctive points. Farmers can cultivate their land entirely interdependently, while fishermen harvest and culture on wetland areas that lack clear borders. At present, allocating rights to use surface water is done only for piscicultural households and on a small scale. Much more comprehensive surface water rights allocations are likely in the future, however, so it is necessary to urgently develop planning and transfer of water surface use rights in wetland areas for aquatic resources.

In sum, the wise, proper, and well-managed use of wetlands, with the community's participation in wetland conservation, is vital task to the success of the management objectives for Viet Nam's wetland areas. The existing legal framework, to be augmented by the national action plans, programmes on conservation and sustainable development of wetland areas, Viet Nam will further facilitate this process.

5.2 Overview of legislation system for wetland, management, utilisation and conservation in Viet Nam

5.2.1 Evaluation of achievement and limitation of the national legislation system

Before acceding to the Ramsar Convention, wetlands resource law was mostly integrated into the legal framework on conservation of natural resources in general. That was and is inadequate there remains no distinct and complete legal document or policy on wetlands.

Since Viet Nam became a member of the Ramsar Convention, the number of legal documents on conservation of natural resources and wetlands has increased and the regulatory scheme has become more comprehensive.

In the Convention as legal documents currently in force, the notion "wetland" is only referred to but no definition is given. In most legal documents currently in force, "wetland" is defined variously as "land with water surface for aquaculture", "national park", "nature reserve", "mangrove forest", "alluvial plain", "coastal flood plain". According to Decree of Vietnamese government No. 109/2003 ND-CP, wetland is determined as areas with water, endowed with typical ecosystems, high biodiversity and functions to maintain water cycles and ecological balance and are of international and national importance (Article 1).

Thus, Vietnamese legislation, so far, has met the requirement in respect to the management, utilisation and conservation of wetland areas in particular as well as ecosystems and biodiversity in general

Review of some legislative documents concerning wetland

Among the legal documents currently in force in Viet Nam, some already use the notion of wetland such as decisions, directives of the Prime Minister, the Council of Ministers on establishment of nature reserves covered by wetland areas, especially areas with diversified ecosystems (such as Tram Chim, U Minh Thuong, Thanh Phu, Lung Ngoc Hoang wetland nature reserves). (*Directive No. 167/CT dated 18 August 1992 of the Council of Ministers, Decision No. 253/1998QD/TTg dated 29 December 1998*. These documents also have articles stipulating the obligation to preserve the wetland nature reserve areas, especially for organisations and individuals carrying out activities inside and around these nature reserve areas.

- ***The 1992 Constitution***

The 1992 Constitution is a basic law, a legal document of highest legislative importance in Viet Nam. It stipulates the basic general principles, is a legal framework to guide the development and implementation of the whole legal system in general and the legislation on wetland in particular.

The 1992 Constitution has established that government (state) own the wetland areas and the bio-resources of the wetland ecosystems. This is an important legal basis for protection wetland areas in general and for development of legislation on wetland in particular. This is shown by the advantages of the State when it issues the Decisions on establishment of national nature reserves. Only the State, acting on behalf of the "people" (the sole owners), has the legal authority to manage wetland areas comprehensively and to use them in a sustainable manner. The law confers upon the state an unrestricted right to use and to dispose of land; thus, a decision by the state to establish a nature reserve may not be challenged by other landowners. And the state will compensate legal user for taking the land without involving the landowner.

- ***The 1993 Law on Environmental Protection and related documents***

The Law on Environmental Protection ("LEP") is a general legal document on the environment, including the management and conservation of wetland areas. "Wetland" is defined in this document as the "land covered with water for aquaculture", "agriculture land", "water resources".

The provisions governing the exploitation, utilisation and conservation of wetland ecosystems are set out in Articles 12, 13, 14 of this law and in other related laws. This collection forms the essence of Vietnamese wetland protection law and includes some expressly imposing organisational and individual duties to protect various wild plant and animal species, biodiversity, and the forest and sea ecosystems.

Article 19 of the LEP also stipulates the right of the state to control the import and export of wetland plant and animal species, and genetic and microbiological resources related to environmental protection.

Besides its scattered provisions specifically addressed to management of wetlands and wetland ecosystem components, the LEP includes a separate chapter (Chapter IV) which authorises State management of the environment, including inspection and monitoring activities, and prosecution of violators.

Decree 175/CP (18 October 1994), supplemented by periodically issued Ministry of Science, Technology and Environment circulars, detail and guide implementation of the LEP. The LEP has created a legal framework for the management and sustainable utilisation of natural resources, including many provisions applicable to wetlands, and is the fundamental law applicable to wetland management and sustainable utilisation. It provides a fairly comprehensive authority for the government and relevant ministries and sectors to promulgate more detailed and concrete regulatory documents.

However, the LEP and documents issued pursuant to its authority set forth only general provisions on environment (including the components of wetland), and have not addressed the specific characteristics of wetland areas. In this law there is still no reference to the notion of "wetland" and still not considered an element of the environmental system in Viet Nam.

– ***The 1996 Civil Code and related documents***

The Civil Code is a legal document of great legislative importance that contains provisions guaranteeing the intellectual property rights of organisations and individuals who have made inventions, utility solutions during the process of exploitation and utilisation of wetlands. Although it is not a document stipulating directly issues of wetland protection, the provisions of the 1996 Civil Code are partly related to wetland biodiversity, in particular the protection of inventions and utility solutions.

– ***The Ordinance on protection and development of aquatic resources and related regulatory documents***

This system of documents consists of: the Ordinance on protection and development of aquatic resources (25 April 1989), Decree 195/HDBT (2 June 1990) guiding the implementation of the Ordinance on protection and development of aquatic resources; Circular 04 (30 August 1990) guiding the implementation of the above Ordinance and Decree.

As wetland is a specific resource, the area of wetland used for aquaculture is very large. And since aquatic resources are large, their aggregate exploitation and cultivation economic value is high, and is crucial to living standards, especially of those people residing in areas with wetlands. The term "wetland" is defined in this document as "the land with water surface for aquaculture", "water logged land". The Ordinance on protection and development of aquatic resources is an important legal document; it serves as a legal basis for protection of the wetland, especially the biodiversity, components of the wetland. Wetland is the main habitat of aquatic species and the protection of aquatic resources is crucial to protecting their habitat. This is stipulated in detail in Article 2 of this Ordinance which authorizes organisations and individuals to exploit aquatic resources, but strictly prohibits all actions injurious to the aquatic resources (including habitat of aquatic species, and mangrove and upstream forest destruction). However, the system of these documents is still dispersed; many provisions still have not high effect. The provisions of this Ordinance and its related documents govern mainly the economic aspects of wetland.

Some of Viet Nam's current legislative documents of use directly the concept of wetlands. Examples include decisions, instructions of Prime Minister and the Minister Council on establishment of reserves, wetland areas, especially those with diversified ecosystems such as Tram Chim, U Minh Thuong, Thanh Phu, Lung Ngoc Hoang natural reserves..." (Instruction No. 169/CP, dated 18/8/1992, of Minister Council, Decision No. 253/1998/QD/TTD, dated 29/12/1998). The documents also have provisions imposing a duty of wetland areas protection, in particular, for organisations and individuals operating in and around those reserves.

– *Government decree No. 109/2003/ND-CP,* dated September 23, 2003 on the conservation and sustainable development of wetland is the first legal document addressed exclusively to wetlands.

The decree includes six chapters, 27 articles, including: general provision, inventory, planning of the conservation and sustainable development of wetlands, awards and handling violation and implementation provision. In Articles 5, 6, 7 and other provisions, the decree specifies as follows:

Article 5: *The Governance of the conservation and sustainable development of wetlands*

1. The Governance activities of the conservation and sustainable development of wetlands shall include:
   - Research and inventories of wetlands;
   - Development of relevant mechanisms, policies and legislation to support the conservation and sustainable development of wetlands;
   - Planning of use of wetlands for the purposes of conservation and socio-economic developments;
   - Management of wetlands that have been localised for the purposes of protection;
   - Management of sectoral activities to harvest resources and potentials of wetlands by agriculture, fisheries, tourism, transportation, irrigation, hydropower and other sectors relating to the conservation and sustainable development of wetlands;
   - Inspection, surveillance, and dealing with any violations against the conservation and sustainable development of wetlands;
   - Encouragement and facilitation of the participation of local communities, particularly local people living within wetlands in the protection of their ecosystems, biodiversity resources and environment;
   - Extension of international co-operation in the field of conservation and sustainable development of wetlands.

2. The Government shall uniformly exercise its governance of the conservation and sustainable development of wetlands.

The Ministry of Natural Resources and Environment shall exercise its governance of the conservation and sustainable development of wetlands national wide.

Article 6: *Activities to be encouraged*

The State shall encourage organisations, individuals and human communities in carrying to the following activities:
- To protect ecosystems, valuable and endangered genera and species of flora and fauna, especially migratory species of birds and wetland environment.
- To rehabilitate degraded and/or over-harvested wetland ecosystems.
- To participate in the surveillance of any activities to harvest wetlands by any organisations and individuals; and;
- To detect and timely notify the functional agencies of any acts against regulations on the conservation and sustainable development of wetlands.

Article 7: *Acts to be prohibited*

The following acts against wetlands shall be strictly prohibited:
- Logging and destruction of mangrove forests, and any operations which can alter the nature of wetlands, destroy or damage their regionally characteristic ecosystems, and cause pollution and degradation to wetlands;
- Fishing of inland freshwater ad marine species of fauna and others in egg-laying and brood feeding grounds;
- Exploiting of natural resources or construction of works on alluvial plain where mangrove forests are being naturally regenerated;
- Application of destructive fishing practices, namely electrical pulse, dynamites, chemicals, toxic substances, and fishing nets with the mesh size against fisheries regulations within wetlands;
- Introduction of alien species of fauna and flora into wetlands environments causing unbalanced ecology and modified genetics of indigenous species of fauna and flora;

- Dumping of solid wastes and discharges of industrial wastewater and other substances containing toxic chemicals without or with treatment but not meeting the national environment standards;
- Disposal of wastes and construction of waste landfills within wetlands; and
- Other actions those are likely to do harm to the benefits and living conditions of human communities living within wetlands and their neighbourhoods.

Article 8: *Contents of wetlands inventory and research*

Contents of wetlands inventory and research shall include:

- Investigation and research of functions of surface and underground water regulation, and economic, ecological, cultural and social values as well as benefits o biodiversity that wetlands provide.
- Inventory and research of genera and species of fauna and flora inhabiting, living and growing within wetlands, especially highly endangered and migratory species.
- Investigation and assessment of the current state of the conservation and development of wetlands.
- Sociological survey and research of human communities whose livelihood relies on resources provided by wetlands.
- Establishment of wetlands database to serve as grounds on which wetlands use plans and planning would be developed for the purpose of the conservation and sustainable development thereof.
- Periodical inventories of the national capital stock of wetlands by regions and categories for their better management.

Article 9*: Responsibility division and authority decentralisation for wetlands investigation and research*

The Ministry of Natural Resources and Environment shall develop a master plan on baseline investigation and environmental assessment of wetlands nationwide; and be primarily responsible for the investigation and research of wetlands of national or international important that are within the jurisdiction of many sectors and provinces.

The Ministry of Agriculture and Rural Development and the Ministry of Fisheries shall be responsible for their sectoral investigation and research of wetlands of international or national importance that are within the jurisdiction of many provinces.

Department of Natural Resources and Environment of provinces and cities directly under the central Government shall be primarily responsible for the investigation and research of wetlands other than those stated in Clause 1 and Clause 2 of this Article.

Article 10: *Grounds and contents of wetlands planning*

The planning of wetlands must be based on the following grounds:

- Socio-economic development master planning as well as land use planning and plans already approved by the competent State agencies;
- Demand for the conservation and sustainable development of wetlands;
- The Ramsar Convention;
- Functions of wetlands to maintain ecological balance regulate water cycles and biodiversity as well as economic potentials and advantages that they provide.
- Contents of wetlands conservation and sustainable development planning include:
- Identification of directions and objectives of the conservation and sustainable development of wetlands;
- Identification of the scope and acreage of wetlands;
- Definition of contents of the conservation and sustainable development of wetlands;
- Identification of major measures for the conservation and sustainable development of wetlands;
- Prediction of and early warning of environmental incidents as well as developing and undertaking of relevant measures to prevent and reduce adverse impacts on the environment.

Article 11: *Planning responsibilities and approval power*

The Ministry of Natural Resources and Environment shall be primarily responsible for planning the conservation and sustainable development of wetlands prescribed in Clause 1, Article 9 of this Decree and submitting them to the Prime Minister for approval.

The Ministry of Agriculture and Rural Development and the Ministry of Fisheries shall be primarily responsible for planning their sectoral conservation and sustainable exploitation of wetlands prescribed in Clause, Article 9 of this Decree and submitting them to the Prime Minister for approval.

The provincial/municipal Departments of Natural Resources and Environment shall assume the prime responsibility for planning the conservation and sustainable exploitation of wetlands prescribed in Clause 3, Article 9 of this Decree and submitting them to the People's Committees of provinces and cities directly under the Central Government for approval.

In general, Viet Nam laws partly meet the requirements of management, utilisation and conservation of wetland in particular and biodiversity in general. However, in practice, this legislative system still shows some weak points relating to rights, duties, and responsibilities of organisations and individuals in management, utilisation and conservation of wetland area.

The achievement of the national legislative system for wetland management, utilisation and conservation. As a participant in Ramsar Convention and other international agreements concerned with environmental protection (e.g., Biodiversity Convention, CITES, and UNCLOS) Viet Nam has devoted considerable effort to building a legal and policies wetland management framework.

The Communist Party of Viet Nam has developed a strategic ideological base laid down in a number of the Party's Resolutions during the renovation period from 1986. These include Directive 36/CT-TW, dated 25 June 1998, by Politburo on strengthening environmental protection during the period of the country's industrialisation and modernisation from 1996. It is addressed generally to increasing environmental protection and has become the strategic guideline and de facto model for the legal, policy and institutional framework being constructed to protect the environment in all fields, including those indirectly related to wetland conservation and management. A key provision, "Reasonable exploitation and use of the natural resources, protection of biodiversity and nature", has become a basis for developing and improving policies, relevant to management, conservation, wise use and recovery of wetland.

Limitation of the national legislative system for wetland management, utilisation and conservation Viet Nam's recently-constructed legal and policy framework broadly incorporates law and policy considerations into an approach to wetlands management, but it has certain inherent limitations, as described below:

The legal provisions are inadequate. Most do not directly regulate wetland management and conservation and many of them are concentrated on special-use forest management through which wetlands can be managed. Those provisions directly regulating wetland management and conservation are mainly issued by ministries or the competent bodies at local level but high central bodies such as National Assembly. Among them there are some legal documents issued by the former Council of Ministers or the Prime Minister. Effective wetland management and conservation requires legal authority entitled to the highest respect, at least in the form of a Government Decree.

Besides, the government's Decree No. 109 – the first legal document on wetland management and conservation, the legal provisions on wetland management and conservation are scattered among many laws and regulations, such as the Law on Forest Protection and Development, the Land Law, the Ordinance on Aquatic Resources Protection and Development, The Law on Fishery Resources and many other sub-legal regulations such as decree guiding the implementation of laws or ordinances. In fact, many regulations embodied in different legal documents are overlapping or too general, making their practical implementation difficult.

The existing legal provisions (including those directly or indirectly relating to wetlands) do not regulate all the issues concerning the wetland conservation and management. Even the Land Law, an important legal document stipulating land grades and land use has no provision on wetland. Thus, wetland utilisation and protection are regulated by provisions on forestland, agriculture land or special-use land.

Most wetland use and exploitation law (including that applicable to the components of wetland ecosystem) are concerned with economic aspects (for example the provisions laid down in the Ordinance on Aquatic Resources Protection and Development or legal documents issued by local authorities), with protection measures such as administrative fines for wrongful acts, and with conservation (especially conservation of waterfowls whose habitats are wetlands). Some wetland conservation laws prohibit certain extreme fishing methods, and there are a few provisions on wetland recovery.

The laws directly applicable to wetlands protection mainly are decisions or instructions of the Prime Minister regulating land grade and management devolving for wetlands (such as national parks or wetland nature reserves), in which there are some provisions on wetland, fauna and flora conservation. In fact, however, laws directly regulating particular aspects of wetland management and conservation do not include penalties for their violation. Moreover, many socio-economic considerations were omitted from the drafting process. As a result, these legal documents have not been effective; for example, those providing measures against alien species or those regulating exploitation and protection of aquatic resources in lagoons or ponds where farmers' income is based mainly on fishing.

The legal documents issued by local Peoples Committees have not met enough requirements of wetland management and conservation. In the fact, most of them are considered as detailed implementing documents for higher effective legal documents promulgated by the government and ministries. They have not counted the socio-economic conditions of the province itself. Furthermore, those documents usually contain administrative measures and they do not achieve the specific measures to attract public participation in conservation and management of wetland and its biodiversity.

There are insufficient provisions laid down in the legal documents issued by both central and local authorities intended to regulate wetland planning and promote the wise use of protected areas and their buffer zones. The most symbolic problem is that no master-plan of wetlands management has been approved yet by the government. Such a master plan is essential to effective national wetlands management. The government should issue these necessary rules for management of Wetlands Nature Reserves System.

At present time, there is no unified and clear policy to protect, to expand or to narrow wetland areas. For many reasons, the importance and value of wetlands have been not been popularly understood, so wetlands – and especially estuarine and coastal wetlands – have in many cases been considered bare lands, easily adapted to different uses; for example, converting coastal wetlands to agricultural land. The policies upon which land use change have been based clearly favour economic development over wetland conservation. Finally, the legal requirements for wetland planning are inadequate. For all of the above-mentioned reasons, wetlands continue to suffer pollution, degradation and decreasing wetland area.

Although competent authorities have issued policies and legal documents on wetland protection, a series of wetlands of high value are not well or effectively protected, managed and conserved. According to the newest statistics of National Environmental Agency (NEA) in "Wetlands of high value for biodiversity and environment" published in 2001, many wetlands such as lake Chu (Phu Tho Province), Thai Binh Estuary (Tien Lang District- Hai Phong City), Cau Hai Lagoon (Thua Thien-Hue), Thi Nai pond (Binh Dinh Province) have suffered from inadequate management and conservation measures.

As matters of fact, a number of legal terms and notions relevant to wetlands have not been applied in unified way in legal documents and policies. This makes more difficult for governmental bodies, individuals and organisations to perform provisions for wetland management, exploitation, utilization, recovery and development.

Though Viet Nam has paid much attention to the implementation of commitments arising from international treaties (Ramsar Convention and others) and has taken into account these international obligations in drafting and enacting legal documents, these efforts have been of marginal effectiveness in wetlands conservation.

Despite the broad system of legal documents stipulating sanctions for wrong acts (including compensations, fines, administrative fines and penalties), the sanctions for violations of biodiversity coservation legal rules remain inadequate. The fines are low in the context of improved current economic and social conditions. Deforestation and rare aquatic species exploitation causes damages to environment in general and biodiversity in particular. These ecological losses may be irreversible, or take years to recover. Low fines are unlikely to effectively change the behaviour of violators who easily can afford to pay them.

Viet Nam has developed a system of legal documents and policies to implement the international obligations laid down in the Ramsar Convention and similar agreements concerned with wetland protection. However, these documents do not meet the Ramsar Convention "wise use" requirement. One of the effectiveness of the implementation of the international obligations arising from these international treaties has also evaluated through building and performance of legal documents and policies on wetland management and conservation.

So far, highly effective normative legal documents of such as laws, decree-laws, decrees of Vietnamese government lack specific, separate regulations demonstrating uniform state management of wetland targeting socio-economic development, environment protection, creating specific legal framework to manage and exploit wetland's potentials properly, serving the purpose of wetland's sustainable development.

5.2.2 Some general comments on enhancement of the legislation systems for wetland management, utilisation and conservation in Viet Nam

In order to enhance efficiency as well as overcome the shortcomings of wetland management, utilization and conservation, it is necessary to revise and amend Viet Nam's legal framework on wetlands as follows:

Developing and strengthening the legislated system for wetland management, utilisation and conservation:

- A legislative system should be developed in systematic, scientific, precise and feasible manner. It is important to collect statistics and documents on legislation concerning wetland as well as to evaluate the existing legislation documents in order to reject provisions that do not correspond to the facts, and to fully evaluate the feasibility of each provision and document. To increase legal designation effectiveness concepts such as "wetland" and "wise use" must be clarified, taking account to existing shortcomings. Another urgent task is promoting of the participation of community and local authorities to enhance and develop new wetland regulatory standards based on scientific and economic criteria, and developing an institutional system for their administration. International cooperation regarding Vietnamese wetland, and conformity of Viet Nam's legal framework with international standards should be assessed. International co-operation will be an important basis helping Viet Nam complete laws on wetland.
- Legalise the concepts of wetlands for consistency and to promote the practical and even-handed application of the laws. The concepts should be officially used in documents, with clear interpretation.
- In wetland-related documents, it remains necessary to include other regulations that clearly define the functions, values of wetland and combine wetland management, utilisation and conservation with professional management.
- It is high time that the government issues a decree, or at least an ordinance on wetland that clearly stipulates the system, organisation and authorized state body for wetland management and utilization. Wetland can't implicitly be seen and thus managed as part of farming or silviculture land.

- Both central and local level management bodies must initiate appropriate policies to encourage and help reduce risks of dealing with wetlands. On the one hand, this would surely encourage people to intensify production activities on the wetland areas, and on the other hand, restrict the adverse impacts on wetlands, thus reducing risks.
- If tax policy on farm land (for rice and vegetable growing) is applied to wetlands available for aquaculture, there are two possibilities: One is the failure to encourage aquaculture farmers to use the water-face to develop fishery; two is the loss of revenue for state budget as the use value of land with water-face available for aquaculture may be higher than that of farm land. Therefore, it is most rational to separate the management of land with water-face from that of farming land.

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