DRAFT

NATIONAL REPORT ON IMPLEMENTATION OF

THE CONVENTION ON BIOLOGICAL DIVERSITY

THAILAND

(Subject to the Approval by the National Environment Board)

THE OFFICE OF ENVIRONMENTAL POLICY AND PLANNING

DECEMBER, 1997

CONTENT

CHAPTER 1

BIODIVERSITY STATUS AND THREAT

Thailand's Biodiversity and its threats.

As a Southeastern Asian country, Thailand has been regarded as one of the richest sources of biological diversity in the world. Although comparatively less diverse than those of South American countries, at least 15,000 species of plants have been found in Thailand, accounted for 8% of estimated total found globally (OEPP 1992). Number of animals has also known to be far exceeding that of European and North American countries with appoximately 1,625 species of terrestrial vertebrates (mammals, birds, reptiles and amphibians) known to scientific community (Nabhitabhata 1993). As for marine biodiversity, the Indo-Malaysian sub-region is a centre of distribution of marine organisms. Thus, Thai water has been riched with diverse forms of marine life including over 2,000 species of marine fishes (Wongratana, 1993), 2,000 mollusk species (Pasuk et-al, 1993) and 11,900 of other marine invertebrate species.

Although significant diversity of biological resources in Thailand is unquestionable, number of specifically unique species may be less than many have expected. Thailand can generally be described as a pennisula connected between two major biogeographical sub-regions; the Indochinese sub-region in the North, and the Sundaic sub-region in the South. In addition, some elements of Thai fauna and flora have also been influenced by biogeographical characteristic of Indian and Palearctic region (Mackinnon and Mackinnon, 1986). Botanically, these influences result in the lack of unique floristic elements with majority of plant species can be found in neighbouring countries. A number of vertebrates endemic to Thailand may be considerable, however many other of these animals are found to be distributed through out the Southeast Asia region. In many cases, selected vertebrates acknowledged as rare species in the country, are known or found to be common in either Burma, Malaysia or other Indochinese countries.

Species diversity

Several wildlife researches and plant inventories have been conducted by public agencies and interested scientists, for more than 30 years. Unfortunately, these researches were usually focused either on specific groups of species or not comprehensively accounted all species known to scientific community in Thailand.

The most extensive compilation of species in Thailand ever attempted, was the 1995 - 1997 Thailand's Biodiversity Country Study. The Country Study, for the first time, was able to present number of faunas and floras known to researchers and scientists and, in addition, account for species under different level of threats. Number of animal species compiled by the Country Study and their conservation status are shown in the following table;

" To be included"

The Country study also compiled all available information on plant species. However, unlike animals, studies on plants have been limited. For example, The Flora of Thailand project of the Royal Forest Department has been able to identify only 30 - 40% of 15,000 collected specimen held at the Royal Forest Herbarium. Thus, no single plant species has yet to be assigned with officially recognized conservation status which signify level of threat the species is facing. Number of plants compiled by the Country Study are shown in table below;

Categories	Families	'Genera	Species
Thallophytes	91	293	1,334
Bryophytes	63	213	820
Pteridophytes	34	132	633
Gymnosperms	6	7	25
Angiosperms	249	1,725	9,441

Table ..... **Number of genera and species of Plants found in Thailand**

Although information on micro-organisms has been substaintially available through findings from various public funded researches, such information at national scale remain unreliable. Information which has remained largely scatter through out institutions are now being look at closely to enable certain compilations, at least on specific groups of interest.

Genetic Diversity

It is generally accepted that, with development of genetic identification techniques during the last 20 years, most of information on genetic diversity is restricted to domesticated species of commercial or agricultural importance while less has been learned about such diversity of wild populations. In Thailand, knowledge of genetic diversity of domesticated crops and animals is fairly limited. For example, rice is the only crop species with extensive information on genetic diversity. Due to less diverse breeds found, diversity of domesticated animals has been more comprehensively learned and documented than those of plants and aquatic animals. However, the present knowledge of genetic diversity of domesticated animals is mostly on native ones as introduced animals have never been properly documented nor assessed for their diverse genetic distinction.

There are five species of wild rice found in Thailand including. Oryza *rufipogon* and 0. nivara which commonly occur through out Thailand and are , thus, closely associated with: presently grown cultivars. 0. *officinalis, O.ridleyi* and *O.granulata (O.meyeriana),* on the other hand, are not usually found near rice fields. *O.ridleyi*, in particular, is regarded by several botanists as an endangered species due to its limited distribution. As for cultivated rice, present varieties have evolved from wild species, mostly *O.rufipogon and 0. nivara,* for more than 7,000 years agos (Chang 1976). At least, 3,500 breeds of the cultivated varieties are existed in Thailand since they are found to be different in both names and morphological characters (Perez and Chang 1974)

"Native rice variety"

List of Thai animal genetic resources reported by FAO's Global Databank for Farm Animal. Genetic Resources (FAO, 1995) was used as basis for compilation of native domesticated animals in the Country Study. Additional breeds were included in the FAO's list to ensure most comprehensive listing of native species as possible. Domesticated animals which are native to Thailand , can be seen in Table... ,

Groups	Breed Name	Status
Cattle	White Lampoon cattles	
	Thai native cattles	
	Gayals	
	Bali Cattles	
	Kouprey	Extinct
Buffalo	Swamp buffaloes	Rare
Goat	Southern goat (Katjung Kambing)	
Pig	Hailum	Endangered
	Kwai	Endangered
	Paung	Endangered
	Raad	Critically endangered
Domestic Duck	Pahk-Nam native duck	Crtinically endangered
	Nakhon Phatom native ducks	Extinct (present stock dirived from introduction)
Domestic Goose	Ped Thed Puen Muang	
Chicken	Ta Pha I	
	Fighting cock (Gai Chon)	
	Thai native chicken (Gai Puen Muang)	
	(6 breeds)	

In addition to these native breeds , there have also been records of newly developed breeds which are important for local consumption or export. these breeds include;

- Meat cattles : 4 Breeds which are White Braman, Mixed Braman, Red Braman and Shabra.
- Milk cattles : 5 breeds which are White-black pure breed, TMZ, Sahiwel and Red Gindhi
- Goats and sheep : 2 breeds include Mixed indigenous goat and Katekeen sheep
- Pigs : 5 breeds include Large white, Kurot Jersey, Land race, Mieo San, Mitsumpan
- Foreign ducks : 2 breeds which are Tha Pha II and Bang Pakong

- Geese : Tha Pha I
- Ducks : 3 breeds which are Khaki Cambell, Pak-Nam, Peking
- Chickens : 7 breeds include Red Lode-Island, Black Barplemutlock, White Barplemutlock, Chiang Mai 1, Chiang Mai 2, Meat variety, Mix indigenous.
- Birds : 3 species include Ostrich, Ema and Partridge

Ecosystem Diversity

Ecosytems in Thailand can be generally divided into 5 types : forest ecosystems,, agricultural ecosystems, fresh-water ecosystems, coastal ecosystems and marine ecosystems. These: ecosystems can be briefly described as follow;

1. Forest ecosystems

Forests of Thailand are usually classified into either evergreen or deciduous forests. With. different geographical features, soil structures, precipitation rate and general climatic conditions, however, these two types of forests could be further sub-divided into 11 types which are;

1.1 Wet evergreen forests, or Rainforests

Wet evergeen forests occur mostly in Southern and Eastern Thailand with dipterocarps as dominant species. The forests situated in areas with annual percipitation of about 2000 mm. per year and at elevation less than 900 m. above the sea level. Approximately 11 index tree species, 8 bamboo species and over 100 species of mushroom and fungi are found in the forets. The forests are known as habitats for various kind of terrestial vertebrates including 146 species of mammals, 338 species of birds, 53 species of reptiles and 53 species of amphibians.

1.2 Dry evergreen forests

As the name suggest, dry evergreen forests occur in area with at least 3 months of continuous drought. Found at elevation below 400 m above the sea level, the forests comprise with less number of dipterocarp species than those in wet evergreen forests. Ten tree species are found indigenous to the forests. The forests, although less humid are hosting higher number of species with 170 mammal species, 356 bird speries, 134 reptile species and 53 amphibian species reported.

1.3 Montane evergreen forests.

Situated at elevation over 1200 m. above the sea level, these cool and humid forests are found scatter on mountain range of Northern and North-eastern Thailand. The montane evergeen forests have been reported to be hosting at least 133 species of mammals, over 314 species of birds, over 41 speries of reptiles and 34 species of amphibians.

1.4 Coniferous forests

Comprised of *Pinus kesiya* and *P. merkusi* as dominant species, these monsoonarl forests are found at elevation between 200-1,800 m. above the sea level , mostly in Northern and Northeastern Thailand. 24 species of major vegetation are presented in the forest hosting over 6 species of smaller mammals (rodents), and over 21 birds.

1.5 Mixed deciduous forests

Mixed deciduous forests situated in areas with three distinct seasonal patterns (Summer, Raining season and Winter) over 3 months of continuous drought and annual rainfall below 1,600 mm. Scattered through out Central Plain, Northern region and North-eastern region, the forests comprise of appoximately 20 species of upper canopy trees and over 10 species of bamboos. The forests are habitats of over 137 mammal species, over 285 bird species, 67 reptile species and over 27 species of amphibians.

1.6 Deciduous dipterocarp forests

Found at elevation between 100-1000 m. above the sea level, mostly in Northeastern plateau, the forests comprise with deciduous dipterocarps as index species. Over 92 species of mammals, 102 species of birds and 38 species of reptiles are reported in the forests.

1.7 Scrub forests

Scrub forests are found in areas of poor quality, shallow or highly acidic soil , with annual percipitation below 800 mm. The forests are subjected to frequent forest fire, limiting reproductivity of large trees and, hence, enabling various scrub species to become dominant vegetation. The forests are common in Northeastern Thailand.

1.8 Grasslands

Although sharing similar ecological features to scrub forests, grasslands cover greater areas than the scrub forests including several parts of important protected areas. Fifteen species of mammals, mostly smalls, species, have been found in the grasslands, -in addition to 154 species of birds and 12 species of amphibians.

1.9 Mangrove forests

Once extensive, mangrove forests in Thailand are now restricted to mostly selected1 Western coasts of Southern Thailand. The latest report by the Royal Forest Department estimated total area of mangrove at 1,085,050 rai (173,608 ha). The forest's vegetation comprises of 74 species of higher plants and approximately 170 species of mushrooms and fungi. Recognized as important habitats for marine species, the mangrove have been found to host approximately 82 species of fishes, 65 species of crab and over 10 species of mollusks. Mangroves also habitats of various terrestrial animals including about 38 species of insects, 32 species of reptiles, 204 species of birds and 6 species of amphibians.

1.10 Beach forests

Occurred on sandy beaches, the forests comprise of mostly drought and saline tolerant plant species. Notable ones are perhaps selected orchid species such as Sarcanthus, Rananthera and Vanda.

1.11 Peat swamp forests

Simply described as flooded forest lands, peat swamp forests are sometime classified. as a category of wetlands rather than another type of forest. Department of Land Development has estimated coverage of peat swamp forests at 400,000 rai (64,000 ha) in which 283,300 rai (45,328' ha) are found in Narativas province. The largest peat swamp forest remain today, Pru To Dang, is also situated in Narativas provinces, covering area of about 10,000 rai (16000 ha). Peat swamp forests are complex ecosystem comprizing over 470 species of plants and hosting over 27 species, of mammals, 15 bird species, 24 species of reptiles and 100 species of fishes.

2.Agricultural ecosystems

Although not of natural origin, agricultural lands constitute an undeniable important part of Thailand's ecosystem diversity, due largely to their sheer size. Approximately 18% of the country or 175 millions rai (28 millions ha) are cultivated lands. Unlike natural ecosystems, agricultural land is much less complex and diverse in features and compositions.

Agricultural ecosystems in Thailand can be sub-divided into 3 systems, Slash and Burn., rain-fed and irrigation supplemented. Slash and Burn systems occur in approximately 25 millions rai (4 millions ha) of land, mostly in mountainous areas of Northern Thailand. The rain-fed systems occur in more fertile areas where natural percipitation is dependable. Presenty, over 112 millions rai (17.92 millions ha) are rain-fed cultivated fields. The irrigation-supplemented systems, in contrust to previously mentioned systems, occur in better developed areas and best suit for intensive farming, practices. The system usually yields high productivity and is currently occured over 36 millions rai (5.26 million ha) of land.

Diversity of agriculture ecosytems depends, for most part on varieties of cultivated crops and commercial plants species. These include 32 varieties of bananas, 21 varieties of jack fruits, 10 varieties of pammellos, 12 varieties of rambutans, 12 varieties of coconuts and 86 varieties of durians.

3. Freshwater ecosystems

Freshwater ecosystems have been natural habitats which are poorly accounted for, due largely to size and diversity of the ecosystems themselves. The ecosystems , now called by certain texts and researchers as freshwater wetlands, cover various kinds of reserviors including , rivers canals, ponds, swamps, paddy fields as well as other man made irrigation infrastructures. Lastest compilation of information on diversity of freshwater ecosystems by the OEPP (1995) has found over 570 species of fresh water fishes including 133 endemic species and 3 species believed to be extinct. In addition, 120 species of crustaceans and 272 mollusk species have also been accounted as fresh water inhabitants.

Sixteen natural wetlands listed by the Wetland International are fresh water ecosystems. Considerable number of additional freshwater wetlands are likely to be included to the listing in the near future, especially when the National Inventory of Natural Wetland will be completed in early 1998. The Inventory is the OEPP's initiative, funded by Danish Cooperation on Environment and Development (DANCED) , to survey all natural wetlands known to exist in the country and will surely yield greater amount of information on biodiversity's components of fresh water ecosystems.

4. Coastal Ecosystems

With coastline of approximately 2,614 km. and 258 islands, coastal zone is undoubtedly an. important ecosystem in Thailand. Diversity in coastal ecosystems can be described in accordance to each type of the ecosystems as follow;

4.1 Mud flats or muddy beaches

Mud flats are areas connected to mangrove forests and hence, riched with nutrients and other deposited sediments. Approximately 22 species of mollusks and 15 species of crabs have been reported to be inhabited in the mud flats.

4.2 Sandy beaches

Sandy beaches are ecosystems subjected to considerable fluctuation and depended largely on physical features and size of particulate (sand). About 7 species of mollusks and 15 species of crabs have been found on these beaches.

4.3 Rocky beaches

Rocky beaches can be found on coasts of both the Gulf of Thailand and Andaman Sea. Surprisingly , diversity of animal on the rocky beaches is quite considerable with 27 mollusk: species and 8 crab species found.

4.4 Seagrass beds

Scattered through out coastline of Thailand, seagrass beds are perhaps one of the most critical coastal ecosystems due to their roles as nurserys and habitats for various kind of marine species . Twelve species of seagrass are found in Thai water. Seagrass beds have been found to support over 40 species of mollusks, 26 species of crustacean, 3 species of sea turtles (all protected. species) as well as Dugong, one of the most endangered marine mammals.

4.5 Coral reefs

Over 300 coral reefs have been considered as sites with significant importance. Over than 645 species of corals were found in Andaman sea , in addition to 91 species of algae found.

5. Marine Ecosystems

Thailand's marine ecosystems include areas of the Gulf of Thailand and Andaman sea which are seperated by. the peninsular of Singapore, Malaysia and Southern Thailand. Thus, the biological composition of these two areas are, somewhat, different.

There are over 300 species of marine algae in Thailand. No less than 210 species of planktons are found in the Gulf of Thailand and over 108 species existed in Andaman sea. Generally however, marine animals found in Thai water are accounted for relatively small proportion of those found globally. For example, 34 species of cephalopods found in Thailand made up to less than 6% of species reported globally, approximately 600 species. About 14% of sea fished existed in the world (15,000 species) , or at least 2000 species are found in Thailand.. However, with more research, up to 3000 species are expected to be found in Thai water.

Only 36 species of marine reptiles are found in Thailand including 30 species of sea. snakes, 5 species of sea turtles, and single species of salt-water crocodiles. As mentioned in. previous section, coastal ecosystems, Dugongs can be found in Thai water in addition to 20 species of dolphins and toothed whales, and single species of marine whale.

Threat to Biodiversity

Thailand's Biodiversity County Study has described threats to biodiversity's components in accordance to each type of ecosystems. Although certain activities are particularly serious to existence of viable populations of species in specific ecosystems, it is possible to summarize the threats to overall biodiversity of Thailand as follow;

1. Destruction of natural habitat

The most serious and appearance threats to biodiversity in Thailand is undoubtedly the destruction of natural habitats. such destruction has been clearly demonstated by rapid destruction of forest lands during the past 50-100 years. In 1960 , 54% of Thailands was still natural forests. Unfortunatelly, forest coverage was rapidly declined to 34.15% in 1978 and, eventually, to 26.02% or 133,521 sq.km in 1992.

Uncontrolable destruction of natural habitats is a directly consequence of the country's quest for prosperity that have been enjoyed by western countries. For the poors, every piece of lands including, natural lands, are wealth that they are entitled to , and thus available for them to be used for elevating their well being in any means possible. This attitude lead to continuous and

intensive destruction of natural lands in order to enabling various kinds of income generating practices, ranging from agriculture , pasture to aquaculture. Public sector, in some way, is reluctant to mitigate or rectify this destructive practices, as until the last 30 years or so, conservation and , especially, preservation of natural habitats had been viewed as activities which ran counter to national agenda of achieving economic success.

2. Excessive and illegal use of biological resources

Excessive use of biological resources is sometime considered as one of the cause to the: previously mentioned threat, habitat destruction. Similar to the destruction of the natural habitats, over exploitation of biological resources is largely due to efforts to obtain greater economic: prosperity, especially, the shift from harvest for domestic consumption to exploitation for export demand. Biological resources had been viewed as pools of infinite wealth and have thus been acquired without recognizing existence of the resource's carrying capacity. The most evidence example of these excessive use is perhaps the over-harvest of fishery resources. It has been. recorded that number of fishing vessels in Thai water raised from 4000 vessels in 1972 to 13,000 vessels in 1980. This increase in number of fishing vessels was believed of be the main cause of drastic reduction of weight per catch in both Andaman sea and the Gulf of Thailand. It was estimated that harvest of both demersal and pelagic fishes has long reached the carrying capacity since 1970 and present stocks of the fishes are, thus no longer able to support any more vessels.

Equally to, in certain cases, and more detrimental than excessive use of biological resources, is illegal exploitation of natual resources. In effort to conserve little of what remaining of the natural forests, the Royal Forest Department banned forest concession in every natural forest lands in 1989. However, considerable forest lands have still been lost every years due largely to illegal logging. Several protected widlife and plants have also been exploited and collected only to satisfy local and international markets. Many of these wildlife and plants are increasingly obtained from protected areas. For example, full trucks load of orchids have been reported to be collected from Phu Luang Wildlife Sanctuary on regular basis and become easily accessible to buyers at several weekend markets as well as markets oversea. Insufficient manpower to control ilegal trade of protected wildlife and plants, even in presence of CITES, has meant that effective control of the illegal trade remain virtually unfeasible.

3. Land ownership

Land ownership is not only one of the most serious threats to biodiversity but also one of the most controversial. As describe in (1) , pursuing greater wealth for the poor is a national agenda of the highest possible priority. Allowing increase ownership of the land has been seen as one of the path for economic properity for the poors, although the lands may be of ecological and biodiversity importance. Accompanied by poorly structured system of public lands, efforts to giving away lands to the poors have now exceeding any common sense even national conscience to conserve biological resources for future generations , with declaration of natural lands, which are: not "ecologically viable" (deteriorated forests) or recognition of human as integral part of natural. habitats.

In several cases, recognition of local community's roles in conserving natural habitats is sustainable mean to maintain local biodiversity. Unfortunately, such recognition in Thailand has been applied indiscriminately, resulting in destruction of natural habitat by those who have taken advantage of the official recognition. Community's rights over natural lands, especially protected. areas, has also become a political issues where ownership of natural resources are debated and negotiated at expense of the conservation.

4. Inappropriate use of biological resources.

In addition to excessive and illegal harvest of biological resources, several kinds of legitimate utilization have proven to be detrimental to biodiversity. The most obvious example is perhaps abandon of diverse landraces by farmers, to make way for newly developed hybrids with higher productivity. Although without detail documentation, 80% of farmers in Thailand and other Southeastern Asian countries are believed to replace their local varieties with few introduced ones. This has significantly increased genetic vulnerability of various economic crops as seen by a number regional epidemics of common plant disease in recent years.

Some destructive practices have been declared illegimate to protect viable stock of biolgical resources . For example, trawling which has been detrimental to aquatic life in coastal areas, is now restricted 3 km away from the shoreline. In practice, however, owners of larger vessels were able to negotiate exemptions with the authorities resulting in restriction of only one km. off the shoreline.

This again demonstrated that conservation of biological resources is still with little or no bargaining power when negotiated with economic interests.

Occationally, misinterpretation of biological resources utilization can lead to destruction of biodiversity. Ecotourism, for instance, has been viewed by many as an appropriate mean for utilization of natural habitat while increasing public appreciation of biological resources and their diversity. However, ecotourisms in Thailand are mostly anything but environmentally sound. Ecotourism has been viewed by many tourist operators as mere touring activities in natural habitats instead of cultural and historical sites, and thus are not awared that special care is need to avoid damage cause by the activities. Recognizable example of destruction of natural habitats by some ecotourism, is a visit to coral reefs in Andaman sea. Without any regards to the coral, anchoring of tourist vessels has seriously damaged coral reefs of Patong bay, Kata beach, Hei island, Dorkmai land, Hui island and a number of areas of Similan island groups. Poorly supervised and instructed. tourists have also been allowed to romp free on the reefs, stepping over and trompling, littering every kind of degradable and non-degradable wastes or even illegal collecting corals for souvenirs. It was believed that considerable proportion of 2,357,100 kg. of coral collected from area off coastline of Phuket province was obtained via tourist operation.

5. Introduction of non-indigenous species

Various alien species in Thailand have long been unaccounted for and several are even misunderstood as native to the country. It's estimated that approximately 80% of 1,000 well known plant species, including fruits, flowering plants and vegetables, have been introduced from oversea (the remaining 20% are believed to be indigenous or at least native). While considerable number of alien species have contributed greatly to agricultural and economic development, some became ecologically harmful and threats to existence of native species. The most recognizable non-indigenous plant species which are detrimental to ecosystem include *Mimosa pigra, Eichhornia* crassipes, *Eupatoriam* odoratum *and* Peninestum *polystachyon*. Unless there is significant increase in recognition of effects from alien species, destruction to local biological resources from the alien species will likely to continuously raise.

6. Development projects

Various development projects have directly and indirectly reduced and destroyed significant number of natural habitats. Road constructiuon, in particular, has been a serious threat to natural habitats. Roads and other motorways have not only destroyed accumulated areas of natural habitats and disturbed wildlife, they have also allowed greater access to biological resources , enabling excessive and illegitimate use of the resources. More importantly , networks of road connecting in "spider-web" fashion through out the country have , in many cases, divided natural lands into small pockets , and made existing population of wildlife and vegetation to became evenmore vulnerable .

Industrial and urban development has also proven to be important agent of destruction to biodiversity. The development permanently convert natural lands beyond any possible natural recovery as well as pollute what remain of natural habitats nearby or even those further away through air and water pollution.

7. Misinformed public

Efforts to control, mitigate and prevent destruction and deterioration of biodiversity in Thailand have been , for the last five years, obstructed by public misunderstanding. It has taken the Royal Thai Government 5 years to finally approve and endose ratification of the Convention on. Biological Diversity . This was largely due to strong opposition to the Convention by a number of Non-Governmental-Organizations (NGOs). Self-regarded as public voice of concerned, the NGOs, mostly lawyers and traditional practitioners based, have opposed urgent ratification of the Convention purely on misinterpretation of the Convention . The NGO's arguements against Thailand's participation in Conference of the Parties as contracting party, ranging from misjudging the Convention as international principle on intellectual property protection regime for biological resources to the most absurd claim that the Convention is a tool for western counties to freely exploit Thailand's biological wealth. The media who never once questioned these claims, has continued to amplify these arguements to general public creating perception suggesting that the ratification is improper actions proposed by the government.

These oppositions and consequent delay in ratifying the Convention have virtually robbed international supports Thailand's should be entitled to during the last five years. With limited public funding available, losing opportunity for available funding is detrimental to various works in protecting biodiversity especially, those with little official recognition such as taxonomic researches.

The oppositions have also hammered any efforts to improve public awareness on conservation and sustainable use of biodiversity suggested under the Convention.

CHAPTER 2

ACTIVITIES PRIOR TO THE ENACTMENT OF NATIONAL STRATEGY ON BIODIVERSITY

Activities prior to the enactment of national strategy on biodiversity

Before enactment of the National Policies, Measures and Plan on Conservation and Sustainable Utilization of Biodiversity, the first administering framework focus directly on biodiversity and the Convention on Biological Diversity, the Royal Thai Government had implemented a considerable number of policy based activities relating to conservation of biodiversity. These activities can be considered as significant contributions to the implementation of Article 6 of the Convention (General Measure for Conservation and Sustainable Use) especially in preparing strategie and legislative frameworks for the implementation of the Convention in addition to the National Policies, Measures and Plans themselves. The activities are summarized in accordance to related articles as follow;

Article 6 : General Measures for Conservation and Sustainable Use

Office of Environmental Policy and Planning (OEPP), a designated focal point for the ratification and implementation of the Convention on Biological Diversity, has long recognized that, in general, effective conservation and sustainable use of biodiversity in Thailand can be achieved by formation of concrete administrative measures on the conservation and utilization of biodiversity and greater availability of information. Thus, under UNEP support, the OEPP had prepared **National Policies, Measures and Plans for Conservation and Sustainable Utilization of Biodiversity Country Study in 1995** and **Thailand's biodiversity.**

Thailand's Biodiversity Country Study which has been prepared through collection of information from various research documents, is aimed to demonstrate the diversity of plants, animals, microbes and ecosystems as well as overall genetic diversity in Thailand. The Country Study also includes conservation activities that have been implemented in the country and assessment of capacity of institutions and human resources that are related to the issue of biodiversity. Previously, activities of concerned agencies were emphasized on resources utilization management rather than biodiversity conservation. Biodiversity was, therefore, treated as mere integral part of biological resources when

considering management action. The Country Study which clearly identifies the solitude importance of biodiversity has successfully promoted greater vision of such issue among institutions in the country. Furthermore, the preparation of the report had extracted the previously 'unidentified information on biodiversity as well as shaded light on some scientific information that had never been officially known. To ensure the quality of the report, the OEPP intends to continuously update information in the report, at least, every three years and uses the Country Study as basic information tool for the implementation of other biodiversity related activities including dissemination of biodiversity information to the general public. UNEP supports for preparation of the Country Study are elaborated in greater detail in chapter 5.

National Policies, Measures and Plans for Conservation Sustainable and Utilization of Biodiversity can be considered as national strategies for implementation of the Convention and direct respense to actions called for by Article 6 of the Convention. Formulated for period between 1998-2002, the National Policies, Measures and Plans clearly signify Thailand's commitment toward comprehensive implementation of the Convention. The presence of the National Policies, Measures and Plans also represents an important step in administering biodiversity and will be essential tools for every institution, organization, agency or individual in mitigating the threat of biodiversity. The National Policies, Measures and Plans are elaborated further, in the next chapter,

To coordinate the implementation of the Convention, the National Committee on Convention on Biological Diversity was established under the National Environment Board in 1993. The National Committee has been instrumental in bringing coordinated atmosphere to biodiversity related works which is essential for the conservation and management works among institutions. Details of the National Committee are elaborated in chapter 4.

Article 8 : In-situ Conservation

Considerable number of natural habitats are secured with legislative measures suggested by Article 8 of the Convention. **Thirteen percents of the total areas of Thailand have been protected by either National Park Act, Wildlife Protection and Presevation Act Forestry Act, or Reserve Forest Act.** These protected areas currently consist of 82 national parks, 37 wildlife sanctuaries and 48 wildlife non-hunting areas with cumulated total areas of approximately 74,542 sq.km. Ministry of Agriculture and Cooperatives by the Royal Forest Department has been well awared of the enormous resources need to maintain and protect the nation's protected areas. In 1990, the department has conducted a study and integrated results obtained from the study in the proposed "conservation, protection, management and development of conserved forest land" project. The project, submitted for funding to the World Bank, was aimed to build capacity of human resources and institutions in protecting biodiversity in the designated protected areas through activities such as designation of the area's boundary and management of buffer zone. However, the project fund has not yet been approved by Global Environment Facility (GEF) due to absence of the country as a participating contracting party to the Convention.

A number of areas outside protected areas are important sources of biodiversity and habitats of numerous endangered and rare species. At present, there has not yet been an legislation addressed facilitation of the conservation of these natural habitats. However, **in certain conditions, the government may declare environmentally protected areas on case by case basis** such as the declaration of 0.5 sq.km. Dun Lumpan forest in Maha Sarakam province to protect a unique habitat of *Thaipotamon chulabhorn*, a rare crab specie endemic only to the forest area. Funding from Environment Fund was allocated for protection of Dun Lampun which will later be elaborated in chapter 6.

In respond to the Convention's initiatives to maintain knowledge, innovations and practices of indigenous and to local communities that are relevant to the conservation and sustainable use of

biological diversity and to promote greater use of such knowledge, **the Royal Forest Department formulated policies to promoted participation of local communities in various forest rehabilitation activities in 1984.** These activities include the establishment of local volunteer groups for forest protection, training on the management of surrounding forests to the local teachers and training of local officials and local population on the rehabilitation and conservation of forest. The department and other related agencies have also drafted **Community Forest Act** where community leader, village committee, district council or district administrative council are enable to proclaim forest lands in their communities as community forest.

Article 9：Ex-situ Conservation

The ex-situ conservation of biodiversity in Thailand has recently been enhanced by **the enactment of the 1992 Department of Agriculture's regulation on the collection and conservation of plant species in-situ, ex-situ and in genebank.** The regulation has provided common procedures for systematic collection and conservation of plant species in the country and from overseas. At present, a number of plant varieties, species and accessions have been collected in research stations, research centres and botanic gardens through out the country. Most of these certtres and stations are operated under the Ministry of Agriculture and Cooperatives and contained collection of main varieties of agricultural and forestry importance.

Collection of freshwater and marine species are mostly kept in either zoos or aquariums of the Department of Fisheries and Burapa University. The Royal Chitladda project has also participated in ex-situ conservatiohy start collecting and storing plant tissues in special plant genetic bank since 1994.

Article 10 : Sustainable Use of Components of Biological Diversity

Concept of sustainable use of biological resources had been integrated in the national agenda prior to the signing of the Convention on Biological Diversity in 1992. However, the concept itself had been frequently neglected and ignored by previous governments in dealing with problems of deteriorated biological resources. The governments seem to favour acute actions such as a ban on logging over mitigating options presented by the concept of sustainable use although such acute actions are frequently ineffective in practice. This can be demonstrated by the reduction of forest land even after the logging ban in 1989.

Majority of activities to promote sustainable use of biological resources by governmental agencies, especially those under **Ministry of Agriculture and Cooperatives, have emphasized largely on the development of local agricultural and fishery practices.** Since 1992, Department of Fishery has conducted a coastal fishery development project to assist small local fishermen along coastal areas in sustainable fishing methods and reduce their conflicts with commercial fishing. The Department of Agriculture has developed and distributed a number of plant varieties, that required low and environmentally sound input, to farmers throughout the country. However, these activities have not yet extended to the large scale covering most of biological resource exploitation and there is greater need to promote the concept of sustainable use in wider area.

Article 11 : Incentive Measures

Provision of incentives for conservation and reduction of incentives for destructive activities have long been implemented even before the signing of the Convention on Biological Diversity. In the early day, **majority of projects on incentive measure had been conducted under initiatives and supports from His Majesty the King and Her Majesty the Queen.** These projects include the Royal project that encourages the local hilltribe communities to give up the cultivation of opium and their “slash and burn” farming practices for sustainable cultivation of temperate crops. Under Her

Majesty's initiatives, local communities had been provided with financial resources and employment opportunities to reduce the community's destructive activities to their surrounding forests.

Apart from the Royal projects, **the OEPP has supported the economic and conservation evaluation of natural resources project** to formulate incentive measures for the conservation of biodiversity at local level using results from the study in 5 southern provinces. The measures will be utilized as basic tools in establishing promotional programs in other areas in the future. Results of the project are expected to be used for delivering appropriate action plan for biodiversity conservation for the areas in the near future.

Article 12 : Research and Training

In general, most of researches and studies conducted under institutions related to the conservation and sustainable development have been aimed to satisfy each institution need. Results obtained from these researches and studies could be used to meet the overall need for biodiversity conservation. Unfortunately, there has not yet been sufficient discussion on this matter between the institutions nor has been an attempt to formulate guidelines for biodiversity research targeting specifically at the conservation of biodiversity at national level just yet.

There have been several attempts to promote more biodiversity related researches in Thailand. In 1989, Science Society of Thailand in cooperation with the United States Agency on International Development (USAID) had arranged **a meeting on the study, research and value of biodiversity in Thailand.** The meeting provided recommendations on priorities related to biodiversity and needs for information, human resources and other institutional supports to ensure efficient implementation of research activities. However, these recommendations were not materialized into any specific policies on administration of researches on biodiversity. Research supported fund has been established to support and promote scientific researches and wider use of results obtained from such researches. The fund which is administrated under the Office of Research Supported Funds, has extended its support for

biodiversity researches through **a special program entitled "Biodiversity Research and Training (BRT)" under cooperation by the National Centre for Genetic Engineering and Biotechnology.** Initiated in 1996, the program is aimed to promote human resource development and capacity building in the sustainable development and utilization of biodiversity including greater support for and training of staff involved in biodiversity researches.

Article 14 : Impact Assessment and Minimizing Adverse Impacts

Although Thailand had a well established system of Environmental Impact Assessment since 1975 which could facilitate the implementation of this article, the system has not yet efficiently served the need for specific assessment on impacts to biodiversity. **Thailand has declared the assessment as one of the compulsory requirements for any development projects by 1992 Enhancement and Conservation of National Environmental Quality Act (B.E. 2535).** Frequently, the Environmental Impact Assessment (EIA) reports, especially those on development projects in natural ecosystems, lack detailed evaluation of impacts of such projects to the endangered, rare of endemic species and can not determine the full extent of the impacts. Many more reports ignore the impacts to biodiversity by dismissing the issue as insignificant matter.

Article 15 : Access to Genetic Resources

In respond to the Convention initiative on systematic access to genetic resources, Working Group on Genetic Resources under the National Committee on Convention on Biological Diversity had held a number of discussions on legislative issues related to the protection and access to biological resources during period between 1993-1994. Toward the end of these series of discussion, the Working Committee which is chaired by Dr. Ampol Senanarong, the Privy Councillor, had drafted **a regulation on access to biological resources.** This regulation consists of principles , conditions, and directions for drafting of contract for equitable sharing of benefits from genetic resources and is aimed to provide a formal system in which a co-ordinated institution and related organizations can be thoroughly

informed on access of genetic resources and thus, ensure that the access and sharing of such resources are conducted in fair and justifiable manner. detail of the regulation is described in annex II.

Article 16：Access to and Transfer of Technology

Although, there has been numerous advance in biotechnology industry in Thailand, the country is still lack expertise on technologies that have direct implications toward the conservation and sustainable use of biodiversity such as biodiversity rapid assessment, screening technology of active ingredients in plant and tissue storage technology. Recognizing this need, the Royal Thai Governrnent has embarked upon facilitating' transfer of technology with other countries and extending **co-operation on scientific and technological development** in according to the governmental policies of 1995 and with respect to proper protection of intellectual property rights. The transfer of technology is expected to be greatly enhanced in the future due to **the strengthen of the protection of intellectual property right by the revision of patent acts in 1992.**

Article 17：Exchange of Information

The exchange of biodiversity information in Thailand is still fairly limited. Majority of these information are scattered around various institutions or with researchers of specific fields, and regularly published as formal annual reports such as annual forestry report of the Royal Forest Department. Dissemination of these annual reports and other documents on biodiversity is relatively insufficient and transfer of biodiversity information through electronic communication (e.g. via computer network) is almost non-existed. This may due to the lack of coordinated network of biodiversity information to ensure systematic management of the information in the country.

Effort to facilitate exchange of information was discussed at International Meeting on Biodiversity held in January 1996 which was partially supported by Danish Cooperation on Environment and Development (DANCED) program. The meeting agreed that greater exchange of information between institutions in Thailand and overseas such as University of Copenhagen and

American Museum of Natural History via the production of CD-ROM should be supported and conducted with participation of Thai researchers to enhance the researcher's capacity in the field of taxonomic works. This kind of proposed cooperation between Thailand and other countries is accordance to the Convention's initiatives and could be considered as another implementation of the Convention itself.

Under the UNEP/OEPP/WCMC* Biodiversity Data Management Project, national guideline and action plan on biodiversity information management were formulated to facilitate greater access and transfer of information relevant to implementation of the Convention. The detail of the project and national guideline/action plan are elaborated in greater extend in chapter 3.

Article 18 : Technical and Scientific Cooperation

Under ASEAN Working Group on Nature Conservation, Thailand has been fully involved in the establishment of regional Center for Biodiversity Conservation and ASEAN Heritage Parks and Reserves, as well as participating in ASEAN Marine Turtle Conservation Program. The regional cooperation as demonstrated by these programs is useful in attracting more funding than programs initiated by individual countries.

Apart from cooperating with ASEAN, **Thailand has also cooperated bilaterally with individual ASEAN countries.** In 1994, Thailand had hosted the Second Meeting of Senior Officials on Malaysia-Thailand Cooperation on Science Technology and Environment which discussed issues on conservation of biodiversity in Thai-Malaysia border and enforcement of laws and regulations in accordance to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Convention on Biological Diversity. Thailand also hosted a **Workshop on Transboundary Protected Areas for Biodiversity Conservation in Indo-Malay peninsula in the**

* World Conservation Monitoring Centre

following year. During the workshop, China and countries in the Indo-Chinese region had agreed to cooperate in exchanging of information and news on protected areas, formulate inventory and protection programs for endangered species as well as establishment of management plans for Mekong river. The Workshop had called for capacity building in the conservation of protected areas through training of officials in each country also.

Article 19 : Handling of Biotechnology and Distribution of Its Benefits

The control of biotechnology application and biosafety have been administered in Thailand by the National Biosafety Committee secretariated by the National Centre for Genetic Engineering and Biotechnology (BIOTEC). The Committee has encouraged related governmental and private institutions to set up committee in each institution to consider, monitor and control researches and experiments related to Genetically Modified Organisms (GMOs) and also encouraged bio-diversity related institutions to follow the guideline for biosafety in genetic engineering and biotechnology experiment at laboratory and field level.

BIOTEC and Department of Agriculture have used Advanced Informed Agreement principle for those who applied for import of GMOs. The applicants must provide information on GMOs to the Department of Agriculture and the Central Committee on Biosafety for approval prior to the import of such GMOs. Applicants must also be responsible, with co-operated institutions, in ensuring safe usage of the GMOs.

However, Thailand is still needed to create a legally binding regulation on the release of GMOs to the environment and an effective mechanism for the approval of the release of GMOs. The country now is planning to formulate a guideline for the risk assessment and management, and is improving the use of the Advanced Informed Agreement principle for the release of GMOs.

CHAPTER 3

NATIONAL STRATEGY FOR IMPLEMENTATION OF THE CONVENTION ON BIOLOGICAL DIVERSITY

National Strategy for implementing the Convention on Biological Diversity

Introduction

Thailand's national strategy on biodiversity, the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity, was not formulated with merely a recognition of provisions under Article 6 of the Convention on Biological Diversity, but also through general realization of need for common framework for implementing biodiversity conservation and management. As demonstrated in previous chapter, Thailand has long been implementing a number of activities relating to biodiversity conservation. However, many of these activities were poorly coordinated and without common objectives which appropriately respond to national need for biodiversity conservation. The National Policies, Measures and Plans were thus created as national administering framework to ensure compliance of biodiversity activities to national interests as well as prioritized actions required for acheiving objectives of the Conventions. Formulated for 5 years period, between 1998-2002, The National Policies, Measure and Plans were approved by the Cabinet on July 15, 1997 and will now become a sole principle framework for biodiversity conservation and management in Thailand.

Background

As master strategy on biodiversity, the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity, were created under participatory frameworks. Following signatory of the Convention on Biological Diversity in 1992, The National Environmental Board had appointed the National Committee on Biodiversity, on June 16, 1993, comprising of representatives from various relevant public agencies, selected NGOs and distinguish local experts. The first task of the National Committee, which is chaired by permanent secretary of Ministry of Agriculture and Cooperatives and coordinated by Office of Environmental Policy and Planning (OEPP), was establishment of a working group to draft a national strategy on biodiversity. To ensure full disclosure and participation, the early draft of the National Policies, Measures and Plans were submitted to a panel of over 100 experts from both governmental agencies and private

organizations at a meeting, organized by OEPP, on July 18-19, 1995 at Amari Watergate Hotel. Recommendations produced at the meeting were integrated into the National Policies, Measures and Plans before presented to the National Committee, the National Environment Board and, then, the Cabinet. The National Policies, Measures and Plans was approved by the Cabinet two years after finalized, on July 15, 1997.

It should be noted, however, that participation of private sector, especially from Non-Governmental Organization or NGOs, in formulating the National Policies, Measures and Plans was seem limited, not by lack of opportunity, but rather an inability of the organizations to provide input at available opportunities. Of approximately 20 NGOs attending the meeting of expert panel in 1995, only 2 organizations provided comments or contributed to written recommendations produced at the meeting. No additional comments were submitted by NGOs prior to presentation of the National Policies, Measures and Plans to the National Environmental Board.

Priority for Implementation

Priorities have been given to 7 strategies formulated under the National Policies, Measures and Plans on the Conservation and Sustainable Utilization of Biodiversity. Measures and activities under each strategy are considered to be of equally importance as indicated by similar timeframe for implementation. Certain activities that are marked for implemention at later stage of the 5 year National Policies, Measures and Plans, are those required completion of other activities as prerequisite, for example management activities that need preliminary information gathering activities beforehand.

Strategies of the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity are ranked in accordance to their priorities as follow;

1. Building capacity of institutions and their staff on the conservation of biodiversity
2. Enhance efficiency in management of protected areas to ensure sustainable protection of overall biodiversity at local level
3. Conservation of species, population and ecosystem

4. Control and monitor processess and activities that threaten existence and richness of biodiversity
5. Promote co - operation between international and national agencies/institutions in conservation and sustainable utilization of biodiversity

Priorities were given to each strategy by a working group under the National Committee on Convention on Biological Diversity, who had been assigned to draft the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity. Under the working groups consideration, strengthening of institutional capacity was identified as the most essentail action for effective conservation and sustainable use of biodiversity in Thailand. At present, there are currently 14 Acts (including drafted Act on Community forest), 2 cabinet decisions, 5 national plans and policies (including the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity) and 2 department regulations, related to conservation of biological diversity. Thus, limited achievement in conserving biodiversity wasn't due to inadequte legislations, but rather a lack of sufficient and proper capacity to enforce and implement provisions of existing laws and regulations. Without improvement of capacity required for effective conservation, if would be difficult if not impossible to achieve goals set out by the remaining strategies.

With larger proportion of natural lands is now protected by some form of legislations, ensuring preservation of biological diversity in protected areas was identified as priority requirement in conservation of biodiversity, especially with regards to in-situ conservation. Under the second strategy, focus has been directed toward harmonizing management of protected areas in order to better reflect need for biodiversity preservation with priority and timeframe for implementation as well as extending coverage of protected area system, enhancing management of protected areas and encouraging more sustainable use of the areas.

Other priority strategies emphasize upon increasing roles and participation of local population, enhancing knowledge of biological resources, and monitoring and controlling effects from human activities to integrity of biodiversity. Athough lesser priorities were given to social aspects of biodiversity management and cooperation with international entities, this by no mean indicates that less efforts will be directed toward these fields. Such priorities only show that these fields are not

emergent need in short - term, but are nevertheless important components in achieving effective conservation and sustainable utilization of biodiversity of the country.

Approaches Undertaken by the National Policies, Measures and Plan on Conservation and Sustainable Utilization of Biodiversity

The National Policies, Measures and Plans have proposed several new and additional initiatives to existing relevant institutions in order to support protection of biodiversity in the country. The main focus of the National Policies, Measures and Plans is however, directed toward emphasizing and enhancing present responsibilities of the institutions which contribute to biodiversity conservation. The institutions should not be burden with large number of innorative tasks while unable to fullfil existing ones. Thus, the National Policies, Measures and Plans were created to act as guideline for the institutions to re-focus their responsibilities toword biological resources in order to better serve the principle of biodiversity conservation and sustainable use.

Contributions of the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity to the national implementation of the Convention on Biological Diversity can be demonstrated by elaborating suggested actions for majors issues addressed under the Convention. As far as the focus of the report is concerned, integration of biodiversity conservation and sustainable use is perhaps the most important issue due largely to the fact that the intergration is a direct translation of provision under Article 6. Other important issues which should also be mentioned include Three objectives of the Convention; conservation, sustainable use and benefit sharing as well as issues related to public exposure to the Convention, such as strengthening awareness. Measures and activities of the National Policies, Measures and Plans for these issues are described in the following sections.

Biodiversity Conservation

As the name suggested, the National Policies, Measures and Plans on Conservation a.nd Sustainable Utilization of Biodiversity have placed majority of their emphasis on Conservation of biodiversity's components. Although a whole strategy of the National Policies, Measures and Plans

(Strategy 4) has been devoted directly toward preservation and maintainence of species, genetic and ecosystem diversity, biodiversity conservation was actually mentioned and integrated into measures and activities of other 6 remainning strategies as well. Suggested actions for biodiversity conservation under the National Policies, Measures and Plans can be elaborated as follow;

In-Situ Conservation *of* Biodiversity

Conservation of biodiversity's components in natural habitats have been mentioned through out the context of the National Policies, Measures and Plans. The most visible ones are perhaps conservation measures under objective 4.1 : Improve capacity in conservation of species, population and genetic diversity in natural habitats (Strategy 4) which are;

1. Measure 4.1.1 : Integrate conservation of species, population and genetic diversity in protected area management

2. Measure 4.1.2 : Use keystone species or well known species as targets to support in-situ conservation, and

3. Measure 4.1.3 : Improve and extend legislative mechanism to protect species

These measures are strongly species oriented with most emphasis on investigating and studying status of flora and fauna diversity in natural habitats. The suggested studies of biodiversity's components are accompanied by legislative reform and formulation of appropriate measures for protecting species underthreated.

On the other hand, measures of the strategy 2 (Enhance efficiency in management of protected areas to ensure sustainable protection of biodiversity) has placed conservation focus toward viable natural habitats especially those which are protected areas. Although, measures under objective 2.1 of the strategy (Establish protected areas to conserve rare and endangered species and ecosystem) do share emphasis on preserving threathened species with those in strategy 4 (objective 4.1), they have been directed to management oriented activities rather than researches, as focused in objective 4.1. In addition, measures under objective 2.3 (To build capacity in protected areas management) and objective 2.4 (To improve preservation of protected areas) also contribute to strengthening of in-situ conservation especially in natural habitats known to be of significant biodiversity importance.

Apart from the above-mentioned strategies, select measures of the remaining strategies are also supportive to in-situ conservation of biodiversity. These measures can be categorized in accordance to their specific emphasis as follow;

1. Capacity building

1.1 Measure 1.4.1 : Support training and continuous education in occupations related to biodiversity (Strategy 1) ;
especially in providing training and short course on biodiversity conservation.

1.2 Measure 6.3.2 : Promote activities that conserve biodiversity in society (strategy 6);
providing support to strengthen role of women and monk in biodiversity conservation.

2. Incentives and public participation

2.1 Measure 3.1.2 : Increase incentive for communities to conserve public lands that are biologically diverse (Strategy 3)

2.2 Measure 3.1.3 : Support maintainance of traditional cultures in biodiversity conservation (Strategy 3)

2.3 Measure 3.3.1 : Promote awareness on value of local knowledge and biological resources (Strategy 3) ;
especially implementation of programs promoting use of local knowledge in conserving biodiversity

2.4 Measure 6.1.1 : Provide incentives for conservation to private firms or organizations who implement biodiversity conservation programmes (Strategy 6)

2.5 Measure 6.1.2 : Support cooperation of private sectors in providing supports to biodiversity conservation (Strategy 6)

3. Information and technological availability for conservation

3.1 Measure 1.2.1 : Build or strengthen national institutions capable of providing information on biodiverstiy conservation and potential value of genetic resources (Strategy 1)

-3.2 Measure 7.4.1 : Promote access and transfer of technologies on conservation and sustainable use of biodiversity (Strategy 7)

Detail of these measures and several others relating to in-situ conservation are as described in Annex I.

Ex-situ Conservation

In contrust to in-situ conservation, measures on ex-situ conservation under the National Policies, Measures and Plans are restricted mostly in Objective 4.2 : Improve capacity of ex-situ conservation to enable biodiversity conservation, public education and support sustainable development (Strategy 4). Although, the measures are comparatively less than those for in-situ conservation, they have comprehensively covered full range of activities which preserve and maintain biological resoures held in collection facilities. More importantly, ex-situ conservation of biodiversity has been considered by the National Policies, Measures and Plans as activity which could 'be enhanced to accommodate relevant and selected in-situ conservation such as species re-introduction, ecological rehabilitation and habitat restoration.

Several measures mentioned in the previous section (in-situ conservation) are undoubtedly supportive to the ex-situ conservation also. This is perhaps a testament that in-situ and and ex-situ conservation should not be implement seperately, but rather, together in self-complementary manner.

Integration of biodiversity conservation and sustainable use into sectoral areas.

With implementing timeframe of 5 years, the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity could be considered as short to medium term administering framework. Thus, focus of the National Policies, Measures and Plans on integration of biodiversity conservation and sustainable use has been guided toward sectors where components or values of biodiversity are directly exploited. Such focus is aimed to urgently ensure proper protection of the components, biological resources, in sectors where use of the resources have been known to be destructive to biodiversity or threathen existence of its components. The sectors

mentioned for integration of conservation and sustainable use principle include tourism, agriculture, forestry and fishery sector.

With recognition of Article 6 (b) ("integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into revelant sectorals or cross-sectoral plans, programmes and policies"), the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity have allocated one of the five sectors (objectives) of Strategy 6 (Promote management of biodiversity in environment and traditional culture) for measures on integration of biodiversity conservation and sustainable use in each sectors. The measures and projects of strategy 6 on the integration are as follow;

Strategy 6 **Promote management of biodiversity in environmental and traditional culture**

Objective 6.5 *To integrate biodiv aity conservation with other activitie !hat utilize biological resources.*

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure *6.5.1* Promote tourism in Thailand in manner that assist biodiversity conservation.	a. Emphasize biodiversity conservation in national and provincial tourism master plans. b. Require cooperation in allocating financial benefits from tourism as funding to maintain biodiversity, c. Formulate a policy emphasizing cultural and biological diversity of Thailand in tourist promotion. d. Campaign for awareness of biodiversity loss as loss of tourist sites and economic revenue. e. Provide knowledge to administrators and local operators on benefits from ecotourism.	- Formulate ecotourism master plan in priority provinces. - Plan education programs on ecotourism. - Establish biodiversity conservation fund in tourist sites by tourist operators. - Promote ecotourism. - Campaign to increase understanding of tour leader, operators and tourists on biodiversity conservation.	TAT SU (Prasarmnit) TAT TAT SU (Prasarmnit)	1998-2002 1999 1998-2002 1998-1999 2000-2002	**50.0** **2.0** **15.0** **15.0** **15.0**
Measure *6.5.2* Integrate biodiversity preservation in agricultural policies,	a. Promote maintaining agricultural plant and indigenous domesticated animal species. b. Support maintaining biodiversity in cultivated fields and pasture through integrated farming systems, natural cultivation etc. c. Promote opportunity for farmers to study successful natural cultivation in order to generate interest in such cultivation.	- Establish and include biodiversity preservation policies into agricultural policies. - Improve farmer's knowledge on importance of indigenous varieties and maintaining agricultural biodiversity. - Financially support farmers in maintaining indigenous varieties. - Conduct study tours on natural agriculture for farmers.	DOA DOLD DOA DOLD DOA DOLD DOA	1999 1999 1999-2001 1999-2002 2001-2002	**2.0** **2.0** **7.0** **7.0** **15.0** **15.0** **9.0**

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure **6.5.3** Integrate biodiversity conservation in forestry policies.	a. Enact additional measures in national forestry master plan requiring rehabilitation of deteriorated forests in every province to maintain natural biodiversity. b. Enact operational directions for maintaining species, ecosystems and genetic pools in national protected areas master plan. c. Require reforestation programmes and forest park plantation to maintain species diversity especially indigenous ones. d. Require logging in development project areas to avoid destruction of biodiversity.	- Enact additional measures in national forestry master plan requiring rehabilitation programmes of deteriorate forests in everyprovincetomaintain natural biodiversity. - Require reforestation programmes and forest park plantation to maintain species diversity especially indigenous species. - Require logging in development project areas to avoid biodiversity destruction. - Rehabilitate deteriorated terrestial forests to maintain biodiversity. - Establish national park, wildlife sanctuary and wildlife non-hunting area master plans with emphasis on maintaining biodiversity. - Establish Biosphere Reserve master plan to maintain biodiversity	RFD RFD RFD Trang/Ranong province RFD RFD RFD	1998-2002 1998-2002 1998-2002 1998-2002 1998-2002 1998-1999	- 30.0 5.0/5.0 50.0 50.0 7.0

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure **6.5.4** Integrate biodiversity conservation In fishery policies.	a. Include rehabilitation and preservation of marine species and ecosystem diversity in Thai sea rehabilitation plan.	- Include rehabilitation and preservation of marine species and ecosystem diversity in Thai sea rehabilitation plan.	DOF	1999	
	b. Emphasize monitoring species diversity and maintaining habitats of endangered aquatic species in fishery policies.	- Emphasize monitoring of species diversity and maintaining habitats of endangered aquatic species in fishery policies.	DOF	1999	-
	c. Require annual reporting of biodiversity status of fishery resources.	- Rehabilitate deteriorated coral reefs to ensure habitats for marine species.	DOF	1998-2002	25.0
		- Monitor biodiversity in freshwater ecosystems.	DOF	1998-2002	15.0
		- Monitor biodiversity in marine ecosystems.	DOF	1998-2002	15.0
		- Report status of biodiversity of fishery resources on annual basic.	DOF	1998-2002	15.0

Note :

TAT : Tourism Authority of Thailand
su : Srinakharinwirot University
DOA : Department of Agriculture
DOLA : Department of Livestock Development
RFD : Royal Forest Department
DOF : Department of Fisheries

Under the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity, institutions responsible for management of biological resources will be assigned further tasks to ensure that their responsibilities are carried out with greater emphasis on biodiversity conservation and sustainable use. The institutions will be supported, as mentioned in budget, for their efforts in revising their adminstering framework as well as implementation of conservation acitivities. In several cases, integration of biodiversity conservation and sustainable use into policies and programmes may not require budget for implementation. For example intitiative on maintaining species diversity especially indigenous species in reforestration and plantation acitivities only require shift in operation strategy without any need for further supporting fund.

Sustainable Utilization of Biological Diversity

Drafted Office of Prime Minister Regulation on Conservation and Utilization of Biological Diversity, an enabling legislation for the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity, does not define term "sustainable use of biological resources" in its text. However, direct translation of the term "sustainable use" has been interpreted with the meaning that indicate long-term use of resources. It is also likely that definition given to the term, if required in future legislations, will be direct translation of that defined by the Convention on Biological Diversity as done so for other terms defined in the Office of Prime Minister Regulation such as "Biological Diversity" and "Biological Resources"

Under the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity, principle of sustainablility has been focused upon use of biological resources by local populations on well as use of the resources in protected areas Strategy 3 of the National Policies, Measures and Plans, "Improve incentives for conservation of biodiversity at local level", includes several measures on enhancing sustainability in utilizing biological resources of local population under Objective 3.1 (To support biodiversity conservation at local level) and Objective 3.2 (To promote and extend sustainable use of biodiversity). Sustainable use is also the main focus of measures order Objective 2.2 (To support sustainable use in protected areas) and Objective 2.3 (To build capacity in protected areas management) of strategy. In all, selected measures and projects on

sustainable use of biodiversity indicated in the National Policies, Measures and Plans can be summarized as follow;

Strategy 2 : Enhance **efficiency** in management of protected areas to ensure sustainable protection of overall biodiversity.

Objective 2.2 To support sustainable use in protected areas

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure 2.2.1 Promote appropriate management of benefits from protected areas.	a. Collect research's results on benefits from protected areas that can be financially estimated as well as those that are intrinsic.	- Collect results of researches related to benefits derived from protected areas, in both financial term and intrinsic value.	OAE	1999	3.0
	b.Classify and evaluate benefits from products and services of protected areas and those benefit from such products and services.	- Conduct studies to classify and evaluate benefits from goods and services of protected areas and classy users of such goods and services.	OAE	1999	2.0
	c. Survey resources in each protected areas, including geography, cultural and historical sites, ecosystems, species and genetic resources, to estimate investing capital.	- Conduct studies to evaluated biological resources asset in protected areas.	OAE	2000	3.0
		- Promote collection of economic information and dissemination of information on utilization of protected area.	OAE	2002	10.0
	d. Disseminate information on benefits from protected areas and provide appropriate means to coordinate usage of different groups	- Formulate guideline on proper management of benefits from protected area.	OAE	2002	2.5

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure 2.2.2 Emphasize communities surround protected areas (in buffer zones and nearby) as assistants in conserving protected areas.	a. Implement protected areas management with local communities to ensure that the management is coincided with daily requirements of the communities. b. Build awareness on sustainable development of protected areas of authorities and communities nearby the areas with community participation. c. Seek supports from communities nearby protected areas in preserving protected area through establishment of committees or volunteers for protected areas management. d. Disseminate documents honoring successful cooperative efforts on protected areas management as examples for other groups e. Develop research methods that can be carried out by communities themselves as basis for appropriate use and dissemination of information to other communities.	- Conduct studies on importance of biodiversity : economic value to local communities. - Organize meetings between officers and local communities to promote awareness in biodiversity conservation. - Establish protected areas mangement committees/volunteers to facilitate biodiversity conservation.	OEPP RFD RFD	1998-2000 1998-2002 1998-2002	**6.0** 2.5 10.0

Objective 2.3 To build capacity in protected areas management.

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure **23.1** Improve management of protected areas to better suit sustainable use.	a. Require authorities of every protected area to report status of conservation of and threat'to biodiversity on annual basis. b. Formulate management plans for groups of protected areas and each protected areas with transparence objectives and coverage of needed and required implementation. c. Organize groups of academics in central, agencies and regional offices to improve and monitor implementation in each protected areas and to provide scientific and technical consultation. d. Support community participation in protected areas management such as volunteers, youth **groups (Young farmers)** as well as surveillance of illegal activities (ie. logging) by the military.	- Annually report on status of biodiversity conservation and theats.	RFD	1998-2002	20.0
		- Conduct consultation meeting to improve management of protected areas.	RFD	1998-2002 (once a year)	5.0
		- Draft a protected area management plan.	RFD	1998-2002	70.0
		- Draft management plans for aguatic organism preservation areas.	DOF	1998-2002	15.0
		- Draft management plans for environmentally protected areas.	OEPP	1998-2002	12.0
		- Train volunteers, youths and military personel to assist in monitoring protected areas.	RFD	1998-2002	7.0
		- Organize conservation networks of communities and produce newsletter to disseminate news and information.	RFD	1998-2002	2.5
		- Compile results from community's researches for dissemination.	RFD	1998, 2002	2.0

Strategy 3: Improve incentives for conservation of biodiversity at local level.
Objective 3. I To support biodiversity conservation at local level.

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure **3.1.1 Support** and **promote efficent** use of agricultural lands to reduce pressure from encroachment of forests and improtant natural ecosystems.	a. Survey, **classify,** and **evaluate** agricultural lands that are valuable for biodiversity conservation.	**- Survey, classify and evaluate** areas with significant value of genetic diversity in order to preserve the areas as genetic sources.	DOA DOLD	1999-2000	5.0 5.0
	b. Promote and support sustainable agriculture, natural agriculture and agricultural forestry especially in areas adjacent to natural ecosystems.	- Encourage **and** promote sustainable agriculture and agricultural forestry especially in buffer zones of protected areas.	DOA	1998-2002	10.0
	c. Legally collect land ownership tax in manners that facilitate conservation.	- Conduct studies to formulate policies and measures on collection of land tax that facilitate conservation.	OAE	1999	1.2

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure **3.1.2** Increase incentives for communities to conserve public lands that are biologically diversed.	a. Support local organizations, such as district councils, in organizing village or districts committees responsible for maintaining and managing biological resources outside protected areas. b. Financially and academically support communities that implement conservation activities. c. Urgently enact Community Forest Act in order to facilitate implementation of forest conservation by communities. d. Accept knowledges of local communites on sustainable, and legitimize local management of natural resources. e. Support communities in maintaining their own biological resources with scientific and technical advices from responsible public agencies.	- Support NGOs and communities who conserve biodiversity. - Conserve and sustainable use biodiversity through use of indigenous knowledge. - Conduct study tours on biodiversity conservation for community leaders. - Increase incentives for communities in conserving public lands that are biologically diverse. - Conducts trainings on involvement of communities in biodiversity conservation. - Support inclusion of provisions on biodiversity conservation in (drafted) Community Forest Act	DEQP OEPP DEQP Office of Permanent Secretary, MOAC office of Permanent Secretary, MOAC RFD	1998-2001 1999-2001 1999-2000 1998-2002 2002 1998	50.0 5.0 10.0 10.0 5.0 not yet specified

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure 3.1.3 Support maintainace of traditional cultures in biodiversity conservation.	a. Study and survey traditions and cultures related to local biodiversity conservation.	- Conduct studies on culture of indigenous communities that is related to biodiversity conservation.	OEPP	1999	**3.0**
	b. Promote and publicize conservation of natural ecosystems with traditional cultures of each local communities.	- Support communities in maintaining local tradition and ecosystem rehabilitation.	OEPP	**2000-2002**	**8.0**
	c. Provide financial assistances and organize trainings for communities in maintaining traditional cultures that recognize values of biodiversity conservation and appropriate practices which do not destroy biodiversitv.	- Release indigenous aquatic species on cultural occasions	DOF	1998-2002	**8.0**
		- Conduct training to provide knowledge on preservation of indigenous culture that recognize value of biodiversity conservation and appropriate occupations that are not destructive to biodiversitv.	MOUA DNE Rajabhat Institutes	1998-2002	15.0 15.0 15.0

Objective 3.2 To promote and ex :nd sustainable use of biodiversity.

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure *3.2.1* Increase benefits to communities from implementing ecotourism.	a. Promote ecotourism in national parks and wildlife sanctuaries with tourism potential.	- Provide education on importance of biodiversity conservation and ecotourism, to communities.	SU (Prasarnmit) Rajabhat Institutes DNE	1999-2000	**8.0** **8.0** **8.0**
	b. Provide opportunities for communities to participate in administering and managing ecotourism on equal term.	- Support communities and NGOs on administering and managing benefit from ecotourism.	TAT	1998-2002	**15.0**
	c. Organize committee to supervise equitable sharing of benefits from tourism between operators and communities.	- Establish a committee to supervise fair benefit sharing of ecotourism between operators and communities.	TAT	1998-2002	5.0
	d. Organize training for communities in operating appropriate ecotourism that is beneficial for conservation and management,	- Train bird watching and natural study leaders in national parks and wildlife sunctuaries, for local youths.	MOUA	1999-2000	10.0
		- Provide bird watching and natural study lessons for school children.	RFD	1998-2002	15.0
	e. Provide knowledge and publicize correct information that is beneficial for conservation and management.	- Train local tourist operators especially those operate ecotourism in national parks.	TAT	1999-2002	5.0
		- Review possibility of conducting ecotourism in wildlife sanctuary.	RFD	1999	2.5
		- Train local tourist operators on ecotourism at sea.	TAT	1998-2000	5.0

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure 3.2.2 Build capacity of communities in maintaining and utilizing agricultural biodiversity.	a. Training and demonstrate integrated agricultural systems, agricultural forestry and natural agriculture. b. Provide information on production of organic fertilizers and biological control.	- Study integrated farming system. - Promote, disseminate and educate integrated farming system. - Prevent and eradicate pests by biological and integrated mean. - Urge maintaining of soil by organic and biological fertilizers - Promote chemical free vegetable and indigenous vegetable species and locate markets for the products - Use of agricultural waste	DOA DOA NRCT (NBCRC) DOA DOA KU	1998-1999 2000-2002 1998-2002 1998-1999 1998-2002 1998-1999	2.0 10.0 30.0 15.0 15.0 5.0
Measure 3.2.3 Develop and publicize roles of traditional herbs and ensure appropriate and sustainable use of the herbs	a. Study, research, and analyze active ingredients of herbs to enable use of the ingredients to benefit health of population. b. Promote and disseminate use of active ingredients to benefit population. c. Develop use of active ingredients for production of health and medical products. d. Conduct studies and researches to certify benefits and quality of herbs referenced by local knowledge, and use information from the researches to benefit health of population. e. Promote and publicize use of traditional herbs and benefits from animal extracted medicines, and provide knowledge on harvesting and breeding herbal plants in order to generate income for communities.	- Study, conduct research and analyze active ingredients of herbs that have health benefits. - Promote and disseminate knowledge on utilization of herbal active ingredients. - Develop active ingredients from studies/researches into health and treatment products (medicines). - Conduct studies and researches to certified benefit and quality of herbs that have been referred by traditional knowledge in order to translate such benefit to the population. - Promote and disseminate knowledge on use of traditional herbs and medicine from animal parts and provide information on harvesting and breeding of herbs in order to generate income for communities.	Department of Medical Sciences Department of Medical Sciences Department of Medical Sciences Department of Medical Sciences Department of Medical Service	1998-2000 1998-2002 1998-2000 1998-2000 2000-2002	10.0 10.0 5.0 5.0 10.0

Note :

OAE	:	Office of Agricultural Economic
OEPP	:	Office of Environmental Policy and Planning
RFD	:	Royal Forest Department
DOA	:	Department of Agriculture
DOLA	:	Department of Livestock Development
DEQP	:	Department of Environmental Quality Promotion
MOAC	:	Ministry of Agriculture and Cooperatives
MOUA	:	Ministry of University Affairs
DNE	:	Department of Non-formal Education
SU	:	Srinakharinwirot University
TAT	:	Tourism Authority of Thailand
NRCT	:	National Research Council of Thailand
NBCRC	:	National Biological Control Research Center
KU	:	Kasetsart University

As indicated in the summarized tables, initiatives on sustainable use are often accompanied by those on conservation. This is perhaps due to the fact that proper use of biological resources can not be practically achieved with out associated conservation efforts and vice versa. Above all, however, sustainable utilization and conservation will be effective in maintaining biological diversity, if both are practiced by local populations who are knowledgeable. Thus providing education and training to the population are then, undeniable and essential components in ensuring sustainable use of biodiversity.

Apart from measures and projects mentioned in the table, there are also a number of projects related to sustainable use of biodiversity in the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity. These projects include collection of indigenous knowledge on conservation and sustainable use of biodiversity (measure 1.3.2 : Support social, religion and cultural researches related to conservation and utilization of biodiversity) and providing correct information on community and farmer right as well as conservation and sustainable use of biodiversity (measure 3.3.2 Support Community rights to local biological resources and farmer's rights as owner of varieties). Although these projects are more closely related to other issues concerning protection of biodiversity than the issue of sustainable use, they are nevertheless contributing elements to success of sustainable utilization of biodiversity in the country.

It is important to note that measures and projects shown in this section are by no mean new and innovative initiatives. They have been, some what, integrated into several legislation and administening framenworks by various public institutions and sectors. For example, promotion of integrated farming systems has been practiced and included in workplans of Department of Agriculture Extension and Department of Agriculture, for sometime, especially with emphasis on maintaining soil fertility through multicropping and crop rotation. Inclusion of these initiative in the National Policies, Measures and Plans are, thus, selection of environmentally sound practises that are benefitial to sustainable use of biodiversity and worth focused in national framework.

Equitable sharing of benefits from biological diversity.

Similar to term "sustainable use", the Office Prime Minister's Regulation on Conservation and Sustainable use of biodiversity does not explicitly define the term " equitable sharing of benefit" derived from utilization of components of biological diversity. The regulation, however, does provide definition for the term "access" to the components that may yield benefits subjected to principle of benefit sharing of the Convention on the Biological Diversity (CBD). Access has been defined, by the regulation, to include "knowing information, coordinating information, finding components of biodiversity (biological/genetic resources), witnessing the components and requesting permission for utilization of the components". With this definition, benefit sharing under the regulation and its enabling administering framework, the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity, would include those derived from bio-prospecting, utilizing information on biological resources and other field and laboratory research activities as well as direct exploitation of the resources in the country.

As one of the countries identified as owners of biological wealth, issue of equitable sharing of benefits in Thailand is closely linked to issue of access and transfer of technology as indicated in context of the Convention on Biological Diversity (Article 15 and 16). With recognition to the need to comply to provision of the Convention, these two issues were comprehensively integrated into the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity. Measures under Objective 7.3 (To ensure appropriate benefits from use of biological resources to Thailand) and Objective 7.4 (To ensure that Thailand receive appropriate technologies on conservation and sustainable use of biodiversity from oversea and is able to transfer existing technology to other country) of Strategy 7 (Promote cooperation between international and national agencies/institutions in Conservation and sustainable utilization of biodiversity) have elaborated actions to be taken to ensure equitable sharing and appropriate technology transfer as follow;

Strategy 7 : **Promote cooperation between international and national agencies/institutions in conservation and sustainable utilization of biodiversity**

Objective 7.3 *To ensure appropriate benefits from use of biological resources to Thailand.*

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure *7.3.1* Equitable and fair sharing of benefits derived from use of biological resources on basis of sustainable use.	a. Enact a regulation and criteria on appropriate access to biological resources.	- Formulate a regulation and criteria on appropriate access to biological resources.	NBC	1999	2.0
	b. Establish the National Biodiversity Center as central agency responsible for coordinating access to biological resources.	- Establish National Biodiversity Center as central agency responsible for coordinating access to biological resources.	NBC	1998-2002	32.5
	c. Formulate a research guideline for international cooperation on researchs and developments of biological resources.	- Formulate a research guideline for international cooperation on researches and developments of biological resources.	NBC	1999	3.0
	d. Formulate a guideline on sharing of benefits related to researches, developments and technology transfers.	- Formulate a guideline on sharing of benefits related to researches, developments and technology transfers.	NBC	1999	2.5
Measure 7.3.2 Legitimate regulation on access to biological resources and benefit sharing criteria.	a. Submit regulation on access to biological resources to the cabinet and acquire approval for enactment as regulation under the Office of Prime Minister.	- Prepare and submit regulation on acess to biological resources to the cabinet and acquire approval for enactment as Office of Prime Ministers regulation.	OEPP	1998	-
	b. Organize meetings of involved agencies and institutions to improve understanding on the regulation,	- Organize meeting of involved agencies and institutions to formulate implementing guideline for the regulation.	NBC	1998-1999	1.5
	c. Strengthen awareness in implementation in accordance to the regulation,	- Promote awarness in implementation in accordance to the guideline	NBC	1999-2002	3.0

Objective 7.4 *To ensure that Thailand receive appropriate technologies on conservation and sustainable use of* ***biodiversity*** *from* ***oversea*** *and is able to* ***transfer*** *existing technologies to other countries.*

Measures	**Implementation**	**Projects**	**Responsible Agencies**	**Duration**	**Budget (million baht)**
Measure **7.4.1** Promote access and transfer of technologies on conservation and sustainable use of biodiversity.	a. Compile lists of technologies required **from oversea** and those that are able to be **transfered** to other countries.	- Compile lists of technologies required **from oversea** and those that are able to be transfered to other countries.	NBC	1999	2.5
	b. Formulate a guideline on technology transfer under fair and mutually agreed term.	- Formulate guideline on access and transfer of technologies.	NBC	1999	2.0
	c. Formulate cooperative guideliner with other countries on access and transfer of technologies protected under intellectual property systems.	- Formulate cooperative guideline with other countries on access and transfer of technologies protected under intellectual property systems.	Department of Intellectual Property	1999	2.0
Measure 7.4.2 Strengthen capacity of the National Biodiversity Center in operating Thailand's Clearing House Mechanism **(CHM).**	a. Establish a networking system to coordinate access and transfer of technologies related to biological diversity.	- Establish a networking system to coordinate access and transfer of technologies related to biological diversity	NBC	1998-1999	5.0
	b. Improve capacity of personnel and acquire equipments that enable more effective operation.	- Improve capacity of personnel and acquire equipments that enable more effective operation.	NBC	2000-2002	5.0
		- Establish research and development network on transfer of technologies on animal genetic resources and genetic resources of animal plants.	DOLD	1999-2000	5.0

Note :

NBC : National Biodiversity Center
OEPP : Office of Environmental Policy and Planning
DOLA : Department of Livestock Development

In addition to the above mentioned measures and projects, the National Policies Measures and Plans also include principle of equitable sharing of benefit in initiative on protect of community's right over local biological resources. Measure 3.3.2 : Support community's right over local biological resources, suggests formulation of implementing guideline on sharing of benefits from harvest of biological resources to communities and farmers who own the resources. Royal Forest Department, Department of Fishery and Department of Livestock Development have been identified as responsible agencies for formulation of the guideline, in 1999 under budget of 2.0 millions ba.ht per each agencies.

Unlike sustainable use, equitable sharing of benefits derived from use of biological diversity is a relatively new issue in Thailand. This is largely due to absence of systematic adminstration and monitoring of access of biological resources in the country. With limited information on the access, it is not possible to determine whether benefits from access are shared on equitable and fair term nor to regulate sharing of benefits themselves. The initatives on benefit sharing, and technology transfers, in the National Policies Measures and Plans, are thus, an innovative and important step in managing biodiversity as well as crucial components in achieving objective of the Convention on Biological Diversity.

Public awareness on importance and benefits of biodiversity

Biodiversity has long been considered as a scientific concept of considerable complexity by general public. Many who interest in biodiversity issues are often found misunderstand or not fully understand the term "biodiversity" and relevant issues on preservation and management of biodiversity. Without such understanding, it is unlikely that the public can effective participate in negotiating management of biodiversity nor be sufficiently competent to involved in conflict resolution process regarding use of biological resources. Limited understanding may also be detrimental to any efforts to implement the Convention on Biological Diversity and other conservation initiatives on - ground - level as public can be easily mislead by politically motivated groups who usually do not completely understand definitions of the terms themselves.

Enhancing public and involved community's awareness and understanding of biodiversity values and conservation need was placed as first priority for actions under the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity. The actions were included in top priority strategy on building capacity for biodiversity conservation (Strategy 1) as measures under objective 1.1 (To increase awareness and appreciation of value and importance of biodiversity). Such measure and accompanied projects are as follow;

Strategy 1 : **Building Capacity of Institutions and Their Staff on the Conservation of Biodiversity.**
Objective 1.1 ***To increase awareness and appreciation of value and imp tance of biodiversity,***

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget [million baht)
Measure 1.1.1 Building awareness in importance and value of biodiversity to culture and society.	a. Continuously provide knowledge on threats to biodiversity and status of biodiversity conservation to general public via various media such as televisions, radios, newspapers, magazines, books, brochures and posters etc. b. Organize slogan, painting and photograph competitions demonstrating awareness of importance and value of biodiversity. General public at all level will be participated in the competition. Winning slogans will be used in promotional programs via different kinds of media. c. Organize additional activities on selected occasions including nature education camps for youths during summer break. d. Honor selected communities or local organizations for their outstanding efforts in conserving biological resources.	- Publish natural science magazines for youths.	DEQP	1998-2002	10.0
		- Compaign to provide knowledge and create awareness of value of biodiversity via radio and television.	RFD	1998-2002	10.0
		- Produce posters and organize slogan, painting, photograph and essay competition on issues related to biodiversity.	DEQP	1998-2002	8.0
		- Organize nature conservation camps for youths (primary & secondary students)	OCID	1998-2002	12.0
		- Honor selected individuals, communities or locals for their outstanding conservation efforts	DEQP	1998-2002	15.0
		- Conduct public relation programs to improve public understanding on importance of conservation and proper use of fishery resources	DOF	1998-2002	2.0
		- Promote biodiversity conservation	Office of Permanent Secretary, MOAC	1998-2002	2.5

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure 1.1.2 Use existing education system to improve awareness on biodiversity and need in conserving biodiversity.	a. Develop an additional subject on basic knowledge of biodiversity in existing experience building program for elementary students. b. Develop additional subjects on importance of biodiversity to human survival in secondary and high school curriculum. c. Develop and publish self-learning text books on biodiversity for teaching of biology in elementary and secondary schools. d. Develop teaching tools on biodiversity including videoes, tape cassettes, posters, cards, games for distributing to elementary schools nation wide. e. Develop additional short training courses identifying importance of biodiversity for institutions that offer special training courses for administrators and high ranking decision makers. f. Encourage development of information sources on biodiversity for local communities using existing infrastructure such as library, village's news hall, center for tradition knowledge education etc.	- Publish additional reading text books on "biodiversity" for primary and secondary students. - Develop Environmental study curriculum (Project 1998) on biodiversity for primary and secondary schools. - Include courses on biodiversity conservation as non-elective courses in university. - Produce education tools, including videoes, slides, tape cassetes on biodiversity. - Produce teacher handbooks on biodiversity and distribute throughout the country - Train teachers on teaching subjects related to biodiversity - Train officers at operational level on biodiversity management. - Train administering officers on biodiversity management. - Support NGOs in establishing conservation new centers in communities with apropriate potential.	DCID DGE MOUA DCID DCID DCID Office of Permanent secretary, MOAC Office of Permanent secretary, MOAC DEQD RFD DOF	1999-2000 1999-2000 1998-2002 1999-2000 1998-1999 1999-2000 1998-2002 1998-2002 1998-2002	10.0 10.0 10.0 20.0 20.0 12.0 10.0 10.0 5.0 5.0 5.0

Measures	Implementation	Projects	Responsible Agencies	Duration	Budget (million baht)
Measure **1.1.3** Integrate concerns for biodiversity loss in external (outside classroom) education.	a. Organize external education programs on biological characteristic of plants animals and ecosystems in national parks and wildlife sanctuaries. b. Encourage expansion of youth trainings for conservation of forest resources nation wide. c. Establish or improve existing tourist service centers in every national parks to act as sources of biodiversity information for visitors using various media. d. Establish natural history museums or nature research centers in areas that contain unique ecosystems such as Songkhla lake, Huai Kha Kaeng Wildlife Sanctuary etc.	- Promote forest plantation for youth farmers	DOA	1998-2002	7.0
		-Eastablish Songkhla Lake Nature Study Center	DOF	1998-2002	30.0
		- Establish nature study centers : Huey Kha Kaeng, Chiang Dow and Kow Arng Ru Nai	RFD	1998-2002	20.0
		- Improve tourist service centers in national parks and ensure that biodiversity information is distributed by the centers.	RFD	1998-2002	30.0
		- Develop mangrove research station, Ranong province into international mangrove research center.	RFD	1998-2002	30.0
		- Grganize forest conservation camps for youth in every provice and conduct youth training.	RFD	1998-2002	30.0
Measure **1.1.4** Strengthen knowledge and basic understanding of biodiversity to those who are "core" in diiseminating information and providing education.	a. Organize field education programs for members of media to disseminate knowledge on biodiversity conservation. b. Organize continuous training courses on biodiversity conservation for teachers nation wide.	- Conduct trainings and study tours on biodiversity conservation for media	DEQP	1998, 2000, 2002	3.0
		- Conduct trainings and study tours on biodiversity conservation for teachers thoughout the country.	DGE	1998-2002	5.0
		- Conduct trainings on conservation of nature and diversity of aguatic organisms for teachers	DOF	1998-2002	5.0
		- Publish documents and disseminate knowledge on biodiversity	OEPP	1998-2002	10.0

Note :

DEQP	:	Department of Environmental Quality Promotion
RFD	:	Royal Forest Department
DCID	:	Department of Curriculum and Instraction Develpment
DOF	:	Department of Fisheries
MOAC	:	Ministry of Agriculture and Cooperatives
DGE	:	Department of General Education
MOUA	:	Ministry of University Affairs

As demonstrated in the above-mentioned measures and projects, improving understanding of biodiversity issues of students at all level is the prime focus of awareness building strategy. Providing education on the issue to childrens has been considered as worthwhile inventment for the future. With corrected and scientifically sound knowledge on biodiversity, future generations will be better equiped and competent to tackle challanges in preserving biodiversity in the upcoming years.

Conclusion

The National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity, as elaborated in this chapter, have comprehensively undertaken almost every possible activities for conservation, sustainable use and equitable sharing of benefits from utilization of biodiversity. Being a rather short term administrative framework, the National Policies Measures and Plans will be throughly evaluated after the year 2002. Although, focus will be placed on assessment to determine whether measures and activities under the National Polices, Measures and Plans have proven to be appropriately responses to national needs in implementing the Convention and maintaining viable components of biodiversity, it will also be important to find out how extensive is the measures and activities been implemented. Such assessment will likely to, for the first time, systematically and officially demonstrate capacity available for implementing the Convention in Thailand.

CHAPTER 4

COORDINATION MECHANISMS FOR IMPLEMENTATION OF THE CONVENTION ON BIOLOGICAL DIVERSITY

Coordination mechanisms for implementation of the Convention on Biological Diversity

During approximately five years period, between signing of the Convention on Biological Diversity and approval of the ratification of the Convention, the national coordinating mechanism on implementation of the Convention has been the National Committee on the Convention on Biological Diversity. Today, the National Committee is often credited with the ratification and formulation of the national strategy, The National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity. In actual fact, however, the National Committee has achieved tremendously in directing governmental attentions toward concerned issues of the Convention and given raise to sectoral coodination bodies with aims to effectively integrate. provisions of the Convention into strategies of each sector. Thus, it is indeed appropriate to consider tasks carried out by the National Committee as great contribution's to realization of the Convention's objetives in the country, especially the Article 6.

The National Committee on the Convention on Biological Diversity

Introduction

It was immediately recognized, after the signing of the Convention on Biological Diversity, that implementation of the Convention would indeed require cross-sectional efforts. Establishment. of a mechanism to accomodate cooperation of relevant agencies and coordinate their implementation of the Convention, was, thus, seen as institutional action of first priority. Such need was realised with formation of the National Committee on the Convention on Biological Diversity, under the National Environment Board (NEB), on June 16, 1993. Direct link between the Committee and the NEB is significantly importance for administering biodiversity and other CBD-related activities in Thailand. The NEB whose members are environmentally related Ministers (notable, Minister of Agriculture and Cooperatives Minister of Science, Technology and Environment, Minister of Public Health, Minister of Foreign Affair etc.) and chaired by appointed deputy Prime Minister, has been assuming role in resoluting the Cabinet's decisions on

environmental issues since 1992. Thus, in principle, the Cabinet has to accept decisions reached by the NEB as its own. Bureaucratically, this process enable the National Committee on the Convention on Biological Diversity to strongly influence the decision making process at the highest possible level.

It is unfortunate, however, that policy making in Thailand is not straight forward nor principle conscious process. Oversensitive politicians, fueled by misinterpretation made by several academics, have often taken inappropriate actions detrimental to implementation of the Convention on Biological Diversity. Notable example is perhaps the ratification of the Convention itself. Members of the NEB were misled, by legal academics, to submit the ratification proposal before the Special Committee for International Conventions under the Ministry of Foreign Affairs, based on the academic's intepretation of the Convention that recommends formulation of new laws. After 20 grueling months, however, the Special Committee, although remained insist upon need for new laws, was unable to tell what or which kind of laws they had seen required. The Ministry of Foreign Affairs eventually rejected recommendations of the Special Committee altogether in 1997, and put forward notions supporting urgent ratification without passing any law.

Despite political weakness, the National Committee on the Convention on Biological Diversity has remained a firm and supportive mechanism in facilitating implementation of the Convention. The committee itself has been, from the start, unique and innovative in structure and component Prior to formal establishment of the Committee, it was agreed that the national coordinating mechanism on the Convention should be centered and handled by Ministry of Science, Technology and Environment who had signed, on behalf of the Royal Thai Government, the Convention, at UNCED meeting in 1992. An agencies under the Ministry, the office of Environmental Policy and Planning (OEPP) was identified as the most qualified body to manage the mechanism and was thus appointed as secretariat. Usually, the head of the Ministry hosting secretariat body, would be invited to chair the committee. The National Committee on the Convention on Biological Diversity was, on the other hand, chaired by Permanent Secretary of the Ministry of Agriculture and Cooperatives. This innovative appointment has now been realized as a crucial step that enabling the Ministry of Agriculture and Cooperative to recognize it's roles and responsibilities in implementing the Convention especially, on the ground level.

Components of the National Committee on the Convention on Biological Diversity has been alterring very little, over 5 years of its existence. These changes were merely aimed to allow more appropriate institutions and groups to be represented in tackling different tasks. For example, over two years ago, the Committee was restructured, with new members, to enable shifting of focus from ratification issues to formulation of national strategy, the National Policies, Measures and Plans on conservation and sustainable use of Biodiversity. The Present National Committee is still chaired by Permanent Secretary of Ministry of Agriculture and Cooperative, assisted by Inspector General of the Ministry and Secretary General of the OEPP as vice-chairpersons. The Committee comprise of representatives from 9 public agencies of Ministry of Agriculture and Cooperatives, Ministry of Science, Technology and Environment, Ministry of Public Health and Ministry of Foriegn Affairs. An NGO and 3 research institutes are also represented in the National Committee. Six distinguished experts from Universities and relevant institutions were invited to participate and consult the Committee in carrying out their deliberation. The OEPP remain secretariat body of the National Committee and thus ensuring continuity of coordinating works and activities.

Roles and Responsibilities

Initially, the National Committee on the Convention on Biological Diversity was assigned to act as the NEB's consultant on the ratification of the Convention. Thus, main tasks of the Committee were then focused on considering the most appropriate means for the ratification as well as to determine immediate actions required under the Convention. After the ratification was approved by the NEB on March 30, 1994, however, the initial tasks of the National Committee were then formally completed. Restructuring roles, responsibilities and, as mentioned, components of the National Committee was, then, needed to enable the committee to meet new and urgent challenges at hand. Such challenges were realized as implementation of national strategy on biodiversity, the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity. The National Policies Measures and Plans, formulated by a selected working group under the National Committee, is administering frameworks on biodiversity for 1998 - 2002 and undoubtedly the prime responsibility of the National Committee. In views of the National Committee, the implementation of the National Policies, Measures and Plans is not a domestic task to preserve and maintain biodiversity and its components in the county, but also implementation of

the Convention, ensuring continuous responsibility of the National Committee, from the ratification to implementation.

Institutionally, current responsibilities were described, under the NEB's order of August 15, 1996, as follow;

1. Provide consultation on the national policies and measures on conservation and sustainable use of biodiversity to the National Environment Board (NEB).
2. Prepare for policy, administering and legistative implementation of conservation and sustainable use of biodiversity in accordance to the Convention on Biological Diversity
3. Coordinated with domestic and international institutions in implementing the Convention on Biological Diversity.
4. Formulate National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity.
5. Coordinate implementation of the National Policies, Measures and Plans on Conservation on Sustainable Utilization of Biodiversity.
6. Supervise and monitor implementation of the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity.
7. Support scientific and technological development related to use of biodiversity.
8. Establish appropriate working groups for specific tasks.
9. Implement other tasks assigned by the NEB.

Apart from responsibilities on the National Policies, Measures and Plans, as mentioned above, the National Committee was assigned to assume the role of national focal point for implementing the Convention on Biological Diversily, a task undertaken by the Committee since first established. This responsibility is also reflected under task 2 where policies, guidelines or even laws may be prepared by the National Committee to 'better respond of specific provisions of the Convention, notably the access to genetic resources.

Achievement

The formulation of policies, guidelines and laws in accordance to the Convention, stated under the NEB's order, is, by no mean, new to the National Committee. Matter of fact, the National Committee's greatest achievements are perhaps the establishment of policies, guidelines and regulations (legislative means) derived from realization of the Convention's objectives and Articles. Notable one is the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity, mentioned in the previous section. Using mandatory tasks assigned by the NEB's order, the National Committee established selected working groups to draft the policies, guidelines or regulations as well as to supervise reporting of issues on biodiversity's components and conservation. For the National Policies, Measures and Plans, a working group was established, on August 18, 1993, to determine their context, with Emeritus professor Tweesak Piyakam from Chulalongkorn University as chairman. Process taken to finalize the National Policies, Measures, and Plans, including participatory approach, was elaborated in detail in the previous chapter.

Another significant institutional achievement of the National Committee is the drafted regulation on access to biological resources. The drafted regulation was a product form efforts of the working group on genetic resources, established under the National Committee and chaired by H.E. Dr. Ampol Senanarong, the Privy Councillor. Presense of H.E. Dr. Senanarong was extremely vital for general acceptance of the draft regulation since it was first formulated. A notable pioneer in agricultural development in his own right, Hon Dr. Seinanarong is well respected as an experience public administrator on biological resources management as well as for his current position as agricultural advisor to His Majesty the King. Thus, when the drafted regulation was finalized, it was viewed as not merely a new legislative mean produced by a group of experts pooled together by the National Committee, but rather a carefully crafted system produced with best mind, knowledge and experience in the field of biological resources administation. In order to ensure full participation in the regulation making process, the draft regulation were submitted to another panel of over to experts from governmental and private agencies on April 19, 1995. The National Committee later approved the revised regulation, which incorporated recommendation made by the expert panel, on June 29, 1995. Context of the drafted regulation is described in Annex ...

The most importance achievement of the National Committee on the Convention on Biological Diversity is perhaps the approval of ratification of the Convention itself. The National Committee, especially its secretariat, the Office of Environmental Policy and Planning (OEPP), has succeeded in making the government and relevant public agencies understand and recognize crucial importance for Thailand in becoming a contracting party to the Convention. This achievement is indeed remarkable in the country that, for the last five years, has had one of the strongest public opposition against and greatest ignorance to *the* Convention anywhere in *the world.* Many private organizations, especially *lawyer and* traditional practitioner based *NGOs, remain oppose the* Convention *by* their *own* misinterpretation today. Thus, approval *for the* Convention *is not only an* institutional achievement but *also triumph of truth and common sense of public agencies, notable the OEPP, over misleded irrational* notions *voiced by incompetent groups of presumed academics.*

Current and future development

Tasks undertaken by the National Committee on the Convention on Biological Diversity are presently more diversified than any time in its 5 years history. Under pioneering efforts of the secretariat, the Office of Environmental Policy and Planning (OEPP), the National Committee are now supervising activities on specific issues, related to the Convention including identification of threatened components of biodiversity, alien species, biodiversity data management and cooperation with relevant international initiatives. A list of threatened vertebrate has been compiled by the OEPP, Under principle recommendation of the National Committee through consultation of distinguished experts at an OEPP arranged meeting. The list is now finalized for publishing and will be available for interested researchers, policy makers and general public in 1998.

Recently, a working group on alien species was established under the National Committee, with Dr. Banpot Napompeth, Chairpman of the National Biosafety Committee, as chairperson. The working group is now undertaking inventory of available and existing information on alien species especially those whose countries or regions of origin can be traced. Another working group was also established to identify and facilitate implementation of clearing house mechanism of the Convention. Entitled “the working group on biodiversity data management)‘, the working group has considered and endosed the National Guideline and Action Plan on Biodiversity Data Management,

formulated by 1995 - 1997 OEPP/OWEP/WCMC* project on Thailand's Biodiversity Data Management. These National Guideline and Action Plan are now been integrated into the National Policies,. Measures and Action Plan on Conservation and Sustainable Utilization of Biodiversity, as facilitating approaches for handling information relevant to biodiversity researches and decision making processes. Detail of the National Guideline and Action Plan were described in the next chapter.

As the Convention on Biological Diversity is increasingly become a principle for managing biological resources at international level, existing global initiatives, especially those responsible by organizations of the United Nations, have restructured themselves to better meet provisions of the Convention. The most visible example is the UNESCO's Man and Biosphere (MAB) programme where new operational strategy, Seville Strategy, was adopted to enable the programme's biosphere: reserves to better serve as experiment sites for implementing the Convention. The restructuring of the MAB programme was, almost immediately, responded by direct coordination between secretariat of the National Committee on the Convention on Biological Diversity and secretariat of the National Committee on UNESCO's MAB programme. Under this coordination, 2 meetings were organized to inform relevant agencies about the MAB programme and relationship between the programme and the Conventions. In addition, objectives of the MAB programme as well as the Seville Strategy were integrated as measures under the National Policies, Measures and Plans on the Conservation and Sustainable Utilization of Biodiversity, further solidifying cooperation between the implementation of the MAB programme and the Convention in the future,

At the Cabinet meeting on July 15 1997, the government did not only approve the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity with budget of 5.467 billion baht, but also endosed, in principle, drafted Prime Minister Office's Regulation on Conservation and Utilization of Biodiversity. The regulation, which has how been resubmitted to the Cabinet, after revision by the Office of the Council of State and relevant institutions, will legitimize establishment of new national coordinating body on biodiversity entitled "the National Committee on Conservation and Utilization of Biodiversity". This new committee is expected to exceed administering authority of the present National Committee on the Convention on Biological Diversity, with Deputy Prime Minister, appointed as vice-chairperson of the NEB, a.s

the Committee's chairperson. A new national focal point created under the regulation, the National Biodiversity Centre, will serve as a secretariat of the new National Committee. Tasks and responsibilities assigned for the National Committee are considerably more extensive than those of any coordinating body ever been established, including the present National Committee, with full coverage of institutional and legislative actions for implementation of the Convention and the national strategy. In total, 12 responsibilities were assigned for the National Committee as follow.

1. Propose guidelines, policies, measures and plans on conservation and utilization of biodiversity to the Cabinet

2. Provide recommendations on plans or projects related to conservation and utilization of biodiversity to the Cabinet.

3. Coordinate foreign assistance programmes for implementation of plans on conservation and utilization of biodiversity.

4. Formulate regulations, criteria and process for access to biological resources, obtaining benefits from the resources and transfer of relerant technologies.

5. Provide consultation and consider problems on policies and measures on conservation and utilization of biodiversity for the Cabinet.

6. Enable policy, administering and legislative implementation of conservation and utilization of biodiversity in accordance to principles and objectives of the Convention on Biological Diversity

7. Act as coordinating center between governmental agencies or other committees, established by laws or the cabinet's decisions and related to conservation and sustainable utilization of biodiversity as well as foreign and international agencies or organizations.

8. Coordinate cooperation with relevant public and private agencies in order to support, urge, monitor, evaluated and solve problems from implementation of guidelines, policies, measures and plans on conservation and utilization of biodiversity.

9. Coordinate implementation of governmental agencies to ensure compliance to guidelines, policies, measures or plans on conservation and utilization of biodiversity that are approved by the Cabinet.

10. Appointed sub-committees or working group to implement specific tasks assigned by the National Committee on Conservation and Utilization of Biodiversity

11. Nominate individuals to the Cabinet or relevant agencies, as representatives to international meetings on conservation and utilization of biodiversity or meeting with foreign and international organizations.

12. Implement other tasks assigned by the Cabinet for enabling successful conservation and utilization of biodiversity.

Present tasks and issues discussed by the existing National Committee on the Convention on Biological Diversity will likely to be fall and continuously implemented under this new National Committee. This would, inturn, mean that the new secretariat, the National Biodiversity Center, will undertake responsibility as the national focal point, in implementing the Convention and the National Policies, Measures and Plans as well as communicating with the Convention's secretariat and other relevant foreign and international agencies. The Center, proposed as an institution under the National Science and Technology Development Agency, will be an independent agency responsible specifically on biodiversity issues with substantial flexibility, which will likely to facilitate implementation of biodiversity activities even further.

Other biodiversity committees

Due to increasing profile of the Convention on Biological Diversity and related issues, several inn-a-agency committees were established to coordinate efforts in managing specific components of biodiversity, responsible by the agencies, as well as in carrying out initiatives of the National Committee on the Convention of Biological Diversity. Notable one is perhaps the Working Group on Implementation of Biodiversity Issues of the Ministry of Agriculture and Cooperatives. the Working Group itself can be considered a testament of recognition by the Ministry that implementation of the Convention, especially at ground level, is direct concerns of the Ministry. In addition, a number of committees were established by agencies under the Ministry of Agriculture and Cooperatives, to further coordinate tasks refined by the Ministry's Working Group. Presence of these committees are also of significant importance since the agencies, such as Royal Forest Department, are large and complex organizations with many specific sections, and thus required institutional body to identified relevant responsible inviduals and sections and hence, enabling coordination of the agency's efforts.

By assigning responsibility to determine areas and issues of biodiversity that relevant to the institution's own and existing works, the Working Group of the Ministry of Agriculture and Cooperative is indeed a sound model of institutional means in integrating biodiversity concerns into plans, policies and activities of specific sectors, as suggested by Article 6 (b). this model is very crucial for implementation of the Convention on Biological Diversity in Thailand as the National Commitee, alone could not achieve comprehensive integration of biodiversity conservation and sustainable use, institutionally and practically, into any sectors without actual integration by relevant institutions (Ministries and agencies), responsible for the sectors, themselves.

The Ministry of Agriculture and Cooperative's Working group is presently chaired by General Inspector of the Ministry and responsible for the following tasks;

1. Prepare the Ministry of Agriculture and Cooperative's plans and management programmes for biodiversity conservation.
2. Formulate necessary measures for in-situ and ex-situ conservation and promoting sustainable use of biological resources.
3. Monitor implementation of biodiversity issues which are concerns and reponsibilities of the Ministry of Agriculture and Cooperatives.
4. Coodinate domestic and foreign institutions in implementing action plans and measures relating to implementation of the Convention on Biological Diversity as well as preservation and sustainble use of biodiversity.
5. Monitor decisions from meetings and operational plans under the Convention on Biological Diversity in order to determine the Ministry workplans and implementation in accordance to global plans as well as nominate individuals to attend international meetings related the Convention.

3 agencies of the Ministry of Agriculture and Cooperatives established their own committees on biodiversity, in respond to Ministry's greater interest on biodiversity issues and establishment of the above-mentioned Ministry's Working Group. These agencies are Royal Forest Department, Department of Fisheries and Department of Agricultures. Responsibilities of these committees are, somewhat, similar to those of the Ministry's Working Group, mentioned in previous paragraph, however, with focus on sectors of their concerns. Distinct features and responsibilities of the committees can be briefly described as follow;

1. Royal Forest Department (RFD) : Committee on implementation of activities related to forest biodiversity

Chaired by Director General of RFD, the committee was assigned to recommend implementations which are compliance to provisions and commitment stated under the Convention on Biological Diversity. Recommendations produced by the committee will be used in formulating common guiding procedures of RFD. These procedures may include measures on in-situ and ex-situ conservation, and sustainable use of biodiversity's components as well as plans for conservation and protection of forest biodiversity. The committee also responsibles for monitoring implementation of biodiversity issues at national level and communicating with relevant domestic and international agencies on implementation of the Convention with emphasis on forest biodiversity.

2. Department of Fisheries (DOF) : Committee on implementation of activities on biodiversity of Department of Fisheries

The Committee, chaired by Director General of DOF, is burdened with responsibilities which are similar to the RFD's committee. These responsibilities include formulation of plans and management programmes on conservation and sustainable use of aquatic biodiversity, creating conservation measures for protection of biodiversity's components with fishery potential, monitoring implementation of biodiversity issues at national level, and coordinating with relevant domestic and international agencies.

3. Department of Agriculture (DOA): Committee on biodiversity

Deputy Director General of Department of Agriculture was appointed as a chairperson of the committee. Unlike the previously mentioned committees, tasks of the DOA's committee are focused on implementation at operational level including formulation DOA's policy on operational guideline on biodiversity as well as monitoring and evaluating results from implementation of biodiversity activities of the Department. The most important aspect of the committee is perhaps the responsibility of the committee to consider drafting of new laws or altering existing ones of the Department, in order to ensure better compliance to the Convention on Biological Diversity.

4. Department of Lifestock Development :

Conclusion

There is little doubt that presence of the National Committee on the Convention on Biological Diversity has been, for the last five years, a vital institutional mechanism for implementation of the Convention in the country. Achievements of the National Committee are not only restricted to success in obtaining approval for the ratification of the Convention nor formulation of national strategies on biodiversity, but also recognition of importance in implementing the Convention by institutions which are instumental in achieving the Convention's objectives. With efforts of the National Committee, relevant institutions were able to realize their obligation to the Convention and the national strategies, and thus translate initiatives and principles, guided by the National Committee, into fruitful and practical actions. This was evidenced by the establishment of coordination bodies, both in Ministry of Agriculture and Cooperatives and selected Ministry's agencies, enabling considerable integration of the Convention's initiatives into concerned sectors.

CHAPTER5

INTERNATIONALASSISTANCES

International assistance

Supports and assistances from international and foreign organizations have long been instrumental in preparing for and carrying out implementation of the Convention on Biological Diversity in Thailand. Since the signing of the Convention in 1992, institutional and financial supports committed from public sector, has not been, in any way, sufficient in operating bulk of activities suggested by the Convention. In most cases, foreign and international funding and cooperation were perhaps the only available and reliable supporting sources for urgently needed initatives. Success of various legistative and research activities relating to biodiversity is thus owned much to kind contributions from oversea.

Notable international sources of assistance for implementation of the Convention, during the last five years, have been the United Nations Environmental Programme (UNEP) and the Danish Government. Their contributions to biodiversity initiatives in Thailand have been of particulary importance, as they were directed, for most part, toward activities associated with building of a basic framework for the implementation of the Convention. Other international and foreign bodies, such as International Development Research Centre (IDRC), the United States Agency on International Development (USAID) and Canadian International Development Agency (CIDA), although were supportive at lesser extend, should also be highly commended for their interest and attention to biodiversity conservation in Thailand. Assistances provided by these organizations can be elaborated as follow;

1. United Nations Environmental Programme (UNEP)

With regards to the Convention on Biological Diversity, the United Nations Environmental Programme (UNEP) was the first international organization that offered supports for preparing for actual implementation of the Convention in Thailand. As host country of the UNEP Regional Office for Asia and Pacific, the UNEP was particularly eagered, from the start, to assist the country in strengthening understanding of biodiversity and its components. This interest was realized with selection of Thailand as one of participated countries in implementing the UNEP's "Guideline for Preparation of Country Studies on Biological Diversity" in November 1991. Funding from UNEP, was then provided for the Office of Environmental Policy and Planning (OEPP) for compiling

Thailands own biodiversity country study in accordance to the UNEP Guideline. The Country study was completed in July 1992 and became the first national report on biodiversity ever produced in the country.

Despite considerable efforts, the 1992 Biodiversity Country Study has been viewed by many to be incomprehensive in presenting biodiversity's components of the county. Thus, there was a general recognition that the Country Study should be properly revised to widen presentation of biodiversity and relating issues to general public and global community alike.

Realizing significant importance in translating the recognition into practical actions, the UNEP again offered financial assistance to support preparation of revised Thailand's Biodiversity Country Study. UNEP's interest in providing such support was commendable as the UNEP's Head of Biodiversity Unit personally travelled to Bangkok to directly discuss funding for the county study with officers of the OEPP in 1994. Following the discussion, the OEPP gratefully accepted the UNEP's financially support of approximately US $ 618,000 for period between August 1994 to March 1997. Since then, the Thailand's Biodiversity Country Study has become a priority compilation of research finding on biodiversity of the OEPP, pooling together all available researches and scientists in every field of biological sciences.

Assistances from the UNEP for the Country Study were not only a research funding for national compilation of information on biodiversity and its compunents, but they also, for the first time, allowed the national focal point of the Convention, the OEPP, to informally create a network of competent experts on biological resources. These experts were later become viable contributors to various biodiversity initiatives including preparation of a Red List of vertabrate species, compilation of records on non-indigenous species, drafting of a regulation on access to genetic resources or even formulation of the national strategy on biodiversity, the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity. Without the UNEP supported country study programme, many of scientists and experts working on biodiversity initiatives may have never been identified and thus could not contribute to implementation of the Convention, at least not at the level they have done so.

Although financial support from UNEP was ceased at the conclusion of the Country Study Programme on March 1997, the OEPP has still been working on improving context of the Country Study onward with their own resources. The OEPP are currently finalizing the Country Study, taking into account other recent initiatives on biodiversity, for printing. The Thailand's Biodiversity Country Study will be available in early 1998.

2. **Danish Cooperation on Environment and Development (DANCED)**

Scientific cooperation between Thailand and Denmark have been recorded for over one hundred years. In the early days, the Danish East Asiatic Company was greatly involved in natural science researches of many Danish scientists through shipping of collected specimens to Denmark. This long history of research by the Danish scientists is clearly evidenced by the vast number of plant specimen collected and maintained in Danish universities and museums today. the researches also allow selected Danish researchers to be among biologists and zoologists with best expertise on Thailand's biological resources.

Danish expertise on Thailand's biological resources was incidently fit profiles of cooperation which the Danish government was looking for during 1990's. The Danish Cooperation on Environment and Development (DANCED) programme was introduced as not only as funding sources for environmental activities but also as collaborative regime where both financial and scientific assistance can be extend to joint initiatives including those on biodiversity.

The Office of Environmental Policy and Planning (OEPP) and Ministry of Science, Technology and Environment were first approached by DANCED in 1994. After several discussions and negotiations, the DANCED was agreed to provide supports for facilitating preparation for implementation of the Convention on Biological Diversity. DANCED funded programme entitled "Support for Thailand's Implementation of the Convention on Biological Diversity" was then initiated with the OEPP as implementing agency. Under the programme DANCED supported two experts from World Conservation union (IUCN), Mr. Jeffrey McNeely and Mr. Dan Navid, to assist assigned working groups on drafting of national strategy on biodiversity and regulation on access to genetic resources. The national strategy, National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity, was later approved

by the Cabinet on July 15, 1997, and hence signified contribution of the DANCED to the implementation of Article 6 of the Convention. As for the drafted regulation on access to genetic resource, DANCED did not only provided funding for the IUCN experts but also for expense in organizing a meeting of a panel of over 70 experts to review the draft regulatiqn.

One of the most outstanding and perhaps visible activity organized under DANCED's funding was the Conference on Prospects of Cooperation on Biodiversity Activities held in Chiang Rai between January 15 -19, 1996. The conference was the first international meeting on biodiversity in Thailand and specifically arranged for openning up opportunity for and cooperation between Thai and foreign scientitists and researchers. The meeting also raised profile of biodiversity issues among relevant public and private institutions in Thailand and enabling integration of views from oversea experts, including supported Danish experts, and local researchers on biodiversity issues of significant importances including the ratification of the Convention. Recommendations derived from the conference are currently used by DANCED as guiding principles for offering support to biodiversity initiatives today.

Another notable DANCED's support to the implementation of the Convention in Thailand was financial resources provided for compiling lists of selected species. Three lists were produced under DANCED support; List of Forest Insect, Bryophyte and Algae, and quickly become one of the most recognized publications for taxonomists, scientists and interested general public. The list of forest insects, in particular, has been use by the British Natural History Museum for identifying insect specimen in one of the largest collection in the world. Demand for the other lists has also been considerable especially the list of bryophyte which was requested by scientists and research institution from various part of the world. The most important aspects of these publications was perhaps recognition of demand for taxonomic referrences for specific groups of species. This recognition allowed the OEPP to secure public funding for an additional list of species, the List of Fishes, in 1997.

In addition to financial support to the implementation of the Convention, DANCED also granted funding for national inventory of natural wetlands. Such funding was indirectly supportive to the Convention as specific natural habitats and their components were identified and properly

documented. Once concluded, the national inventory will surely assist in administering management of biodiversity, and further signify contribution of the DANCED to conservation and sustainable use of biodiversity in Thailand.

3. **Other international cooperations**

Assistance and cooperation from other international and foreign agencies, although often short-term, were usually innovative and considerably useful.

In 1994, OEPP cooperated with the **Canadian Centre for Remote Sensing (CCRS)** in implementing a project entitled "Electronic Atlas of Agenda : Biodiversity" or ELADA 21 with financial support from IDRC. Under the project, a software was introduced to OEPP for delivering characteristics and status of Thailand's biodiversity via digital hypermedia scenario. Information compiled by Thailand's Biodiversity Country Study programme had been utilized for the scenario enabling users to directly interact with the information from basic desktop computer facilities. the ELADA 21 and accompanied scenarios were well received by the general public with substantial national exposure through publication of articles on the projects in two national newpapers and a magazine. Although technology of the ELADA 21 has now been viewed, somewhat, Obsolete by several data management experts due to limited applications, the project has successfully drawn attention toward importance of proper and appropriate presentation of biodiversity information in the country.

Canadian government also participated in conservation oriented project. In 1996, **Canadian International Development Agency (CIDA)** financially support an OEPP's initiative on cultural forest in Maha Sarakarm prorince. Under the project, a forest land with cultural importance was rehabilitated and replanted with participation from local communities assigned to maintain and manage the forest land.

Significant proportion of researches on biodiversity components in Thailands has been with foreign supports and/or collaboration. There was thus a recognition that priority areas and necessary resources should be identified to allow better focus on issues where scientific findings are urgently required. in 1989, Science Society of Thailand cooperated with **the United States Agency on**

International Development (USAID) in organizing a meeting on study, research and value of biodiversity in Thailand. Recommendations of the meeting acknowledged type of biodiversity researches required and need for information, human resources and institutional supports for implementing the researches. However, these recommendations weren't translated into any specific policies for administering biodiversity research in the country.

Conclusion

International cooperations have played an important role in implementing the Convention on Biological Diversity in Thailand. More importantly, however, the cooperations have been wisely manage by the national focal point, The OEPP, and relevant agencies to better accommodate lack of sufficient public funding for biodiversity activities. Fora example, funding from the UNEP was not used for only the preparation of the biodiversity country study, but also allocated for organizing several meetings to formulate the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity. In many case, supports from international and foreign sources were instrumental to success in implementing biodiversity activities, not as major funding of the activities but rather additional small grants for completing the activities. Thus, productiveness of international collaboration initiatives on biodiversity will continue to be rely, not on how many sources and how much fund the local institutes can secure, but the manner inwhich the international 'supports are managed and allocated.

CHAPTER 6

CAPACITY FOR IMPLEMENTING THE CONVENTION ON BIOLOGICAL DIVERSITY

Capacity for implementation of the Convention on Biological Diversity

It has been relatively difficult to determine capacity available for effective implementation of provisions stated under the Convention on Biological Diversity. This is largely due to wide range of activities relating to the Convention and, at considerable extends, limited recognition of contributions from these activities to the implementation of the Conventions. Actual realization of the capacity was first known to the national focal point, the Office of Environmental Policy and Planning (OEPP), during preparation of a revised Thailand's Biodiversity Country study in 1994. Compilation of information required for the Country Study did not only reveal lack of supporting capacity for accessing information but also limited availability of appropriate institutional framework and sufficient human resources for identification as well as management of biodiversity's components. Systematic evaluation of capacity and resources for biodiversity activities, was later conducted under UNEP/OEPP/WCMC Biodiversity Data Management Project (1995 - 1998) and further confirmed capacity associated problems, sighted earlier by the Country Study Programe, From the above mentioned initiatives and coordination experience of the national focal point, capacity for implementation of the Convention can be elaborated as follow;

Institutional Capacity

There are indeed existing public agencies responsible for conservation and utilization of almost every components of biological diversity. Institutional obstruction to comprehensive realization of the Convention's objectives, is, thus, not an absence of governmental organizations and mechanisms responsible for the components, but rather, a lack of proper attention, commitment, and operational plan, for certain aspects of conservation and sustainable utilization of biodiversity. This is evidenced by limited views and recommendations of relevant institutions on innovative issues such as invasive alien species, access to genetic resources, threatened status of species and biodiversity information management. Such limitation has sometime been detrimental to the implementation of the Convention not only as inability to offer practical suggestions of the implementation in the institution's responsible sectors (forestry, fishery and agriculture etc.) but also as occational expression of views which ran counter to initiatives and provisions of the Conventions.

In total, 6 Ministries; Ministry of Science, Technology and Environment, Ministry of Agriculture and Cooperatives, Ministy of Foreign Affairs, Ministry of Commerce, Ministry of Public Heath and Ministry of University Affairs, are responsible for issues related to implementation of the Convention. With exception of Ministry of Commerce and Ministy of University Affairs, These Ministries, are represented in the national coordinating body, the National Committee on the Convention on Biological Diversity, thus ensuring relatively comprehensive participation of relevant institutions. In actual fact, the Ministry of Commerce and Ministry of University Affairs, are not completely absenced from the national coordination process since a legal councellor of the Ministry of Commerce and scientists from selected universities were invited to participate as distinguished experts in the National Committee. Participated institutions in the National Committee were mentioned in the previous chapter.

As elaborated also in the previous chapter. The National Committee on the Convention on Biological Diversity has been significantly contributing to improvement of institution's recognition of their roles and responsibility in implementing the Convention. The recognition has been vital to strengthening of capacity in the institutions, especially their efficiency and effectiveness. Coordination between institutions via the National Committee, has allowed the institutions to became aware and able to identify areas and activities of overlap, redundancy or with conflict of interests. For example with coordination from the National Committee, the Department of Agriculture could recognized promotion of productive crops in areas adjacent to protected areas may prove to be detrimental to effort to restrict stock of threatened wildlife within the protected areas, responsible by the Royal Forest Department.

Institutionally, effective capacity building for implementation of the Convention and related activities is not a quantity oriented task. Involved institutions, especially the Ministry of Agriculture and Cooperatives, are mostly comprised with extensive networks of regional, provincial and local offices and stations including those in specific natural habitats such as protected areas. The Royal Forest Department, for example, have offices in every provinces, amphers (adminstrative sub-division of province) and designated limits (areas of 2 - 3 provinces) as well as in every protected areas and forest plantations. Coverage of governmental authorities for administering biological resources is thus considerably sufficient.

Problems associated with development of institutional capacity for implementing the Convention is a lack of appropriate focus of the institutions themselves. Although, the National Committee has been successful in enabling the institutions to recognized their role in the implementation of the Convention, such recognition has not yet been adequtely translated into institutional actions, Committees and working groups established in the institutions. notably the Ministry of Agriculture and Cooperatives (see previous chapter), may signify awareness of the institutions in implementing the Convention, but, however, are mere coordinating mechanisms and not new institutional bodies created to directly responsitble for specific aspects of the implementation or any other biodiversity issues. There is, presently, an attempt by the Ministry to establish Natural Resources and Biodiversity Institute (NREM). Unfortunately, the institute, as planned, will likely to be another coordinating body with additional responsibility on preparing the Ministry's own administering frameworks. In someway, estublishment of NREM is perhaps placing unnecessary bureaucratic burden on any reform required for enabling the Ministry's agencies to be more responsive to provision of the Convention. This mainly because the presently existed ministrial coordinating body, the Working Group on Implementation of Biodiversity Issues (see previous chapter for detail), could be equipped with authorities, if the Ministry choose to do so, to urgenty conduct appropriate institutional reforms in concerned agencies ie. Royal Forest Department, Department of Agricuture and Department of Fishery.

Realistically, institutional reform in Thailand is, by no mean, an easy task. It is commonly known, but not publicly accepted, that re-organization, restructure and reform of public agencies are not only responsibility driven but also incentive driven. When an institution is re-organized with newly assigned sections, divisions or offices, it usually implies that more funding would be allocated to issues and tasks responsible by the new sections, divisions and offices. Additional funding may thus be considered as one of the motivation for institution to restructure. This bureaucratic practise, is, although still existed in many institutions, is no longer feasible for adjusting institutional make up especially in present period of limited budget and worsen economic situation. Without new and additional funding, restructuring institution and/or establishing new responsible sectional bodies would mean allocating financial resources from other tasks with lesser priorities, an action which many institutions usually hesitate. Even if the institutions are convinced to allocate existing fund, from other activities on natural resources management, for special

assigned biodiversity units and their tasks, they will not be able to do so effectively since priorities given to issues and tasks in the institutions are often unclear or, in several case, have not been or could not be specifically determined due to politically motivated nature of their administration themselves.

Commitments, especially action oriented ones, is thus the key to successful development of institutional capacity for implementation of the Conventions and related tasks. The institutions should be able to demonstrate that individuals and sections have been assigned with responsibilities over specific issues mentioned by the Convention, notably the in-situ/ex-situ conservation, sustainable use and access to genetic resources. Existing coordination bodies of the institutions are probably the best mechanisms available for identifying and recommending such individuals and sections. Once assigned, these bodies could enhance their role even further by ensuring continuous and effective coordination of individuals and sections, among themselves and between new sections and pre-existing ones.

Human resources capacity

There is no doubt that the most serious problem associated with human resource capacity is limited availability of the resources itself. Lack of workforce for biodiversity activities is, somewhat, common to those experienced by other biological researches and studies where the insufficiency is particularly severe in highly specialised groups such as taxonomists. This is by no mean, a newly found problem, but rather, a lingering one that has been largely ignored for many years. Notable example is the "Flora of Thailand" Project where no significant number of additional staff was provided during over 30 years of existence.

Recent surveys* of human resources available for biodiversity activities have estimated number of staffs in relevant institutions to be less than one-six of the total. These estimation may be overstated as all researching personnel were accounted as those involved in biodiversity works. With several institutions are still unable to specifically identify activities and tasks in respond to provisions of the Convention on Biological Diversity (as elaborated in previous section), it would

* Institutional Surveys of UNEP/OEPP/WCMC Thailand's Biodiversity Data Management (BDM) Project (19951998)

be improbable, if not impossible, to determine exactly how many individuals are responsible for biodiversity activities in the institutions. At present, diversified types of research and management activities are qualified as biodiversity related, thus, large number of individuals may, directly and indirectly contributed to conservation and sustainable use of biodiversity, however at different level and extend.

Although accurate number of those who participate in implementation of the Convention may have never been known, it was cleared from the surveys and other data compilation works, such as Biodiversity Country Study, that available workforce is nowhere sufficient for completing even basic tasks suggested by the Convention. Identifying components of biodiversity, for instance, is mostly rested with small groups of taxonomists and assistances in either public agencies or universities. Acquiring addition skilled personnel for these governmentally funded institutions has been increasingly difficult during the last 15-20 years. By indiscriminately enforcing current workforce policy, the government has been cutting back on recruiting new public servants in order to place greater emphasis and funding on improving quality and qualification of existing personnel. The policy, although is appropriate for bureaucratic based institutes (ie. Ministry of Interior), devastated management and research oriented agencies where employing graduates with expertise on recently developed scientific fields (ie. new genetic identification technique) is a key in enhancing knowledge on and capacity for management of specific components of biodiversity.

Effects from workforce policy of the government has forced many institutions to employ some graduates on temporary basis. Unfortunatety, it has become more difficult to find such employees in recent years, due to combination of low pay, poor worker services and absence of working incentives. Those temporary employed by the government, unlike public servants, are not eligible for promotion or pay-raise. In many case, the employees are troubled greatly by the delay in payment of their monthly salary as long as 6 months. High salary and adequate service provided by private firms have drawn a large number of temporary employees, newly graduates and even life-time employed public servants to the firms causing so called “brain draining” from public institutions. There has not, however, been any evidences suggesting that the government do recognize “brain draining” as inevitable result of vacuum created by their empoyment policy and poor efforts to improve welfare of their skilled temporary employees.

It is fortunate, however, that problems of workforce shortage has been recognized and tackled by the national strategy, the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity. Commitments to biodiversity conservation and management, especially researched on biological resources, was visualized as crucial basis for improving human resources capacity. Thus, priority under National Measure 1.4.2 : Strengthen incentives for occupation on biodiversity at local and field level (Strategy 1 : Building Capacity of Institutions and Their Staff on Conservation of Biodiversity), was directed toward formulation and enactment of policy for conservation and sustainable use of biodiversity in each institutions. The Measure also suggests increasing of positions for biodiversity researchers, especially at stations in protected areas, and declaration of specific biodiversity expertizes, such as taxonomy, conservation ecology and population genetic as, deficient expertizes of public sector. These later actions, can be effectively implemented only when the institution's own policies on biodiversity are in place, however. In meantime, capacity of existing workforce, would be diversified and enhance by funding participation in training courses and short post-graduated programmes offered by domestic, foreign and international institutes, as suggested also by the Measure. Similar to other governmental administrative frameworks, successful implementation of ther measure and other components of the National Policies, Measures and Plan, is depended, for most part, on financial resources which will be discussed in next section

From BDM institutional survey, it was found that 67% of workforce in public institutions are university graduated in which 40% of these are gruduated with Master degree or higher. Percentage of staffs with Master or higher degree in universities is higher than those in other public agencies. This is due to the fact that vast majority of universities does offer positions with, at least, a Master degree, while ministerial institution (ie. departments and offices) are comfortable to employ workers with qualification equal to or above undergradated degree.

Although present education system has sufficiently produced gruduates to supply human resources need of public institutions, it remains uncertain whether newly recruited graduates are equipped with necessary skills or expertizes to meet challenge introduced by the Convention. From various researches and identification activities, such as Biodiversity Country Study, it is appearance that new employees with highly specialist expertises, are almost negligible, especially in public

agencies. Many experts on specific fields in the agencies today, did not acquire their expertize from university education but rather from their own interest and studies into such fields. It is fair to say that biodiversity researchers have become experts in their chosen fields not by enhancing their knowledge obtained from their formal education but rather by tackling new research challenges which nobody attend to.

Qualification for those administering and managing conservation and sustainable use of biodiversity is also an area of concern. With progressive discussion of the Convention's Conference of the Parties (COP) and its advisory bodies, implementation of the Convention has become increasingly multi-discipline oriented. Satisfying commitments to the Convention would thus require relevant institutions to integrate various skills for specifically concerned issues. Presently, universities in Thailand do offer post-graduate programmes on integrated management of natural resources. However, most programmes fall short of adequately addressing biodiversity issues. Notable field with significant importance is perhaps laws and legislations. Faculties of law in many universities are now having strong interest toward issues of legitimate rights over use and ownership of natural resources, in particular those of local and indigenous communities. However, when dicussing such rights for access and benefit sharing relating to biodiversity, most fell to recognize and integrate principles of existing intellectual property protection regime, resulting in conclusion wrongly accuses the Convention as mean for foreign exploitation of biodiversity's components of Thailand. Today, only few legal experts explicitly recognize extend of access and benefit sharing issues under the Convention as integrate areas where legal protection of biological resources, scientific development and appropriate commerce procedures are all involved.

These quality associated problems have been properly addressed by the National Policies, Measures and Plans on Conservation and Sustainable utilization of biodiversity under Strategy 1 : "Building Capacity of Institutions and Their Staff on the Conservation of Biodiversity". Measure 1.4.1 of the Strategy (Support training and continuous education in occupations related to biodiversity) encourages universities to produce greater specialized personnel, particularly taxononists, through provision of scholarship for under-graduate and Master degree students in different fields. The Measure also demonstrate national intention to improve university capacity in producing gruduates with existing biodiversity related programmes. This measure is thus a very

crucial step in improving capacity of human resources for biodiversity activities at grassroot level, as universities and education institutions will be allowed and supported in integrating greater context on biodiversity and the Convention in their curriculums (biodiversity programmes) and thus enabling students to acquire multi-discipline skills. In addition to emphasis on improving production of graduates, the universities and education institutions are also viewed as competent bodies for conducting capacity building programmes for public servants and employees of relevant governmental agencies as well as staffs of private organizations. Short courses and trainings were suggested by the Measure as activities which universities could organise as contribution to improving workforce knowledge and skill in implementing the Convention.

It is not possible to address human resources capacity for implementing the Convention on Biological Diversity without taking into account financial and institutional capacity available, On simplest term, lacking institutional commitment and policies on biodiversity issues would result in limited funding which, in turn, restricted recruitment of new personnel or provision of training for existing ones. Thus institutional willingness is perhaps even more importance to improving human resources, than the financial resources themselves. In several cases, funding from private and oversea donor enabled institutions to acquire additional skilled workers and experts, conduct training programmes or even purchasing necessary infrastructure and facilities. However, without specific commitments and policies, capacity building of human resources was often temporary. Once the funding was used up, initiatives supported by the fund were usually ceased to continue, no new graduated was recruited, no training was further conducted and thus disabling any more capacity building efforts of the institutions.

As elaborated earlier, Inappropriate policy on labourforce can prove to be detrimental to human resources capacity. Politically motivated policies of institutions, in parlicular, have occationally disrupted development of skills and expertize of staffs and even on going research and management activities inwhich the staffs are assigned to. Policies of some institutions have caused shifting of positions of public servants serveral times a years. The positions would then become unsettled causing hesitation to conduct any capacily building initiatives for workforce and/or preventing existing ones to be any effective.

Financial Capacity

As information and authorities for implementation of the Convention on Biological Diversity are mostly with public agencies and organizations, securing sufficient and consistent financial resources for the agencies are undoubtedly necessary. However, since the signing of the Convention on Biological Diversity in 1992, there has not been any significant increase in budget allocated to relevant agencies responsible for either identification of biodiversity's components, conservation of the components or coordination of conservation efforts. For example, Royal Forest Herbarium, who responsible for classification of over 15,000 collected specimen, is still funded with budget of merely 1 millions baht (approx as $ 27,000) annually with 10 working staffs.

Limited funding for biodiversity activities, in several cases, was a direct result of lack of recognition and awareness of institutional roles and responsibilities in conserving and managing biodiversity. Although the institutional recognition has now been significantly improved, through efforts of the National Committee on the Convetnion on Biological Diversity (see previous chapter for detail), additional funding for new and existing biodiversity related tasks is, by no mean, increased or forthcoming in significant amounts. This is perhaps a reflection of overall attention and priority given to environmental issues by the' government in general. Ministry of Science, Technology and Environment, since was signified as an authority on environment matters, has remained one of the least funded ministry in the government. When budget cut is called for, especially during current economic crisis, funding for environmental management and conservation, including those on biodiversity, is the first to suffer.

Although, some may argue that the governmental bodies responsible for carrying out biodiversity activities at ground level, such as Ministry of Agriculture and Cooperatives, are properly and sufficiently funded, the works of the public agencies are often extremely diversified and thus, can not guarantee that funding will eventually fell to works which are complementary to national prioriry on biodiversity nor any urgent agenda of the Convention. This is perhaps evidence by the fact that great amount of funding are still directed toward infrastructure and other mega-projects and less is spent on identifying biodiversity components of the institution's concern.

Almost as if suggesting that the government has anticipated lack of public sector's own financial commitment to environmental matter, the 1992 Enhancement and Conservation of National Environmental Quality Act (B.E. 2535) has enabled establishment of the "Environmental Fund" for providing necessary, financial resources for environmental activities of urgent and immediate need. However, since it was first created, contributions from the Environmental Fund to implementation of the Convention and other biodiversity activities have been limited, especially among the public institutions themselves. Section 23 of the 1992 Act clearly states that most activities eligible for disbursement from the Environment fund are pollution control oriented. These include grants for investment in waste treatment facilities, loan for public pollution control system, or loan for private firms for installing their own waste treatment systems. As for other environmental activities, the section simply mentions, under heading 4, that aids or grants may be provided "to support any activities concerning promotion and conservation of environmental quality as the Fund Committee sees fit and with the approval of the National Environment Board". No mention of biodiversity activities in sections related to the Environment Fund in the Act.

Administeration of the Environmental Fund for the last six years, has been remarkably consistented with principles and priorities outlined by the 1992 Act. Latest report of the Fund (September 30, 1997) revealed that 5,397.87 millions baht from total disbursement of 6,383.94 millions baht were granted to projects under the Action Plan for Reduction and Eradication of Pollution in Pollution Controlled Areas. Policy for distribution of the Environmental Fund, formulated by the designated Fund Committee, has specified disbursement of the Fund only to initiatives and investments under individual provincial action plans on environmental quality management or pollution control programmes in Pollution Controlled Areas. This virtually implies any biodiversity related activities, including taxonomic research, field study, habitat management, capacity building, institutional restructure or legislation review, are presently ineligible to receive any support from the Environmental Fund, despite certain urgency of some of these activities.

This policy however does not apply to projects proposed by Non-Governmental Organizations (NGOs). Approximately 88.27 millions bahts were reported to be approved for 18 NGO's projects on various natural resources conservation and rehabilitation. Thus, it could be concluded that scope of initiatives eligible for the fund, for the NGOs, is significantly greater than

that of public sector. Such policy may allow the private organizations, especially poorly funded NGOs, to obtain much needed financial resources for conservation of selected biodiversity's components, especially at local level. However, contributions from the funded NGOs projects to national implementation of the Convention are usually uncertain as they were implemented without recognition of national strategy on biodiversity nor supervision of the National Committee on the Convention on Biological Diversity.

Despite limited access to the Environmental Fund by public agencies, the Office of Environmental Policy and Planning (OEPP) was successful in obtaining financial resources from the Fund for protection of 0.5 km. "Dun Lampan" environmentally protected areas of Maha Sarakam province. the areas is a habitat of *Thatpotamon Chulabhorn*, a rare crab species endemic to very few places in Thailand. Funding from the Environmental Fund was actually released for the areas as a part of grants for Maha Sarakam Action Plan for Environmental Quality Management. This is thus a notable example suggesting that certain administering alteration for the Environmental Fund could allow the Fund to contribute to biodiversity conservation and implementation of the Convention at significant extend.

As mentioned in chapter 5, financial assistance from bilateral-cooperation with foreign and international organizations has been vital to preparation for implementing the Convention. Once become a contracting party to the Convention, Global Environment Fund (GEF) will be offically available for Thailand and thus furthering options for oversea sources of funding. However, although facing one of the greatest economic crisis in modern history, the country is still regarded among countries "with economic in transition" and will not likely to be given priority of those lesser develop countries.

Funding from foreign organizations for implementation of the Convention is also increasingly become uncertain. Danish Cooperation on Environment and Development (DANCED), for instance, has restricted proposed projects within a Thai-Danish Cooperation frameworks. This has proven to be problematic to various cross-sectional initiatives on biodiversity, as the framework was drafted by a cooperative committee with representatives from only two ministries. Limited scope of representation eventually resulted in cooperation framework which do not comprehensively

address concerned issues of biodiversity conservation and management in Thailand. The lastest cooperation framework on environment, for example, only allow “area approach” projects on biodiversity to be proposed to DANCED, without any considerration of “issue approach” initiatives which may be of immediate importance to the country.

Optimistically, improving institutional recognition and awareness of importance in implementing the Convertion should allow greater flow of financial resources to biodiversity activities. Thus, more efforts are needed to ensure increasing involvements of all concerned institutions in national implementation of the Convention through initiatives suggested in the national strategy, the National Policies, Measures and Plans on Conservation and Sustainable Utilization of Biodiversity. Urgency of the initiatives should be properly addressed and adequately accommodate with every possible financial support. Although, the country is currently facing one of the serious economic challenge ever, worsen economic condition should not be-come an short term excuse to limit fund for biodiversity activities. Politicians and administrators alike should be made aware that biodiversity conservation is a low risk investment which will continue to pay rewarding return for future generations to come.

Information Capacity

It has now been widely recognized that identification of every components of biodiversity will not be possible in the near future. In fact, majority of the components, will not been known even within the next fifty years. Approximately 1.75 millions species which have been identified, are believed to account for less than 8% of total number of species existed, roughly estimated at 13-14 millions. Although significant proportion of higher vertebrates and angiosperms is known to scientific community, taxonomic knowledge of invertebrates, lower plants and micro organisms remain severely limited. For instance, scientist has been able to classify roughly 750,000 species, which are merely about insect 10% of lower end of estimated number in total. Groups of species which have been comprehensively identified, after a few hundred years of taxonomic researches, are often those with least numerous number such as mammals, reptiles, birds and amphibians.

In general sense, knowledge and information on components of biodiversity in Thailand are similar to global pattern where more is known in higher evolved groups of fauna and flora and less is learned about the rest. Recent literature surveys found that 95% of mammals and birds have been identified while 70% of other higher vertebrates (reptiles, amphibians and fishes) are learned. However, only 10% to 15% of invertebrate species have been scientifically known. Although sharing similar pattern of taxonomic information deficiency with the rest of the world, the problem is comparatively more serious in tropical countries such as Thailand. One percent of total number of selected groups of species in tropical countries is often several times more numerous that that in countries of temperate zone. For example, 1,625 species of terrestrial vertebrates (mammals, birds, reptiles and amphibians) found in Thailand (Nabhitabhata, 1993) are at least 5 times greater than those in Norway (299 species) or Sweden (328 species) (WCMC 1992). Thus, lacking knowledge of even a single percentage of a group of species in Thailand could amount to a lost of information on existence of considerable number of species.

Insufficient taxonomic information could logically be considered serious obstructions to effective conservation of biodiversity components. However, as mentioned earlier in this section, identifying all or even majority of the components will not likely to be feasible even in the next century. What urgently needed is, thus, information which acknowledge threatened components of biodiversity as well as the threats themselves. Conservation status has been recognized as one of effective means to identify the threatened components. Criteria use by IUCN's Red List of Species, in particular, has been instrumental in providing common classification regime, for determination of existing situation of species. By assigning IUCN and other conservation status to species, those responsible for conservation and management are increasingly capable to focus on biodiversity's components whose existence are uncertain and better place emphasis on most serious threats to the components themselves.

Prior to 1996, classification of species in accordance to their conservation status had been limited. Revised 1992 Wild Animal Reservation and Protection Act (BE, 2535) has provided protection for over 200 listed wildlife species. These protected species are classified into 4 categories which are; preserved species, protected species (with 2 sub-categories), breedable protected species and species listed under Convention on International Trade in Endangered Species

of Wild Flora and Fauna (CITES, 1973). However, the classification, with exception of listed species under CITES, does not explicitly address nor indicate specific conservation status of the species. Listings of “preserved” and “protected” species, for instance, were carried out by panels of experts who pooled and discussed all available information for the listing. The preserved species under the Act are thus include range of those which are under serious threat to species reported to be rare in the wild while, protected species could include any species from relatively rare to commonly found ones.

For several years, there had been attempts to classify wildlife species in accordance to their conservation status. However, these classifications were usually without common criteria and often become incomparable and, in some case, conflicting with each other. Recognizing these problem, the national focal point for the Convention on Biological Diversity, the Office of Environmental Policy and Planning (OEPP), embarked upon compiling lists of threatened vertebrates, classified with IUCN criteria. An meeting was organized by the OEPP, on May 29-30, 1996, for vertebrate experts from universities and research institutions, to participate in listing of mammal, bird, reptile, amphibian and fish species into selected IUCN threatened categories. Species documented by the 1994 IUCN Red List of Threatened Animals are used as basis in assigning conservation status to discussed species at the meeting. At the conclusion, the participants successfully produced lists of threatened vertebrates of Thailand which are acceptable and satisfactory to all distinguished experts in the field. The lists is now being finalize for printing by the OEPP and will be available in early 199x.

Determination of conservation status of plant species has also been interested by the OEPP. Unlike vertebrates, local expertize alone is not sufficient for listing of threatened plants. It has been recognized for many years that significant proportion of Thai plants has been collected and studied by western scientists and researchers, especially from Denmark, for at least a hundred year. Thus, to properly classify the species into selected threatend groups, foreign experts should be invited to involved in the classification. Realizing this need, Danish Cooperation on Environment and Development (DANCED) programme was identified as the most suitable donor for listing of threatened plant species, due largely to the DANCED’s own policy in not merely providing just financial resources, but also expertize for scientific cooperation. DANCED is presently considering

a project proposal entitled “Red List of Plant Species” submitted by the OEPP. Under the project, distinguished Danish experts will be jointed by local experts from universities and relevant public institutions in attempting to list, within 18 months, threatened plant species from approximately 15,000 specimen collected at the Royal Forest Herbarium. If the funding for the project is approved, the list of threatened plant species will likely to be available in 2000.

In addition to availability of referrence lists of threatened biodiversity components in Thailand, the OEPP’s efforts in assigning conservation status to selected species also allow realization of problems associated of biodiversity information. The most appearance, at that time, was perhaps an absence of proper coordination between researchers in respected fields as well as limited opportunity for them to discuss their views, opinions and findings. Thus, when a panel of researchers and experts is convened to discuss or determine issues relating to their interest or studies, for example threatened status, it is often difficult to reach consensus agreements. This problem also underlines overlapping and redundancy of research activities which have not been properly addressed by relevant institutions and authorities yet.

These above mentioned problems were further explored by UNEP/OEPP/WCMC project entitled “Thailand’s Biodiversity Data Management (BDM)”. Initiated in 1995, the BDM project was actually a part of a collective group of initiatives on biodiversity data management carried out under funding from the Global Environmental Facility (GEF) in 10 developing countries around the world. Lack of coordination, overlapping, redundancy and other information associated problems have been found, by the BDM project, to be consequences of a single cause, limited availability of information itself. This would imply that, while significantly small amount of information on biodiversity’s components is existed, much lesser can be accessed and/or used. With little “available” information, scientists and researchers would find building knowledge base from existing information while avoiding overlapping of works among themselves to be a difficult task to accomplished indeed.

Incidently, limited information availability is an outcome of the major problems associated development of both institutional and human resources capacity, the lack of commitment toward biodiversity issues and activities. It is commonly found that several researchers, although equipped

with considerable amount of information, often have little interest in making their information available. This problem, in many cases, is capacity related as researchers were without properly skilled personnel to compile their information nor sufficient funding to publish them. In several other cases, however, researchers simply were not aware of importance in enabling access to their information and chose to devote as much as possible of their time for producing information from their selected researches instead. Some also hesitated to publish their finding and information on basis that present academic system in Thailand has not yet able to guarantee proper protection and suitable punishment for perjury of scientific findings and works.

Institutionally, attention in making information available has been relatively limited. Majority of public agencies has not considered nor included information service as one of their prime mandatory operational responsibilities. Little interest have been paid on making more up-to-date information available to general public, and even less attention was directed toward preparing the information to meet need for biodiversity conservation and management. Although information centers have been established in several public agencies and universities, these centers are usually burdened with mostly information analysis and interpretation tasks, and often incapable to direct users to sources of information of their interest.

This limited commitment to make information available was clearly demonstrated by finding of institutional surveys of the BDM project. Less than 20% of information, is found to be kept in digitized format while only half of this information is 100% completed. Most of the remaining information, however, is either published documents or raw data. When considering number of computer facilities, found in the survey to be on average over 3 sets per institutional unit (section, division, faculty, station, office etc.), there is little doubt that minimal attention was given to utilization of the facility to keep the institution's own information. Presently, almost all publicly available information of the insititutions are in printing format with the lastest ones are usually uncomplied raw data. This is evidence in the lacking latest reports on status of specific components of biodiversity (ie. forest), on yearly basis. Those who need to acquire latest information on biological resources, thus, could not rely on institution's annual report, usually 2 years late and have to directly contact the institutions and deal with interpreting and analyzing raw information by themselves.

The other problem associated with limited availability of biodiversity information is poor selection of information technologies. This problem is almost strictly institutional where technologies acquired can not meet real need of information management. In actual fact, the problem itself is a failure to recognize and address demand for information of the institutions. for example, acquisition of Geographical Information Systems (GIS) in early 1990's was carried out on basis that the technology (system) and services provided by the technology as well as sufficient fund for purchasing were available and not whether information needed can be satisfied by the technology. Thus, When the GIS was eventually acquired, with supporting technical personnel, very few decision makers realized what contribution the system can provide and what tasks should the system be assigned to. At present, the GIS systems in several public institutions have been used in analysing environmental and ecological conditions on case by case basis and in specific areas such as head-watershed zones of important watershed in Northern Thailand.

Limited availability of biodiversity information and other problems mentioned in previous paragraphs have, by no mean, been ignored by the national focal point, the OEPP. In addition to institutional surveys, formulation of national guideline and action plans on biodiversity information management, was the main activity under the BDM project. Since the national guideline and action plan were drafted from finding of institutional surveys, they have comprehensively addressed all information problems mentioned in this section and identified the best possible means for tackling these problems.

To resolve the problem of limited available information, the guideline has formulated measures and activities to ensure greater institutional commitment toward documenting their information and assessing their data management capacity. An informal network was suggested to provide systematic cataloging of biodiversity information available in relevant institutions. Voluntary members of the network will be coordinated by an independent agencies (hub) who responsible for compiling names, types, characteristics and access conditions of the member's information and, provide technical and institutional supports to members as well as information services to interested users.

The guideline has also given priorities to limited workforce and facility for data management work. However, it has been recognized, since it was first initiated, that acquisition of additional personnel and equipments are burden and responsibility of individual institutions. Thus, The guideline has confined itself as merely a "guide" for best possible means to maximize data management capacity with minimum additional personnel and equipments possible. Cost-effective means in acquiring technologies and (data management) specialist were also included in the guideline.

Components of the national guideline on biodiversity data management can be summarized as follow;

1. Biodiversity Information Networks (BINET)

An informal network operated as an association of voluntary institutions and individual who are able to satisfy criteria of the BINET and proven to be competent custodians of biodiversity information. BINET will be maintained by Data Transfering Coordinator or "hub", an independent agencies under the proposed National Committee on Conservation and Utilization of Biodiversity.

2. Guideline on Development of Efficiency in Biodiversity Data Management

A guideline for BINET's members and other relevant institutions for strengthening efficiency and capacity for data management. Administrative measures for data management and practical guide for selecting additional personnel are suggested under the guideline.

3. Biodiversity Data Management Standard (BDMS)

BDMS is a criteria for determining data management capacity of BINET members. Under the BDMS, minimum criteria is set to ensure that appropriate access and availability of the member's information. In other word, the standard could be seen as a set of conditions for measuring member's commitments to their own data management.

In ensuring most beneficial output from the guideline, these components should be implemented together as a complete system. Of these three, BINET is the core component where systematic documentation of dataset (information) will be carried out in and between importance information custodians. The Guideline on Development of Efficiency in Biodiversity Data Management will act as facilitating guide for improving capacity in managing information

documented by the BINET. At the same time, information gathered by the BINET will, assist in refining suggestions and measures of the Guideline. The other component, the BDMS will systematically assess implementation of both the BINET and the guideline by determining improvement of data management of BINET members and institutions undertaken implementation of the guideline. If operate effectively, the BDMS could enable the whole data management regime, suggested by the national guideline, to become a self-evaluated system where experiences from implementation are reflected in consistently adjusted operational measures.

Essentially, the national guideline on biodiversity data management alone may not be sufficient to ensure progressive development of biodiversity data management as required. After all The national guideline is merely a technical guideline, a set of suggestions, for enhancing data management capacity and, does not assigned specific responsibilities for particular institutions in doing so. Thus, it is deem necessary to formulate a concrete measure capable of effectively translating initiatives of the guideline into practical acivities with responsible institutions and timeline for implementation. Such measure was realized as biodiversity data management action plan. the action plan consist of 4 policies, 15 measures and 51 specific activities. Since no institutions has yet been identified and obtained membership of the BINET, the action plan is not able to name institutions for specific tasks. Many of activities are thus assigned to so called "custodian institutions" until they are found.

The national guideline and action plan have been approved by Working Group on Biodiversity Data Management under the current National Committee on Convention on Biological Diversity, and will be presented to higher authorized bodies in the near future. It's expected that with the up comming establishment of the National Committee on Conservation and Utilization of Biodiversity, implementation of the guideline and action plan, especially establishment of BINET, will become responsibilily of the National Center under the new National Committee's supervision, assuring Thailand of proper guiding principles and measures for development of biodiversity information for the future.

Conclusion

Recognition and commitment, both institutionally and financially, are the key to successful implementation of the Convention on Biological Diversity. Such commitment should not merely increase support to biodiversity activities, but should also demonstrate acknowledgement of specific tasks of immediate need. There is little doubt that, for many years, vast amount of financial resources and workforce have been allocated to conservation and management of biological resource. However very small proportion of these resources was directed toward tasks prioritized by the Convention, notably, identification of biodiversity's components. Thus, institutions should re-focus their resources management to be better supportive to the Convention, particularly through providing greater attention to provisions of the Convention themselves. Private sector should also be encouraged to participate in strengthening capacity for the implemention, securing not only additional resources but also supervision of management of public supports to biodiversity conservation by national coordination body also.

ANNEX I

NATIONAL POLICIES, MEASURES AND PLANS ON CONSERVATION AND SUSTAINABLE UTILIZATION OF BIODIVERSITY

Policies Measures and Plans for the Conservation and Sustainable Utilization of Biodiversity.

Target

To protect ecological process and ecosystem for the conservation and the sustainable utilization of biodiversity.

Principle

- Conservation of biodiversity in the most suitable manner possible including the in-situ conservation alongside needed ex-situ conservation.
- Prevent and solve the problems concerning the loss of biodiversity.
- The conservation of biodiversity require co-operation between various responsible agencies, conservation groups, communities as well as the resources users themselves.
- Recognize the importance of preservation of Indigenous knowledge, creativities and tradition as first priority for conservation and sustainable utilization of biodiversity.
- Thailand urgently need greater public education, capacity building for existing staffs involved in conservation as well as production of efficient staff for research and education on biodiversity.
- The consideration and decision on utilization and sharing of biological resources must be conducted in fair and transparency manner and led to effective practice of the utilization.
- The conservation of biodiversity can be implemented along side inventory of information on biological resources.
- The implementation of activities on the conservation and sustainable utilization of biodiversity must be coincided with related law and regulation at both national and international level.

Strategies

1. Building capacity of institutions and their staff on the conservation of biodiversity.
2. Enhance efficiency in management of protected areas to ensure sustainable protection of biodiversity.
3. Improve incentives for the conservation of biodiversity at local level.
4. Conservation of species, populations and ecosystems.
5. Control and monitor processes and activities that threaten existence and richness of biodiversity.
6. Promote management of biodiversity in environment and traditional culture.
7. Promote co-operation between international and national agencies/institutions in conservation and sustainable utilization of biodiversity.

Strategy 1 : Building Capacity of Institutions and Their Staff on the Conservation of Biodiversity.

Objective 1.1 To increase awareness and appreciation of value and importance of biodiversity.

Measure 1.1.1 Building awareness in importance and value of biodiversity to culture and society.

Implementation

- Continuously provide knowledge on threats to biodiversity and status of biodiversity conservation to general public via various media such as televisions, radios, newspapers, magazines, books, brochures and posters etc.
- Organize slogan, painting and photograph competitions demonstrating awareness of importance and value of biodiversity. General public at all level will be participated in the competition. Winning slogans will be used in promotional programs via different kinds of media.
- Organize additional activities on selected occasions including nature education camps for youths during summer break.
- Honor selected communities or local organizations for their outstanding efforts in conserving biological resources.

Measure 1.1.2 Use existing education system to improve awareness on biodiversity and need in conserving biodiversity.

Implementation

- Develop an additional subject on basic knowledge of biodiversity in existing experience building program for elementary students.
- Develop additional subject on importance of biodiversity to human survival in secondary and high school curriculum.
- Develop and publish self-learning text book on biodiveristy for teaching of biology in elementary and secondary schools.
- Develop teaching tools on biodiversity including videoes, tape cassettes, posters, cards, games for distributing to elementary schools nation wide.
- Develop additional short training courses identifying importance of biodiversity for institutions that offer special training courses for administrators and high ranking decision makers.
- Encourage development of information sources on biodiversity for local communities using existing infrastructure such as library, village's news hall, center for tradition knowledge education etc.

Measure 1.13 Integrate concerns for biodiversity loss in external (outside classroom) education.

Implementation

- **Organize** external education programs on biological characteristic of plants animals and ecosystems in national parks and wildlife sanctuaries.
- Encourage expansion of youth trainings for conservation of forest resources nation wide.
- Establish or improve existing tourist service centers in every national parks to act as source of biodiversity information for visitors using various media.
- Establish natural history museums or nature research centers in areas that contain unique ecosystems such as Songkhla lake, Huai Kha Kaeng Wildlife Sanctrary etc.

Measure 1.1.4 Strengthen knowledge and basic understanding of biodiversity to those who are 'cove" in disseminating information and providing education.

Implementation

- **Organize** field education programs for members of media to disseminate knowledge on biodiversity conservation.
- Organize continuous training courses on biodiversity conservation for teachers nation wide.

Objective 1.2 ***To support institutions in disseminating information necessary for biodiversity conservation.***

Measure 1.2.1 Build or strengthen national institutions capable of providing information on biodiversity conservation and potential value of genetic resources.

Implementation

- Support relevant institutions in collecting and disseminating basic information necessary for biodiversity conservation.
- Promote reporting of results from biodiversity researches to general public.
- Encourage every institutions to develop information systems to maintain data on biodiversity, its usages and threats.
- Financially support institutions in acquiring tools and equipments for collecting and exchanging biodiversity information through networking system with other institutions.

Measure 1.2.2 Establish national biodiversity monitoring programme and report on the programme's progress on regular basic.

Implementation

- Establish national biodiversity monitoring programme with nation wide network
- Establish long-term biodiversity monitoring programmes in selected areas.
- Conduct trainings on data collection for field staffs emphasizing species that are examples of ecosystems and easy to survey.
- Disseminate documents and information on changes in biodiveristy through newsletters and magazines on regular basis.
- Support biodiversity research by providing financial resources, equipments and documents.
- Support printing and dissemination of information obtained from biodiversity researches.

Measure 1.2.3 Create national news and information networks to accelerate transfer of information at local, national and international **level.**

Implementation

- Provide financial resources, equipments and experts to support establishment of news and information networks in public and private educational institutions
- Improve effeciency of universities in Bangkok and in regions to better serve as regional information centers capable for disseminating information at local level/ and within Bangkok.
- Establish National Biodiversity Center to transfer and exchange biodiversity information at national level.

Objective 1.3 ***To promote basic research and apply research emphasizing study of species and status of biodiversity.***

Measure 1.3.1 Promote basic and apply researches on biological science emphasizing biodiiersity conservation.

Implementation

- Support basic survey and reporting of biodiversity status in protected areas on annual basic.
- Prioritize supports to taxonomic researches and establish network for Flora of Thailand and Fauna of Thailand project to ensure participation of relevant institutions and agencies.
- Prioritize and provide supports to research activities that are satisfying biodiversity conservation policy and required for sustainable use of biological resources.
- Establish research fund to support public and private organizations on basic and apply researches on biodiversity as well as comprehensive long term research projects.

Measure 1.3.2 Support social religion and cultural researches related to conservation and utilization of biodiversity

liuplementation

- Financially support researches by establishing research fund for communities and private organizations who conduct researches on traditional plants, community forests, maintainance of local biodiversity and community welfare.
- Financially and administratively support researches on Buddhism and biodiversity conservation.

- Encourage public and private educational institutions and agencies to conduct ethnobiology researches.

Objective 1.4 *To* ***build capacity of staffs in biodiversity conservation.***

Measure 1.4.1 **Support training and continuous education in occupations related to biodiversity.**

Implementation

- Create biodiversity personnel, especially taxonomists, by providing scholarship for undergraduate and master degree student in different fields.
- Provide educational tools, library and financial support to public and private agencies to enable them to train occupations related to biodiversity conservation.
- Support universities and other educational institutions in organizing short courses on biodiversity conservation for personnel from public and private sector.
- Improve capacity of universities and other educational institutions, that offer biodiversity related programme, in producing undergraduates and master degree personnel.
- Organize national programmes to tram officers and staffs responsible for biodiversity conservation and to produce biodiversity personnel.
- Urgently establish a national center for training on biodiversity conservation.

Measure 1.43 Strengthen incentive for occupations on biodiversity at local and field.

Implementation

- Formulate policy for public agencies, involved in conservation and sustainable use of biodiversity, to give first priority to biodiversity research.
- Allocate additional budget for travel, per-dium and other expenses for personnel attending educational courses, training programmes and research activities related to biodiversity conservation, domestically and internationally.
- Increase number of positions for biodiversity researchers especially in researchers stations at national parks, wildlife sanctuaries and wildlife non-hunting areas.
- Declare biological diversity works with expertize on taxonomy, conservation ecology, and population genetic as deficient expertize in public sector.
- Acquire suitable equipments for field staffs and encourage central agencies and biodiversity related agencies such as national park and wildlife sanctuary authorities, to cooperate with personnel who conduct field surveys and researches.

Measure 1.43 Support exchange of knowledge, opinions and experiences between personnel and biodiversity experts.

Implementation

- Provide opportunity and funding for personnel to attend seminars oversea.
- Support biodiversity related agencies to organize seminars on biodiversity in/or between the agencies, at least once a years, to allow academics to exchange information and opinions.
- Support organization of seminars on biodiversity of Thailand.

Measure 1.4.4 Strengthen capacity for business, private institutions NGOs in biodiiersity conservation.

Implementation

- Organize certificated training courses on biodiversity and related legislations for personnel of NGOs and private sector.
- Encourage private educational institutions to give first priority to education on biodiversity conservation.
- Support NGOs in researching and surveying biodiversity, and implementing activities on biological resources conservation.
- Provide academic support for business sector in order to allow the sector to continuously receive information on biodiversity conservation.
- Support expansion of trainings for forest protection volunteers nation wide.

Measure ***1.4.5*** Strengthen and develop capacity for public agencies responsible for biodiversity conservation.

Implementation

- Organize oversea visiting trips on biodiversity conservation for administrators.
- increase number of positions responsible for biodiversity issues.
- Establish committees in agencies responsible for conservation and utilization of biodiversity, to supervise and cuoordinate works and activities on biodiversity.
- Request agencies responsible for conservation and utilization of biodiversity to report on capacity in implementing biodiversity tasks on annual basic.

Strategy 2 :	**Enhance efficiency in management of protected areas to ensure sustainable protection of biodiversity.**

Objective 2.1 Establish protected areas to conserve rare and endangered species and ecosystems.

Measure 2.1.1 Review existing protect areas system and plan for national protected areas system.

Implementation

- Urgently formulate national plan on protected areas system to investigate adequateness and need in the future for developing protected areas into examples of various kinds of ecosystems.
- Categorize protected areas to better suit biodiversity conservation and enact suitable legislative measures for protection and management of each type of protected areas.
- Prioritize protected area management and formulate short and long term measures.

Measure 2.1.2 Establish additional protected areas when and where appropriate and required.

Implementation

- Establish additional protected areas in accordance to national plan on protected areas system.
- Establish environmentally protected areas in unique and threatened ecosystems.

Measure 2.13 Support establishment of transboundary reserves.

Implementation

- Investigate suitable sites for and criteria in establishing transboundary reserves with nighbouring countries.
- Coordinate with neighbouring countries and request for academic supportsfrom international organization such as IUCN, WWF and UNEP, in preparing operational plan for transboundaryreserves.

Measure 2.1.4 Recognize "overall" geography of each regions and integrate protected areas as part of regional geography to preserve biodiversity

Implementation

- Identify and establish buffer zones surround protected areas and expand conserved forests to connect boundary of the forests.
- Integrate planning of protected areas development into regional planning.

Objective 2.2 To support sustainable use in protected areas

Measure 2.21 Promote appropriate management of benefits from protected areas.

Implementation

- Collect research's results on benefits from protected areas that can be financially estimated as well as those that are intrinsic.
- Classify and evaluate benefits from products and services of protected areas and those benefit from such products and services.
- Survey resources in each protected areas, including geography, cultural and historical sites, ecosystems, species and genetic resources, to estimate investing capital.
- Disseminate information on benefits from protected areas and provide appropriate means to coordinate usage of different groups

Measure 2.2.2 Emphasize communities surround protected areas (in buffer zones and nearby) as assistants in conservating protected areas.

Implementation

- Implement protected areas management with local communities to ensure that the management is coincided with daily requirements of the communities.
- Build awareness on sustainable development of protected areas authorities and communities nearby the areas with community participation.
- Seek supports from communities nearby protected areas in preserving protected area through establishment of committees or volunteers for protected areas management.
- Disseminate documents honoring successful cooperative efforts on protected areas management as examples for other groups
- Develop research methods that can be carried out by communities themselves as basis for appropriate use and dissemination of information to other communities.

Measure 2.2.3 Encourage and create supporting base for conserving protected areas from NGOs and general public

Implementation

- Organize local protected areas supporting groups and campaign for support and funding at national level.
- Promote and publicize activities of the groups by organizing ceremonies presenting awards and conducting personal coordination.
- Encourage public agencies, NGOs and general public to formulate information dissemination and education programmes as well as continuous distribution of news on protected areas.

Objective 2.3 ***To build capacity in protected areas management.***

Measure 2.3.1 Improve management of protected areas to better suit sustainable use.

Implementation

- Require authorities of every protected area to report status of conservation of and threat to biodiversity on annual basis.
- Formulate management plans for groups of protected areas and each protected areas with transparence objectives and coverage of needed and required implementation.
- Organize groups of academics in central agencies and regional offices to improve and monitor implementation in each protected areas and to provide scientific and technical consultation.
- support community participation in protected areas management such as volunteers youth groups (Young farmers) as well as surveillance of illegal activities (ie. logging) by the military.

Measure 2.3.2 Provide funding support for management of protected areas.

Implementation

- Provide funding support, such as those from NGOs campaigns, Environmental Fund and tourism, for management of protected areas.
- Set appropriate fee for use of products and services from protected areas to pay for expense in managing the areas

Measure 2.33 Support researches to benfit management of protected areas.

Implementation

- Acquire equipments and facilities for scientific researches in protected areas, and staff assigned to responsible for coordinating researches in every protected areas.
- Ensure that management of protected areas *is* scientifically sound and based on research findings in the areas.
- Support researches that emphasize rectifying urgent problems including pollution, control of alien species and management of species with low population in the wild
- Find appropriate means for collecting and managing information on protected areas, possibly, through establishment of protected areas information centers in each regions with linkages.

Objective 2.4 ***To improve preservation of protected areas.***

Measure ***2.4.1*** Set up correct and fair boundary for every protected areas.

Implementation

- ⇨ Establish committees to identify boundary of each protected areas with participation of local communities (including land holders) and officers from relevant public agencies.
- ⇨ Utilize Global Positional System (GPS) and Global Information system(GIS) in identifying the boundary.
- ⇨ Appropriately improve boundary of protected areas and create permanent landmarks indication the boundary.

Measure 2.4.2 Increase **effeciency** of agencies responsible for preserving protected areas.

Implementation

- ⇨ Improve communication systems in protected areas and in transboundary protected areas.
- ⇨ Acquire fire protection equipments and provide adequte and effective surveillance.
- ⇨ Organize trainings for officers on protection of biological resources as well as other promotion activities.

Measure 2.4.3 Improve legislations to enable more tightly control and effectively enforce legislations to preserve and protect biodiversity.

Implementation

- ⇨ Improve and revise acts related to protected areas to enable effective protection of rare, endemic and endangered species.
- ⇨ Train officers in protected areas to improve the officer's expertize in protected areas legislations.
- ⇨ Train communities nearby protected areas to better understand protected areas legislations.

Strategy 3 : Improve incentives for conservation of biodiversity at local level.

Objective 3.1 ***To support biodiversity conservation at local level.***

Measure 3.1.1 Support and promote **efficent** use of agricultural lands to reduce pressure from encroachment of forests and improtant natural ecosystems.

Implementation

- ⇨ Survey, classify, and evaluate agricultural lands that are valuable for biodiversity conservation.
- ⇨ Promote and support sustainable agriculture, natural agriculture and agricultural forestry especially in areas adjacent to natural ecosystems.
- ⇨ Legally collect land ownership tax in manners that are facilitating conservation.

Measure 3.1.2 Increase incentive for communities to conserve public lands that are biologically diversed.

Implementation

- ⇨ Support local organizations, such as district councils, in organizing village or districts committees responsible for maintaining and managing biological resources outside protected areas.
- ⇨ Financially and academically support communities that implement conservation activities.
- ⇨ Urgently enact Community Forest Act in order to facilitate implementation of forest conservation by communities.
- ⇨ Accept knowledges of local communites on sustainable, and legitimize local management of natural resources.
- ⇨ Support communities in maintaining their own biological resources with scientific and technical advices from responsible public agencies.

Measure 3.1.3 Support maintainace of traditional cultures in biodiversity conservation.

Implementation

- Study and survey traditions and cultures related to local biodiversity conservation.
- Promote and publicize conservation of natural ecosystems with traditional cultures of each local communities.
- Provide financial assistances and organize trainings for communities in maintaining traditional cultures that recognize values of biodiversity conservation and appropriate practices which do not destroy biodiversity.

Measure3.1.4 Compensate communities or individuals who lost their land for biodiversity protection.

Implementation

- Appropriately and fairly compensate, with financial resources or lands, those who lost rights to use their lands.
- Relocation of communities, in areas important to ecosystem and security, must be carried out with careful consideration on basis of reliable information and with appropriate implementation on case by case basis.
- Provide adequte infrastructure for relocated communities, give advices on occupations and monitor implementation of the relocation.

Objective 3.2 To ***promote and extend sustainable use of biodiversity.***

Measure 3.2.1 Increase benefits to communities from implementing ecotourism.

Implementation

- Promote ecotourism in national parks and wildlife sanctuaries with tourism potential.
- Provide opportunities for communities to participate in administering and managing ecotourism on equal term.
- Organize committee to supervise equitable sharing of benefits from tourism between operators and communities.
- Organize training for communities in operating appropriate ecotourism that is beneficial for conservation and management.
- Provide knowledge and publicize correct information that is beneficial for conservation and management.

Measure 3.2.2 Build capacity of communities in maintaining and utilizing agricultural biodiversity.

Implementation

- Training and demonstrate integrated agricultural systems, agricultural forestry and natural agriculture.
- Provide information on production of organic fertilizers and biological control.

Measure 3.2.3 Develop and publicize roles of traditional herbs and ensure appropriate and sustainable use of the herbs

Implementation

- Study, research, and analyze active ingredients of herbs to enable use of the ingredients to benefit health of population.
- Promote and disseminate use of active ingredients to benefit population.
- Develop use of active ingredients for production of health and medical products.
- Conduct studies and researches to certify benefits and quality of herbs referenced by local knowledge, to use information from researches to benefit health of population.
- Promote and publicize use of traditional herbs and benefits from animal extracted medicines, and provide knowledge on harvesting and breeding herbal plants in order to generate income for communities.

Objective 3.3 ***To ensure that communities and individuals who own knowledge on biological resources conservation, receive proper benefit from use of such resources.***

Measure ***3.3.1*** Promote awareness on value of local knowledge and biological resources.

Implementation

- Study, survey and document local knowledge related to biodiversity.
- Honor owners of local knowledge on sustainable use of biological resources.
- Encourage registrations of local inventions or knowledge.
- Implement programmes promoting use of local knowledge in conserving biodiversity in example areas.

Measure 3.3.2 Support community rights to local biological resources

Implementation

- Enact appropriate legislations and promote supports to community rights to biological resources and farmer's rights as owner of varieties.
- Implement equitable sharing of benefits from harvesting biological resources to communities or farmers who own varieties.
- Provide correct information on community and farmer rights over varieties as well as information on conservation and sustainable use of biological resources.

Strategy 4: Conservation of species, populations and ecosystems.

Objective 4.1 ***Improve capacity in conservation of species, population and genetic diversity in natural habitats.***

Measure 4.1.1 Integrate conservation to species, population and genetic diversity with protected areas management

Implementation

- Urgently survey status of endemic, rare and endangered species or genetic pools in protected areas and natural lands outside protected areas.
- Revise size of protected areas in local and nearby forests for possible expansion of the areas to appropriate size in maintaining existing populating and genetic resources.
- Enact measures prohibiting release of wild animals in protected areas without prior checking records of the animals and appropriate release process.

Measure 4.1.2 Use keystone species or well known species as targets to support in-situ Conservation.

Implementation

- Survey status of every protected areas emphasizing important plant and animal species.
- Campaign to educate and improve understanding of nearby communities or general public on importance of protecting important species.
- Rehabilitate and maintain important plant and animal species especially indigenous species.

Measure 4.13 Improve and extend legislative mechanisms to protect **species.**

Implementation

- Urgently ratify the Convention on Biolocical Diversity which is a mechanism supporting protection of habitats of important species.
- Urgently ratify Ramsar Convention which is a mechanism supporting protection of important wetland habitats.
- Include additional species in lists of reserved and protected wild animals and plants to ensure that the lists do comprehensively cover all endemic, rare and endangered species in Thailand.
- Enact legislative measures to protect endemic, rare and endangered species and natural habitats of the species.
- Enact and strictly enforce legislative measures prohibiting trading and ownership of endemic, rare and endangered species.
- Enact appropriate measures for maintaining and managing migratory species and species with transboundary range.

Objective 4.2 ***Improve capacity of ex-situ conservation to enable biodiversity conservation, public education and support sustainable development.***

Measure 4.2.1 Extend capacity in conserving genetic resources of crops, fruits, wild-plants, traditional vegetables and traditional livestocks.

Impiementation

- ⇨ Improve and strengthen capacity of equipments, facilities and other tools in genebanks, culture collection centers and aquatic animal breeding stations.
- ⇨ Strengthen cooperation and financially support acquisition of equipments and tools for maintaining culture collection of crops, fruits and livestocks.
- ⇨ Establish an information center for genebanks to exchange information domestically and internationally.

Measure 4.2.2 Improve capacity in conserving and breeding varieties of herbal plants.

Implementation

- ⇨ Organize programmes to maintain important herbal plants and to breed the plants for culture collection centers.
- ⇨ Develop capacity of research in identifying and introducing herbal plants (including wild plants) with commercial potential.
- ⇨ Promote expansion of production and commercial use of herbal plants to farmers and interested public.

Measure 4.2.3 Develop microb culture collection centers to be more efficiently operated.

Implementation

- ⇨ Provide financial support in acquiring necessary tools and equipments for microb culture collection centers.
- ⇨ Improve microb varieties information system to enable linkage with information oversea.
- ⇨ Study and collect local microb species from different ecosystems and permanently maintain specimens in microb culture collection centers.
- ⇨ Improve capacity of research in identifying and introducing microb species with commercial potential.
- ⇨ Study safe use of microb germplasm.

Measure 4.2.4 Promote and support seed banks in improving protection and exchange of plant genetic resources.

Jiuplementation

- ⇨ Identify and develop commercial varieties.
- ⇨ Establish plant varieties information systems to exchange information nationally and enable linkage with networks of seed banks oversea.

Measure 4.2.5 Develop botanical gardens into network for conservation of wild plants.

Implementation

- ⇨ Organize projects to conserve rare and endangered plants through breeding in botanical gardens and parks.
- ⇨ Acquire sufficient botanists and tools for breeding of wild plants especially indigenous species that are threatened or inhabited in destroyed natural lands.
- ⇨ Investigate possibility in re-introducing plant species and carry out re-introduction for appropriate species.
- ⇨ Promote development of methods in establishing botanical gardens for schools.
- ⇨ Improve operation of botanical gardens to meet international standards and support establishment of large botanical gardens in every regions.

Measure 4.2.6 Strengthen roles of zoos, wildlife breeding centers, aquatic animals museums and aquatic animal breeding stations in conserving biodiversity.

Implementation

- ⇨ Organize progarmmes and plans and acquire tools for breeding stations of endangered and threatened animals or animals that was inhabited in destroyed habitats.
- ⇨ Support roles of zoos and museums in educationg general public and maintaining genetic resources.

- ⇨ Investigate possibility in re-introducing species back to original habitats using correct and appropriate steps.
- ⇨ Formulate control measures in managing wild animals in private zoos on scientifically sound basis.

Measure 4.2.7 Strengthen cooperation between agencies/institutions responsible for in-situ conservation and agencies/Institution responsible for ex-situ conservation, in order to extend roles of ex-situ ***conservation*** to include re-introduction of species into the wild, ecological restoration and exosystems rehabilitation.

Implementation

- ⇨ Organize exchange of genetic material of endangered animal, plant and microb species between natural habitats and areas outside natural habitats (i.e. ex-situ collections) to preserve genetic diversity.
- ⇨ Support study and research on re-introduction of rare and endangered species into natural habitats.
- ⇨ Organize exchange of information and experiences between researchers on different groups of species.

Measure 4.2.8 Extend capacity of species, population and genetic resources information system especially those in ex-situ conservation.

Implementation

- ⇨ Compile information on species, population and genetic resources and develop harmonizied databases with network and linkages.
- ⇨ Establish national information center on species, population and genetic resources.

Strategy 5 : Control and monitor processes and activities that threaten existence and richness of biodiversity.

Objective 5.1 To develop environmental impact monitoring and assessment systems to enable effective protection of biodiversity.

Measure 5.1.1 Provide specific protection for endangered, rare and endemic species.

Implementation

- ⇨ Enact legally appropriate measures forcing development projects to avoid land usages that destroy natural habitats of endangered, rare and endemic species.
- ⇨ Officially declare lists of endangered, rare and endemic species to prohibit destruction of natural habitats of the species.

Measure 5.1.2 Conduct detail biodiiersity impact assessment especially for projects in protected areas and natural lands.

Implementation

- ⇨ Formulate and development policies by given first priority to impact to biodiversity.
- ⇨ Enact legislative measures required every projects in protected areas to prepare environmental impact assessment (EIA) reports.
- ⇨ Formulate guideline for biodiversity impact assessment (BIA) covering possible impacts to structure, components and roles of ecosystems.

Measure 5.13 Improve capacity and **expertize** in assessing impacts **to** biodiiersity to **relevant** personnel.

Implementation

- ⇨ Study biodiversity impacts of development projects that have been carried out as examples in evaluating the impacts.
- ⇨ Produce a guidebook for reviewing biodiversity impact assessment reports.
- ⇨ Produce list ofendangered, rare and endemic species with information of ecosystem where the species inhabit.

- ⇨ Organize trainings for public and private sector on preparing and reviewing biodiversity impact assessment reports.

Measure **5.1.4** Exchange biodiversity' between relevant public agencies and private sectors to enable use of information to study ***and*** plan for rectifying environmental impacts.

Implementation

- ⇨ Collect and publicize biodiversity information importance for planning and assessing impacts.
- ⇨ Organize biodiversity information network connecting information of public agencies and private sectors used in assessing impacts to biodiversity.

Objective **5.2** Improve capacity to monitor impacts to biodiversity and take urgent actions in emergency situations.

Measure 5.2.1 Provide **NGOs** and local organizations with role in surveillance and monitoring biodiversity impacts.

Implementation

- ⇨ Continuously educate and train NGOs and local organizations on methods for monitoring biodiversity impacts from development projects.
- ⇨ Financially support organization of local environmental volunteers to report news on biodiversity impacts.
- ⇨ Authorize district councils or NGOs to act as authorities responsible for surveillance and monitoring biodiversity impacts in their areas.

Measure 5.2.2 Improve reporting process in case where accidents severely impact biodiversity.

Implementation

- ⇨ Acquire modern equipments for transferring news and information to agencies responsible for monitoring impacts.
- ⇨ Plan for accidents that severely impact biodiversity for example, urgent reporting of water pollution directly to responsible agencies and disseminating information on the pullution to general public.
- ⇨ Provide information to population in and adjacent to project areas on process and their rights to report accidents.

Measure 5.2.3 Organize urgent responds in case where biodiversity is seriously destroyed.

Implementation

- ⇨ Decentralize authorities to regional and local agencies directly responsible for solving urgent problems of serious biodiversity destruction.

Measure 5.2.4 Support international cooperation in solving problems and formulating cooperative implementation plans.

Implementation

- ⇨ Organize international coordination and cooperation for planning and preparing for emergency situations that severely impact biodiversity such as forest tire and oil spill.
- ⇨ Formulate a plan for preparing readiness for emergency situations with identification of responsible agencies and roles of the agencies.

Objective 5.3 ***Prevent spreading of alien species and genetically modified organisms that may result in alteration of biodiversity.***

Measure 5.3.1 Strengthen knowledge and understanding on impacts from alien species to biodiversity.

Implementation

- ⇨ Study and survey alien species, compile lists of the species and document their distributions and impacts to ecosystems and indigenous species.
- ⇨ Organize seminars and trainings for officers and general public on impacts from alien species.

Measure 5.3.2 **Formulate addition regulations on import of alien species and control use of the species.**

Implementation

- Set up additional animal and plant quarantines and strictly enforce associated importing laws.
- Formulate a regulation for agencies involved in importing alien species for developing agricultural breeds.
- Strengthen knowledge of officers and organize trainings on import, export, or transfer of species outside the country.
- Produce guidebooks on alien species, with pictures, for authorities.
- Control and monitor release of alien species and genetically modified organisms.

Measure 5.3.3 **Provide additional legislative mechanisms to control transport of genetically modified organisms.**

Implementation

- Obtain **cabinet approval for biosafety regulation and declare the regulation under the Office of** Prime Minister in order to legitimize the regulation which, at present, is practiced on voluntary basic.
- Provide for additional evaluation of risks to biodiversity in biosafety regulation and strict monitoring of the regulation.

Strategy 6 : **Promote management of biodiversity in environment and traditional culture.**

Objective 6.1 ***To support initiatives of private sector in biodiversity conservation programs.***

Measure 6.1.1 **Provide incentives for conservation to private firms or organizations who implement biodiversity conservation programs.**

Implementation

- Award and honor private firms or organizations who implement biodiversity conservation programs for youths such as bird watching program and youth camps for nature conservation.
- Enact tax break measures for private firms or organizations who invest in researches that are supportive to biodiversity conservation.
- Campaign for use of biodiversity conservation as cause for public relation of private sectors.
- Support researches and developments of both public and private sector through prioritizing and supporting bibdiversity conservation with Environment Fund.

Measure 6.1.2 **Support cooperation of private sectors in providing supports to biodiversity conservation.**

Implementation

- **Establish a committee of private sectors to support biodiversity conservation.**
- **Formulate. working conservation** programs and invite private sectors to continuously implement the programs
- Create competitive atmosphere in conserving biological resources in order to attract priyate investments.

Objective 6.2 **"To promote biodiversity conservation in urban and rural communities.**

Measure 6.2.1 **Support use of public lands to establish natural forest parks to demonstrate local natural ecosystems.**

Implementation

- Allocate public lands in major cities to plant additional indigenous plant species and modify landscape to be resemble natural conditions.
- Establish natural education centers in large natural forest parks as sites for exhibitions and dissemination of information on biodiversity conservation.
- Organize cooperative programs to ensure participation of private sector communities and youths in establishing and maintaining natural forest parks.

Measure 6.2.2 Promote preservation of indigenous plant species and local animal species in public and private lands.

Implementation

- Disseminate knowledge and information related to indigenous plant species and local animal species.
- Give away indigenous plants on traditional occations and invite citizens to plant in private lands and public lands such as along motor-ways.
- Support conservation and maintainance of privately owned natural lands to ensure their long term existence.
- Provide low interest loans for private sector in implementing biodiversity conservation such as bird sanctuaries, public parks, natural forest parks etc.
- Establish fund to support private firms or organizations who require financial assistance in maintaining their natural lands.

Measure 6.23 Promote preservation of natural conditions in work places and residential areas.

Implementation

- Declare governmental policy require educational institutions, temples and public agencies to preserve natural conditions in their responsible areas especially preservation of old trees and maintaining swamps and ponds that are habitats of bird species.
- Request cooperation from private sector in preserving natural conditions in responsible areas especially preservation of old trees and maintaining bird habitats etc.

Measure 6.2.4 Formulate land-planning measures to facilitate strengthening of biodiversity in urban communities.

Implementation

- Create up conditions requiring housing schemes, residential buildings and shopping centers to include natural parks as part of the buildings and strictly monitor compliance to the conditions. If there is change in the allocated parks, communities will have to be informed.
- Create up conditions requiring protection of some areas as "'green areas" or "buffer zones" for large transportation projects, such as express ways, railways and transport stations, which utilize large area of land and create pollutions to communities.

Objective 6.3 ***To conserve biodiversity in accordance to preservation of Thai traditional cultures.***

Measure 6.3.1 Study and survey traditions and cultures compliance to biodiversity conservation.

Implementation

- Survey Thai traditions and cultures and classify favourable and adverse impacts of the traditions and cultures to biodiversity conservation.
- Promote Thai traditions that conserve and sustainable use biodiversity.
- Preserve customs and ceremonies that use biological resources as important components.
- Provide and disseminate knowledge to general public in order to increase public awareness of biodiversity value in Thai traditions and cultures.

Measure ***6.3.2*** Promote activities that conserve biodiiersity in society such as activities of monks and women.

Implementation

- Honor and promote "roles of women as those who recognize values of biodiversity and actively conserve and sustainable use biodiversity in home and in daily occupations.
- Study and promote role of monks in teaching youths to conserve biodiversity and in preserving natural areas in and nearby monasteries.

Objective 6.4 To Preserve biodiversity in cultural forests.

Measure 6.4.1 Promote rehabilitation and **replantaion** of cultural forests and give right to communities in participating in management of **cultural** forests through preservation and sustainable use

Implementation

- Survey coverage of biodiversity in and use of cultural forests nation wide.
- Formulate long-term programs to rehabilitate ecosystems in cultural forests through joint implementation between communities and local universities.

Measure 6.4.2 Provide knowledge to general public and promote awareness on importance and necessity in conserving cultural forests.

Implementation

- ⇨ Produce mediums, equipments and technical methods for promoting knowledge and awareness of biodiversity value in cultural forests to general public.
- ⇨ Organize training for youths and general public and establish volunteer agencies to lookafter cultural forests with continuous promotional activities.

Objective 6.5 ***To integrate biodiversity conservation with other activities that utilize biological resources.***

Measure 6.5.1 Promote tourism in Thailand in manner that assist biodiversity conservation.

Implementation

- ⇨ Emphasize biodiversity conservation in national and provincial tourism master plans.
- ⇨ Require cooperation in allocating financial benefits from tourism as funding to maintain biodiversity.
- ⇨ Formulate a policy emphasizing cultural and biological diversity of Thailand in tourist promotion.
- ⇨ Campaign for awareness of biodiversity loss as loss of tourist sites and economic revenue.
- ⇨ Provide knowledge to administrators and local operators on benefits from ecotonrism.

Measure 6.5.2 Integrate biodiversity preservation in agricultural policies.

Implementation

- ⇨ Promote maintaining agricultural plant and indigenous domesticated animal species.
- ⇨ Support maintaining biodiversity in cultivated fields and pasture through integrated farming systems, natural cultivation etc.
- ⇨ Promote opportunity for farmers to study successful natural cultivation in order to generate interest in such cultivation.

Measure 6.5.3 Integrate biodiversity conservation in forestry policies.

Implementation

- ⇨ Enact additional measures in national forestry master plan requiring rehabilitation of deteriorated forests in every province to maintain natural biodiversity.
- ⇨ Enact operational directions for maintaining species, ecosystems and genetic pools in national protected areas master plan.
- ⇨ Require reforestation and forest park plantation to maintain species diversity especially indigenous ones.
- ⇨ Require logging in development project areas to avoid destruction of biodiversity.

Measure 6.5.4 Integrate biodiversity conservation in fishery policies.

Implementation

- ⇨ Include rehabilitation and preservation of marine species and ecosystem diversity in Thai sea rehabilitation plan.
- ⇨ Emphasize monitoring species diversity and maintaining habitats of endangered aquatic species in fishery policies.
- ⇨ Require annual reporting of biodiversity status of fishery resources.

Strategy 7 : Promote cooperation between international and national agencies/institutions in conservation and sustainable utilization of biodiversity

Objective 7.1 ***To create cooperation between government private; organizations and local communities in conservation and sustainable utilization of biodiversity.***

Measure 7.1.1 Promote cooperation between public agencies involved in conservation and sustainable use of biodiversity.

Implementation

- ⇨ Improve components and structure of National Committee on the Convention on Biological Diversity to ensure more effective operation.

- ⇨ Formulate a coordination guideline for more cooperative operation between involved agencies.

Measure 7.1.2 Coordinate cooperation between public sector, NGOs and local communities in formulating provincial environmental plans that include conservation and sustainable use of biodiversity

Implementation

- ⇨ Establish coordinating committee between public and private sector to formulate provincial environmental plans on conservation and sustainable use of biodiversity.
- ⇨ Establish local coordinating committees to formulate guidelines on conservation and sustainable use of biodiversity in accordance to provincial environmental plans.

Objective 7.2 ***To promote cooperation in research and development of biotechnologies between public and private agencies.***

Measure 7.2.1 Allocate fund to systematically and comprehensively support, researches to emphasize benefits from development of biotechnology.

Implementation

- ⇨ Prioritize biotechnology research and development projects for further support.
- ⇨ Allocate funding sources for prioritized projects.

Measure 7.2.2 Support cooperation between public and private sector in research and development of biotechnologies.

Implementation

- ⇨ Provide incentives to private sector for joint researches and developments i.e. tax break measures for industries.

Objective 7.3 ***To ensure appropriate benefits from use of biological resources to Thailand***

Measure 7.3.1 Equitable and fair sharing of benefits derived from use of biological resources on basis of sustainable use.

Implementation

- ⇨ Enact regulation and criteria on appropriate access to biological resources.
- ⇨ Establish the National Biodiversity Center as central agency responsible far coordinating access to biologic+ resources.
- ⇨ Formulate a research guideline for international cooperation on researchs and developments of biological resources.
- ⇨ Formulate a guideline on sharing of benefits related to researches, developments and technology transfers.

Measure *73.2* Legitimate regulation on access to biological resources and benefit sharing criteria.

Implementation

- ⇨ Submit regulation on access to biological resources to the cabinet and acquire approval for enactment as regulation under theOffice of Prime Minister.
- ⇨ Organize meetings of involved agencies and institutions to improve understanding on the regulation.
- ⇨ Strengthen awareness in implementationin accordance to the regulation.

Objective 7.4 ***To ensure that Thailand receive appropriate technologies on conservation and sustainable use of biodiversity from oversea and is able to transfer existing technologies to other countries.***

Measure 7.4.1 Promote access and transfer of technologies on conservation and sustainable use of biodiversity.

Implementation

- ⇨ Compile lists of technologies required from oversea and those that are able to be transfered to other countries.
- ⇨ Formulate a guideline on technology transfer under fair and mutually agreed term.
- ⇨ Formulate a cooperative guidelines with other countries on access and transfer of technologies protected under intellectual property systems.

Measure 7.4.2 Strengthen capacity of the National **Biodiversity** Center in operating **Thailand's** Clearing House Mechanism **(CHM).**

Implementation

- ⇨ Establish networking system to coordinate access and transfer of technologies related to biological diversity.
- ⇨ Improve capacity of **personnel** and acquire equipments ***that*** enable more effective operation.

Objective 7.5 *To promote appropriate* ***access and transfer*** *of* ***biodiversity*** *information.*

Measure 7.5.1 Establish national biodiversity information networks and systems.

Implementation

- ⇨ Revise existing information exchange mechanism for information reiated to**conservation and** sustainable use of biodiversity.
- ⇨ Require the National Biodiversity Center to responsible for coordinating data **collections,** establishing biodiversity information networking system and disseminating information.

Measure 7.5.2 improve capacity in collecting and utilizing information.' for' **agencies** and personnel

Implementation

- ⇨ Organize trainings on **collection** and use of biodiversity information in networking system **for** agencies and institutions.

Measure 7.5.3 Promote cooperation on information exchange between domestic and **oversea** agencies.

Implementation

- ⇨ Formulate and, domestically and internationally, publicize a guideline on **access** and transfer of biodiversity information.

ANNEX II

DRAFT REGULATION ON ACCESS TO BIOLOGICAL RESOURCES

Draft Regulation on the Access and Transfer of Biological Resources

Access to biological resources for either commercial or research purposes is probably the most critical and controversial issue related to the ratification and implementation of the Convention on Biological Diversity. In the actual event, the concern over this issue has propelled ratification of the Convention to the national stage with extensive criticism from various NGOs and, at one stage, threatened the ratification process of the Convention itself. Whether such concerns arose from insufficient understanding or economic interest, the OEPP has recognized that a regulation on the access to biological resources must be formulated to ensure control on the issue as well as strengthen the country's readiness in implementing the Convention. In this regard, the Office of Environmental Policy and Planning (OEPP), under cooperation with and supervision of the Working Committee on Genetic Resources chaired by Dr. Ampon Seinanarong, Privy Councillor, drafted the Regulation on the Access and Transfer of Biological Resources. The regulation, which include principles, conditions, and directions for drafting of contract that would ensure suitable share of benefit from genetic resources, has been summited to a panel of over 70 experts from various governmental agencies and private organizations at the meeting on April 19, 1995. After corporating recommendations provided by the experts, the regulation was summitted to the National Committee on the Convention Biological Diversity on June 26, 1995.

Under the regulation, the proposed National Biodiversity Centre and the National Committee on Conservation and Utilization of Biodiversity are empowered to review and grant requests to access and transfer biological resources. The permission process itself was designed with emphasis on preservation of the existing diversity, which must include the collected species and their habitat, as well as sensible time limits for efficient operations. Conditions for individuals to gain permission to access biological resources are stated in the regulation as follows:

I. Those granted legal permission to access and transfer biological resources...

- must represent a company, foundation, cooperative, institutional, organization or agency of the state that is party to the Convention on Biodiversity and must be legally empowered to sign a contract.

- If such company, foundation, cooperative, institutional organization and agency is not yet legally or officially established, the person seeking permission must accept the principle, conditions, process and format imposed by the centre.

2. Biological resources allowedfor utilization

- Biological resources transferred across boundaries must not include resources that are protected by other laws and regulations.

- The Central Committee is empowered to declare what types of biological resources, do not require permission to transfer, and to set conditions under which permission is not required. These conditions can be modified or canceled by the committee at any time.

- In the case of biological resources which were previously permission-exempted, the Committee is empowered to temporary or permanently cease the exemption of permission .

3. *Requests for permission to access and transfer biological resources must be submitted to the National Biodiversity Centre.* The request form must follow the conditions and format designated by the National Biodiversity Centre, and must include a project proposal and terms of reference for gaining access to or importing or exporting biological resources. The request must also indicate the status of the legally responsible person, and be accompanied by any other relevant legal documents.

4. Principles for the consideration of project proposals submitted for permission to access and transfer biological resources.

Proposals related to the access and transfer of biological resources that will be approved by the National Committee must be technologically suitable, economically enhanced, and must equally share the benefits. The following proposal components will be considered;

- Type and quantity of required biological resources;
- Location of the required biological resources;
- Process or technology used for access to the required biological resources;
- Thai researchers or representatives involved in the access of the biological resources;
- Funding for the access to the biological resources;
- Objectives of the utilization of the biological resources at present and in the future;
- The implementation of conditions once permission is gained;
- Limitations in the utilization.
- Proposal for sharing the benefits from the utilization;
- Violation of community rights;
- Violation of animal rights and moral codes for the use of living organisms in research;
- Other conditions the National Committee considers essential and suitable, etc.

5. Period of time for consideration of the proposal.

- The Centre must finalize the consideration process of the permission request within 60 official days. The Centre is empowered to call upon the permission seekers to explain their request and proposal or to ask for additional documents related to the request. Once the request is approved by the Centre and National Committee, the permission seekers must be informed within seven official days.

6. The draft of the contract between the Centre andpermission seekers must be finalized within seven official days.

7. The Centre will collect an insurance payment against any possible loss and degradation of the requested biological resources with the centre's regular fee before handing out the permission document.

8. *Permission can not be granted for a period greater than one year. Renewal, suspension and cancellation of permission is conducted according to principles, conditions and process designated by the Centre.*

Coordination and permission request

1. Must coordinate with individual and institutions/agencies involved in the research in Thailand prior before requesting permission.

2. Must submit the request form for permission to access to biological resources to the National Biodiversity Centre before enter-ring Thailand. Detail information about the project that request the used of biological resources must also be submitted.

3. Must enter the country with researcher or sample collector visa, and not a tourists one. The accommodation in Thailand must be indicated during the entire study for the project. If there is change in the accommodation, the location of new accommodation must be informed to the director of the Centre within 5 days.

4. Once gaining permission for the access to biological resources from the National Committee on Conservation and Sustainable Utilization of Biodiversity, The contract must be written in according to direction designated by the centre.

5. Once permit to survey and collect samples in protected areas, the collectors/researches must strictly obey the regulation of such areas.

6. In the survey for collecting sample. There must be Thai researchers or representative presented at the survey at every occasions. The researchers/representatives must include at least 1 biologist and expense must be provide for every researchers/representatives joining the survey.

7. Must collect the sample of species, varieties, genus and families that are permitted and must collect only the part of organism permitted for the utilization or research. The collectors must not collect too many sample. The collection must not threaten the existing of the species, their habitat or create impact upon the nearly species and their habitat. The collector is liable to damage or loss of natural resources caused by the collection.

8. In case that the survey resulted in the finding of rare or endangered species/varieties, the collectors must inform the Centre as well Thai institution/organization involved in the research/study of such finding on the species and the location where the species in found.

Analysis and Research

9. Once the survey and sample collection are completed, the collectors deposit samples of duplicate specimens used in the research with the sample details including the location where samples is collected to the' Centre in order to ensure the convenience in repeating the collection. The collector must also give copy of picture or slide to the Centre or Thai institutions involved in the research or museums or natural science institutes established in Thailand.

10. In case that new species is found as result from the research, the researcher must give the type specimens of the newly found species to museums, natural science institutes and herbariums in Thailand.

11. Must conduct preliminary researches in Thai institution/organisms involved in the research. Such preliminary researches could include the extraction and the study of biological activity of extracted compound. The researches are aimed to develop expertise of the local staff in the research.

12. Methods used in the research must not conflict the moral code for the utilization of living organisms for research:

Transfer

13. When request permission to transfer biological resources, the permission request form for the transfer must be submitted with the one for access to biological resources.

14. The individuals who transfer the resources must strictly obey the regulations, conditions' and processes for the export and import of samples of biological resources. Such regulations include disease quarantine, CITES convention, International Air Transportation Association's Life Animal Regulation-(IATA).

15. The transfer of endangered/rare or ecologically reliable biological resources must be conducted in accordance to their laws and regulations.

16. Must inform the centre and Thai institution/organizations of the location of the transfered samples and must continue corporation of further information transfer on the exported biological resources.

It should be noted that the process was also designed to encourage the partnership for researches and other sample collecting activities. The aim of such partnership is not only to improve the ability of local staff in sample collection technique but also enhance their capability. and consequently, the efficiency in providing assistance for sample collectors in future activities.

ANNEX III

DRAFT NATIONAL GUIDELINE ON BIODIVERSITY DATA MANAGEMENT

National Guideline on Biodiversity Data Management

Introduction

Early Phase of Thailand's Biodiversity Data Management (BDM) project was devoted to surveys of institutional capacity in handling and managing biodiversity information. Finding from these surveys, the Guideline Testing and subsequent BDM Institutional Survey, had indicated certain difficulties and problems associated with information management in biodiversity related institutions. It's deem necessity that these difficulties and problems receive attention from those concerned and be appropriately tackled by specific administrative measures. Thailand's BDM project have long believed that institutions have exclusive right and responsibility over the use and management of their own information as accepted by the recent Conference of the Parties to the Convention on Biological Diversity. Thus, soft administrative means, such as guideline and action plan, seem to be more appropriate measure in solving problems related to management of biodiversity information. Under these considerations, the Thailand's BDM project has drafted a National Guideline on Biodiversity Data Management as a suggested measure for improving management of the information in biodiversity related institutions. The guideline was presented to concerned institutions in a meeting entitled "Guideline and Action Plan for Biodiversity Data Management" held in Bangkok on December 20, 1996. Comments and opinions expressed by participants in the meeting was later integrated into the guideline as well as the National Action Plan which was also presented.

Principles

Since its early development , the National Guideline on Biodiversity Data Management has aimed to achieve two major goals; improving information availability and better identification of need for new and additional data management technologies. Such goals are direct results of finding from the institutional surveys which identified lack of information availability and poor selection of data management tool as two most serious problems. In resolving these problems, the guideline has set out to establish and ensure institution's commitments toward documenting their information and assessing their data management capacity through formation of informal network. Initially, the network will be operated with voluntary participation by interested institutions and individuals who can be identified as information custodians. An independent agencies (hub) will be created to provide service to network's members (participants) as well as maintaining overall operation of the network.

The guideline has also aimed to tackle other problems identified in the institutional survey including lack of sufficient workforce for data management tasks and limited availability of hardware and software. Measures formulated under the guideline for these problems will, however, be implemented at lesser extent than those in previous paragraph (establishment and maintenance of network). Thailand's BDM project has realized from the initial drafting of the guideline that acquiring additional staffs and equipments are burden and responsibility of the institutions. Thus, the guideline should just confine its role as merely a "guide" for best possible means to

maximize improvement in data management with minimum number of additional personnels and equipments acquired. In addition, technical assistance for cost-effective acquirement of technologies and (data management) specialists was also included in the guideline.

Finally, the guideline will be used to raise profile of data management tasks in institutions that maintain information concerning aspects of biodiversity. The guideline, through provision of informal network, will attempt to improve awareness on important of data management and ensure better information service from the institutions. The guideline will also act as reference for the institution in determining their data management status as well as in making appropriate adjustment to improve such status.

Components

The National Guideline on Biodiversity Data Management consists of 3 major components which are ;

1. Biodiversity Information Network (BINET)

BINET is an informal network comprised initially with institutions and individuals who have been identified as custodians of biodiversity related information. The network is maintained by a data transferring coordinator or hub which is operated as independent agency under the existing National Committee on the Convention on Biological Diversity.

2. Guideline on Development of Efficiency in Biodiversity Data Management

This guideline provides guidance for both participants of the BINET and other institutions, in building efficiency in data management. Under the guideline, administrative measures for data management and practical guide in selecting additional personnel are suggested.

3. Biodiversity Data Management Standard (BDMS)

BDMS is a criteria used mainly for determining status of data management of institutions participated in the BINET. The BDMS indicates minimal requirements for the institution in making information available or providing access to the information. The standard could be seen as a set of conditions for measuring the institution's commitment to data management also.

In order to ensure maximum benefit from the guideline, these three components should not implemented separately. Instead, the components should be operated together as a completed system. The BINET (1.) could act as operation component where information on status of (biodiversity) data management is consistently collected and new measures for improving management capacity are tested and implement. At the same time, Guideline on Development of Efficiency in

Biodiversity Data Management (2.) could be used assist the operation of the BINET through administrative change and effective acquiring of personnels and equipments. In return, the guideline would benefit from information gathered from the BINET in refining its own measures. The last component, the BDMS (3.), could present itself as a criteria in assessing effectiveness of the Guideline on Development of Efficiency in Biodiversity Data Management as well as benefit from the BINET. If implement effectively, Thailand's BDM project believes that these three components can sufficiently provide basic platforms for standardized data exchange and transfer system with greater complexity and more extensive and wide-reach network in the upcoming years.

I. Biodiversity Information Network (BINET)

Until recently, most of biodiversity related information in major sources, the governmental agencies, was classified to general public. Although these information are often research related and do not possess any treats to national security nor authority of the government, access to these information ,decades ago, was virtually impossible. Thus, when the government endorsed greater disclosure of their information to interested public, the agencies were relatively unprepared to provide effective information service or facilitate access to their information. Decades of minimal information transfer between the agencies and interested users and between even the agencies themselves have leave most of the agencies unaware of necessity of effective information management. It is often found that several governmental institutions do not have the full knowledge of information that they are obtained and know even less about their data management capability. If these knowledge are not improved, the institutions will not likely to be able to participate effectively in global networking community in the upcoming information age.

The Biodiversity Information Network (BINET) is aimed to ensure greater interest toward basic information management. By participating in the BINET, institutions are liable to commit their resources for documentation of their information as well as available personnels and equipments assigned for data management tasks. Contributions made by the participation institutions(information of available data and resources for data management) to the BINET are compiled, published and returned back to the institutions as a reference document. Apart from the document, the institutions would benefit from other networking services provided by a coordinator also.

BINET is not a computer network and would not rely exclusively on electronic communications, i.e. the Internet, in maintaining contact between participating institution. Instead, the BINET would operate on basis similar to that of the Clearing House Mechanism (CHM) of the Convention on Biological Diversity, where participants are welcome to transfer and exchange information in format best suit to their present data management capacity. Since published document was identified, by the BDM Institutional Survey, as the most common format, the BINET would place higher priority for exchange of publications and lesser priority for electronic transfer in the network until digital information is proven to be dominant form of data storage. such priority settings clearly reflect a principle objective of the

BINET in ensuring greater availability of information in all possible forms. Although information availability is the utmost important goal of the BINET, the network would provide for certain means to enable participating institutions to transfer their information via electronic (computer) network in order to encourage interest in conversion of data into digital format as well as development of electronic networks in the country.

1.1 Components of BINET

In all, BINET is comprised of three components as follow;

1. Participated institutions/individuals

Initially, participants of the BINET would be consisted of institutions or individuals that can identified themselves as custodians of biodiversity related information. To obtain membership in the BIONET, the institutions and individuals must be able to demonstrate ownership over their information. The participants must also have authority to provide permission for accessing and making use of their information also.

2. **Data Transferring Coordinators (hub)**

As the name suggested, Data Transferring Coordinator or hub is responsible for coordinating information exchange in the BINET. The hub would act as a central agency in collecting information from participated institutions in the BINET as well as assisting the institutions in searching and modifying their desired information. In addition, the hub would also be responsible for monitoring status of data management and providing support for improvement of data management capacity in participating institutions.

The hub is operated under the Working Group on Biodiversity Data Management that was formed by the National Committee on the Convention on Biological Diversity. The Working Group would supervise operation of the BINET as well as approve activities to be implemented by the hub.

3. **External users**

Interested institutions or individuals that do not participate in the BINET are regarded as external users. The users may be those that are not sufficient capable and/nor are willing to commit themselves in the BINET. External users can ask for certain information services (i.e. information search) from the hub but are not entitle to receive any supports for building data management capacity that BINET's members had.

Apart from reports from participating institutions (BINET's members), any information transfers that do not acquire services from the hub, would not be regarded

as activities under the BINET. The BINET's members are free to distribute, exchange or supply their information to any individuals or institutions as well as retain all rights to prohibit access to and use of their information. The hub is authorized to ensure that reporting commitments are met by the members but are not empower to administrate any change in data management of the member. The member can withdraw from the BINET at any time. The withdraw of the members is come into effect once the Working Group on Biodiversity Data Management acknowledges the withdrawal.

1.2 **Roles and Responsibilities of BINET's Components**

1.2.1 Data Transferring Coordinator (hub)

Hub is responsible to fulfill seven major tasks as follow ;

1. collect, catalog and publish information available in BINET's members.
2. Provide information searching services and, upon request, produce information products from information of the members.
3. Monitor and provide support to development of data management capacity of the members in order to ensure better compliance with Biodiversity Data Management Standard (BDMS).
4. Survey and compile lists of resources used for data management by the members.
5. Assist in providing linkage between the members and international organizations, i.e. WCMC, IUCN etc.
6. Regularly rank the members on their need for strengthening data management capacity.
7. Locate and obtain funding for development of data management capacity of the members.

In order to ensure effective implementation of these tasks, the hub would be administrated and operated by two mechanisms which are ;

Working Group on Biodiversity Data Management

As mentioned earlier, operation of the BINET is governed and supervised by Working Group on Biodiversity Data Management. This Working Group has already been established by the National Committee on Convention on Biological Diversity to supervise Thailand's BDM project. The Working Group is currently comprised of selected experts and representatives from major governmental institutions (i.e. Royal Forestry Department, Department of Fisheries). Representatives of BINET's members will, however, be included to the Working Group once the BINET is fully operational. These

representatives will be selected in assembly of the BINET's members held annually to review performance of the BINET.

The Working Group on Biodiversity Data Management is entrusted with responsibility to review and consider the following issues ;

- Applications of news BINET's members
- Provision of supports for development of data management capacity in the BINET's members
- Ranking of the BINET's members on the need for development of data management capacity
- Allocation of BINET's budget for various tasks including funding provide for development of data management capacity
- Conducting specific negotiations between access applicants and information custodians where access dispute occurs.

The Working Group is not responsible for considering regular information services provided by the BINET. The Working Group would, however, review reports of the services prepared by the other mechanism, the operational team, on regular basis and provide suggestions on how to improve such services.

Operation team

As the name suggest, operation team is responsible for operating information services and performing other BINET's tasks. These services and tasks include information search, collecting compulsory reports from the BINET's members, compilation and publishing of information/resource metadata as well as preparing document for meeting of the BINET governed body, the Working Group on Biodiversity Data Management. The operation team would also perform specific tasks assigned directly by the Working Group such as making appointment for those involved in access negotiations.

The operation team is made up of individuals with either biodiversity, data management, administration or financial expertise. The Working Group on Biodiversity Data Management would appoint a chief to head the team. The chief is entrusted with authority to make decisions on regular services and tasks of the BINET that do not required the Working Group's approval.

The operation team is responsible for arranging annual meeting of BINET's members. Apart from selection of the member's representatives to the Working Group on Biodiversity Data Management, the meeting would act as an open forum for the members to express and discuss performance of the BINET. In addition,

representatives from international organizations such as IUCN, WCMC and Specie 2000 will be invited to participate in the meeting. Interest individuals and institutions are welcome to actively participate in this annual event also.

1.2.2 Participated institutions/individuals **(BINET's** members)

Initially, institutions/individual participated in BINET must be information custodians who can clearly demonstrate official or legal-binding ownership of their information to the administrator of the BINET, the Working Group on Biodiversity Data Management. The institutions/ individuals or BINET's members may not need to be those who carry out data collection themselves as long as they are able to be responsible for the following tasks ;

- Maintain information in accordance to Biodiversity Data Management Standard (BDMS)
- Regularly update information preferably in accordance to BDMS
- Ensure consistent accuracy of information
- Provide appropriate access to information, unless the information is classified
- Provide advice on appropriate use of information

As far as membership is concerned, responsibility of BINET's participants is confined to reporting of their information and data management status. BINET's members has to regularly submit their reports to Data Transferring Coordinators (hub) within limited time frame set by the Working Group on Biodiversity Data Management. With preliminary evaluations from the operation team, the Working Group would grant approval for the reports. If the reports are found to be incomplete by the Working Group, BINET's services to the submitted members will be temporary suspended until resubmitted reports are approved by the Working Group. ***Failure to submit the reports may, however, result in termination of the membership.***

BINET's members are required to prepare and submit two types of reports which are ;

1. Data Management Report

   Data Management Report is documentation of all available resources allocated for data management in BINET members. Using a form supplied by the Data Transferring Coordinator (hub), the members must list numbers of

personnel assigned for data management tasks as well as quantity and specification of equipments, such as hardware, and software in possession. Information obtained from the report is to be used by the hub to determine needs for development of data management capacity of each members and in ranking of the members according to such need.

2. Dataset Reports

BINET's member have to list names of their sets of information, or datasets, specify characteristic of the datasets as well as describe how the datasets are maintained in two separated reports as follow ;

2.1 Dataset statement

Initially, BINET members must prepare and submit a dataset statement enlisting all of their available datasets and describing how each dataset is managed and what conditions users need to comply to gain access to the datasets. The members only need to submit one dataset statement per each dataset at the beginning of their participation in the BINET to validate their memberships. The members have to prepare the statementsfor every news datasets compiled/established , however.

If the members fail to report their new and additional datasets, services provided to the member will be suspended until dataset statements for such datasets are submitted. In some cases, where failure to compile the statement suggests the serious lack of commitment by the member (i.e. fail to report new datasets for over 1 year), BINET's membership may be terminated.

2.2 Updating report

Updating report consist of three main components ; (1) addition (with dataset statements) / cancellation/transfer of datasets, (2) addition/ cancellation/transfer of "components" of datasets and (3) alteration of access conditions. Although, these three components have to be submitted to the hub together on regular basis, it is desirable that BINET's members report changes in any components, either datasets, components of the datasets or access conditions, as soon as they occur.

Failure to report change in the above mentioned component on regular basis is considered as serious lack of

commitment and may result in immediate termination of membership.

1.2.2.1 Entitled services

As member of the BINET, participating institutions /individual are able to enjoy the following services ;

- Entitle to obtain copies of analyzed/refined/modified datasets or any information products produced by the hub.
- Receive BINET datasets catalogues from the hub with regular updates.
- Entitle for information searching service. The service is free of charge. However, for datasets that required certain access fee, those who use the service would have to pay the fee themselves.
- Entitle for dataset modification from the hub. The service is usually free. If the modification is, however, proven to be costly, those use this service will need to pay for some expense.
- Entitle to ask for advice and consultation on data management issues
- Entitle to receive institutional and financial supports from the hub for development of data management capacity.

1.2.2.2 Criteria for selecting BINET's members

In order 'to obtain BINET's membership, institutions or individuals must be able to demonstrate the following qualifications ;

- Possess official or legally-binding ownership of their proclaimed datasets (information). The members may have copyrights over their datasets or receive institutional recognition of the ownership. *Most importantly, the members must be able to legitimately authorize access and use of their datasets.*
- '*Responsible for maintenance of datasets. The members may not need to collect information first hand, but are required to be entrust with responsibility to ensure integrity of the datasets.
- Be the first person or institution to document changes in the datasets. The member must be able to the first who record and report addition, cancellation, transfers and other alterations of the datasets and theircomponents to the hub.
- Be the most suitable and competent to maintain the dataset. In a case that similar datasets are maintained by more than one institutions/individuals, institution/individual with best

data management commitment and capacity, is granted the membership in the BINET. However, lesser qualified custodians are welcome to joint the BINET as owners of other different datasets, if present, or as partners of the one that receives the membership.

- Institutionally and financially secure. The members must be able to secure consistent funding and supports and able to allocate sufficient resources for data management tasks regularly.

1.2.3 **External users**

As mentioned earlier, institutions or individuals who intend to use the BINET's services but are not interest nor qualified to obtain the BINET's membership, are regarded as external users. Similar to BINET's members, participation of the external users is confined to activities that required services from the hub such as information search or access negotiation. Access and transferring information directly from the members to the users is considered as bilateral activities under jurisdiction of the members and not of the BINET. Unlike the member, however, the users usually have to pay for services offered by the hub with exception of certain promotional documents (i.e. brochures, posters)

1.3 Access Negotiation

As far as BINET is concerned, access to unclassified datasets for non-commercial purpose can be carried out with simple registration with the hub. The registration is enable the hub to obtain required datasets from BINET's members and inform acquirers of conditions they need to comply in order to access and/or use such datasets. The registration also allows the hub to learn what purposes the acquirers intend to use the datasets for and whether the purposes are acceptable to dataset providers(members). If the purposes is found to be conflicting with objectives of the dataset (i.e. use for commercial purposes) or unacceptable to the providers (i.e. benefits from the datasets are not substantially returned to the providers), the hub will arrange for a negotiation between the acquirers and the providers (concerned members). The Working Group on Biodiversity Data Management would act as negotiation panel and mediator for resolving access dispute between the two parties, the acquirers and the providers.

The operation team is responsible for coordinating access negotiation process. the team would inform and advice the acquirers on preparation and presentation of their access proposals ,and assist the dataset providers (concerned members) in preparing necessary information for the negotiation,

i.e. objectives and access conditions of their datasets. The team is also responsible for arranging venue and date for the negotiations.

Since providers have absolute authority over their dataset, results from access negotiations, whatever the outcome, are final. There will not be any appeals after the negotiations nor new panels to renegotiate the access.

For every access inquiry and request via the BINET, the hub is entrust with duty to inform access conditions and disputes, mentioned in above paragraphs, to acquirers with 5 working days. If the disputes are occurred and the acquirers are willing to negotiate the access with concerned information providers, the hub will further provide necessary forms for and advice the acquirers on negotiation process. However, for minor disputes, the hub would attempt to convene informal meetings between the acquirers and the providers to find possible resolutions and avert time-consuming formal negotiation process in the Working Group's panel.

II Guideline on Development of Efficiency in Biodiversity Data Management

2.1 Guideline on development of data management for BINET's members

This guideline is an operational framework for allocating available support to the BINET's members. Under the guideline, the hub is considered as a representative of all BINET's members in requesting and obtaining new and additional resources to replenish support to the members. Such representation is expected to enhance possibility in securing funding and other supports from non-government sources, especially international organizations.

With information from submitted reports, BINET's members are ranked according to need for development of data management. Higher the ranking indicate greater the need. The ranking is carried out almost entirely by comparing data management status of the members with Biodiversity Data Management Standard (BDMS).The BDMS will be described in detail later on in this document_

BINET's members are entitle to request for supports for specific development of data management. If the requested members are higher ranked and the requests themselves are for interest of the whole BINET' (i.e. increase information availability),the Working Group on Biodiversity Data Management will grant approval for supports to the members. The operation team is then responsible for arranging and releasing institutional/financial supports as well as monitoring the use of the supports by the members. Inappropriate utilization of the supports may result in disqualification for the supports in the future.

In all, the guideline has indicated four areas of development that should be supported by the BINET as follow ;

1. Compilation and publishing of information

Due to abundance of raw data in majority of biodiversity institutions, compiling and publishing the data are undisputedly the most important elements in improving information availability in and outside the BINET. Initially, supports provided for these activities would be directed to the members that host information most valuable for better understanding of the country's biodiversity. These information include lists of species found in the wild, taxonomic description of species and composition and distribution of species at all levels.

2. Building data management capacity

Strengthening data management capacity of persomiel through training is possibly the best possible mean to improve the capacity of institutions. The training is also an cost-effective activity where a relatively large number of personnel can obtain addition data management skill with a single event (training course). Topics or subjects of the training should respond to data management need of most institutions. The topics and subjects are ,thus, able to be selected from assessment of reports from the BINET's member

3. Acquiring additional data management software

Since BINET is a single organization with members represented by the hub, the hub is , thus, able to acquire softwares, on behalf of the BINET, and distribute to all participating members without violating copyright laws. The hub is , however, ready to allocate certain funding for fee of intra-organization distribution of some softwares, if required by distributor, but would continue to insist single organization status of the BINET. Selection of softwares is similar to those for training topics/subjects described in previous paragraph.

4. Acquiring specific hardwares and additional equipments

Acquisition of hardware and additional equipment, i.e. scanners or modem, is usually regarded as responsibility of BINET's members. Thus, the Working Group on Biodiversity Data Management, the BINET's governed body, would only grant hardware supports on certain occasions where provision of the supports is significantly improves availability of information valuable for better understanding of Thailand's biodiversity. Such cases include members who collect and maintain a large amount of basic taxonomic information at national and regional level.

BINET's members should request for supports in either ones of the above mentioned areas. Other types of supports including those for database and local network development, may be requested from the BINET. However, such supports are not likely to be approved by the Working Group unless they

are proven to be beneficial for overall improvement in either data availability and management.

2.2 Guideline on development of biodiversity data management for general institutions

Due to lack of information on data management in most institutions, this guideline is consisted of only general recommendations for improving information availability and data maintenance capacity in the institutions. Implementation of the guideline is relied solely on commitment and allocated resources of the institutions. Thus, successful development of data management capacity can not be achieved by just following the guideline but also by the institution's willingness to improve their data nianagement potential. The recommendations in the guideline are as follow ;

1. Allocate sufficient fund for compilation of all available datasets. Institutions may use BINET's dataset catalogues as example for this activity.
2. Improve data management capacity as preparation for obtaining membership. in the BINET. Benefits expected from the BINET (information services) may be used as justification for the improvement.
3. Arrange training workshops or courses on data management ,especially widely used softwares, in order improve data maintenance skill of personnels. Institution may cooperate with others in organizing the workshops/courses to increase participation and minimize cost.
4. Establish a section or unit responsible for providing information service. The section/unit should be entrust with duty to maintain dataset catalogue as well as facilitate appropriate access to unclassified information available.

2.3 Guideline on development of personnel for biodiversity data management

Apart from occasional provision of general training for BINET's members, other developments of personnel for data management, including acquisition of additional staff, are responsibility of both the members and non-member institutions themselves. Thus, this guideline would confine itself as merely a recommended strategy that institutions can adopt to enable the development. Similar to the guideline on development of biodiversity data management for general institutions, as described under the previous heading, successful development of personnel under this guideline is depended entirely on commitment and available(allocated) resources. It is important, however, to note that unlike development of overall data management structure described by earlier guidelines (2.1 and 2.2), greater number of available personnel with better skill do not always ensure better data management capacity nor efficiency. Institutions should be consistently reminded that without well developed data management structures and procedures, contribution from

development of concerned personnels to development of the capacity is likely to be limited.

2.3.1 **Types of personnel involved in biodiversity data management**

Before specifying strategy for the development of personnels, It is useful to first classify the personnels involved in biodiversity data management. In general, the personnel can be categorized into ones of the following group ;

1. Biodiversity specialists

Biodiversity specialists are scientists and researchers who have good understanding and knowledge on certain aspects of biodiversity. The specialist are viable human resources in management of biodiversity information, especially where most of the information is remained as raw data. Their knowledge is an valuable asset in classifying, compiling and cataloging of the raw data and thus enable them to be the only group of personnel that capable to access information at lowest level.

2. Information processors

Information processors are those responsible for storing collected information into institution's chosen mediums, usually a computer. When information is properly compiled and collected, the processors are entrust with duty to select tools and/or softwares that are best accessible as well as most suitable to objectives of the collection.

3. Data analysts

Data analysts are personnels with specialized data analysis skill. They usually considered as those who bridge information transfer between information custodians and users. Due to highly specialist skill and great demand in the market, number of the analyst is usually scare and allows the analysts to demand above-average to extremely high salary from institutions. Thus, large to medium scale employment of the analysts would surly be costly for the institutions.

2.3.2 **Strategy for development of personnels**

Institutions may carry out personnel development activities by adopting the following strategies ;

1. Acquisition of additional personnel

To ensure effective development of personnel for biodiversity data management, institutions should consider their own data management need before acquiring additional staff. If majority of information is remained as raw data, institutions should concentrate on employing biodiversity specialists to improve availability of

information rather than acquiring information processors or analysts. Once most information is properly collected and compiled, the processors may be employed to further the availability in digital format. Institutions should. however, acquire the analyst when specialized analysis of their information is needed (i.e. exist staffs are not capable to carry out the analysis) and sufficient fund is available for the employment of the analysts.

Overall, however, acquisition of additional personnels is appropriate when institutions have sufficient financial resources and are able find personnels suitable for their data management need. The acquisition is usually a suitable mean for institutions with minimal data compilation and thus, are custodians of largely raw data. In general, acquiring biodiversity specialists is often more appropriate than acquisition of other types of personnel since the specialists are playing larger role in making information, especially raw data, available. Employment of the specialists may be considered also as cost-effective long term investment due to long term commitments by the specialists who often devote to the biodiversity tasks by their own interests. In certain case, data analysts may be required to fulfill specific (data management) tasks. The institutions should however remind themselves that the analysts usually have short term commitment and demand for relatively high income.

2. Building data management capacity

Development of personnel's data management capacity, as described at certain extend in previous guideline, is best carried out by training workshops/courses due to their cost-effectiveness. Institutions should embark upon arranging the training workshops or courses when they are sufficiently equipped with data management staff. In short term, training is usually more appropriate for information processors due to short period of learning and compatible price. Training for biodiversity specialist, although a good long term investment, is usually lengthy while training for data analyst is often expensive. Training that the analysts received, can not always guarantee significant improvement in data management capacity, especially when the management structure is poorly developed, also.

3. Exchange of personnels

For institutions with limited resources available for development of data management, exchange of personnel seem to be the best option. To exchange personnels, the institutions need to locate needed staff in other institutions and seek cooperation for transfer for the staff. The institutions also need to be ready to provide their own staff as well as other resources, if requested, in return for released personnel from other institutions. It is rather unfortunate that present human resource scarcity, limited budget and complex bureaucratic

process are likely to make most institutions reluctant to conduct any personnel transfers.

III **Biodiversity Data Management Standard (BDMS)**

As mentioned earlier in this document, Biodiversity Data Management Standard(BDMS) is a criteria for assessing performance of biodiversity data management of BINET's members. Institutions that are not BINET's member, are however, welcome to use the BDMS as a guide for evaluation of their data management. If the institutions are proven to be qualified under the BDMS, they will likely to be granted membership to the BINET given they are committed to the required reporting.

The BDMS is not a tool for comparing amount of resources available for data management but rather for assessing how such resources are used. Under the BDMS, data maintenance practices are evaluated in accordance to available resources of the BINET's members. Required tasks under the BDMS are within capability and resources of most institutions. Thus, failure to comply to the BDMS can be considered as lack of proper attention and commitment to data management. In certain cases where resource's insufficiency is the main cause for the failure, however, the failure is indeed an indications of serious resource deficiency and supports from BINET should be provided as soon as possible.

The BDMS consists of three components as follow ;

1. Data compilation standard

   Institutions (including BINET's members) are qualified under data compilation standard when they have completed the following tasks ;

   - Compile and update datasets at least every 6 months.
   - Compile and published available datasets at least every year. Institutions may choose to disseminate their datasets via electronic network instead of publication as long as the dissemination is carried out at least annually.
   - If computer facility is available, over 50% of the datasets must be collected and maintained in digitized format.
   - If more than 5 datasets are available, institutions must compile and update metadata (catalogue) of the datasets at least every 2 years. For institutions that did not compile such metadata prior to being accepted as BINET's members, they must do so and submit the metadata, as a part of the required report, within 3 months after membership is granted.

2. Data analysis standard

   Institutions must complete the following tasks to qualify under data analyst standard ;

- Analyze collected data within 3 month after the collection is completed.
- Publish or disseminate, via electronic network, information obtained from analysis within 6 month after the analysis is completed.

3. Access standard

Institutions must be able to implement the following tasks to ensure compliance of Access standard ;

- Compile and publish metadata of dataset collectors or those responsible for maintaining datasets at least every **6** month.
- Compile and publish access conditions of all unclassified datasets at least every year unless there is no addition or cancellation of the conditions (exiting conditions are valid).
- If datasets are contained in digitized format, users must be able to duplicate the dataset into diskettes unless such duplication is prohibited.
- If datasets are updated at least every 3 month, institutions must prepare documents informing users of the update.
- If institutions have network facilities (i.e. modem), they should at least acquire an E-mail to ensure better information access. Institutions may acquire facility for Internet and create their own Homepage to further the access, but they must enable access via other mediums, especially publication also

Foreword

The National Guideline on Biodiversity Data Management is formulated specifically for improving data management in Thailand. The guideline is likely to be unsuitable for other countries where priorities for data management are somewhat difference. The BDM project, however, believes that, with certain discrete modification, the guideline may be adopt by other countries.

Since much of the guideline are derived from WCMC document, the BDM project and Office of Environmental Policy and Planning (OEPP) do not reserve any rights on the guideline. Thus, the guideline is treated as a product from research activities, institutional surveys, and , thus, a public good available for all interest public.

Finally, the guideline should be treated as a flexible “guide” rather than restricted law or regulation. The project and OEPP welcome any change to components of the guideline especially those resulted from evaluation of implementation of the guideline. Authorized body established under the guideline including the Working Group on Biodiversity Data Management are available to consider any proposed changes.

ANNEX IV

DRAFT NATIONAL ACTION PLAN ON BIODIVERSITY DATA MANAGEMENT

Thailand's Biodiversity Data Management Action Plan

Introduction

Following formulation of National Guideline on Biodiversity Data Management, there is a common recognition that the guideline alone may not be sufficient to ensure progressive development of biodiversity data management as required. After all, the guideline is merely a technical guidance, a set of useful suggestions, for concerned institutions to undertake enhancement of their (biodiversity) data management efficiency and capacity and does not assign specific responsibilities for particular institutions in doing so. Thus, it is deem necessary for Thailand, and possibly other countries, to formulate a concrete measure that can effectively translate initiatives stated in the guideline into practical activities with responsible institutions and timeline for implementation. Such measure was realized, after the drafting of the guideline, as Biodiversity Data Management Action Plan. The plan has identified tasks for concerned institutions for improvement of national biodiversity data management through utilization of the guideline as reference. Present body overseeing biodiversity information management, the Working Group on Data Management under the National Committee on the Convention on Biological Diversity have reviewed and grant approval for the plan. National implementation of the plan will, however, take place only after the plan is approved by the National Committee, the National Environment Board and eventually the cabinet. This approval process may be time consuming, but nevertheless necessary to obtain consensus approval by all involved and thus avoid conflict during the actual implementation.

Components

In Total, the Biodiversity Data Management Action Plan consists of 4 policies, 15 measures and 5 1 specifics activities. Majority of the activities has been assigned as responsibilities of Data Transferring Coordinator (hub), a body established to operate Biodiversity Information Network (BINET). This is largely a result from the fact that the BINET is indeed a core mechanisms of the plan and thus commands a large proportion of the activities. A considerable number of the activities is fell under responsibility of " Custodian Institutions". Such institutions are referred to agencies that are known to collect and maintain biodiversity information. Initially, to ensure effective implementation of the activities, the custodians institutions will be those that gain BINET's membership which, in effect, certifies the competency in (biodiversity) data management of the institutions. If the implementation of the activities under the action plan are proven successful, members of the BINET should increase and consequently, expand the implementation of the activities to greater number of institutions.

Generally, Thailand's Biodiversity Data Management Action Plan was formulated with structure as followed :

- Policy 1: Promote Biodiversity Data Management at National Level

Measures : 1. Establish Biodiversity Information Network (BINET).
2. Formulate Criteria for Participation in BINET, Service of Data Transferring Coordinator (hub) and Agreement between the hub and Information Custodians (BINET members).
3. Encourage Information Custodians to Appropriately Manage Their Own Biodiversity Information.
4. Encourage Publishing of Information\News Related to Surveys and Monitoring of Biodiversity Information in Newsletters or Magazines on Regular Basis.
5. Encourage Communication and Information Exchange between Institutions as well as Appropriate Use of Information.

- Policy 2 : Promote Development of Efficient in Biodiversity Data Management at National Level

Measures : 1. Continuously Survey Status of Biodiversity Data Management (Including Equipments and Personnel).
2. Strengthen Data Management Capacity of BINET's Members.
3. Strengthen Data Management Capacity of Non-BINET's Member Institutions.
4. Encourage Implementation of Joint Projects, with Other Countries or International Organizations, that are Related to Transfer of Technology for Biodiversity Data Management.

- Policy 3 : Promote Development of Biodiversity Data Management Personnel

Measures : 1. Provide Supports for Training and Education Program on Biodiversity Data Management.

2. Increase Number of Data Management Personnel in Institutions.
3. Encourage Exchange of Knowledge, Opinions and Experiences between Personnels and Experts on Biodiversity Data management.

- Policy 4 : Promote Regional and International Cooperation

Measures : 1. Prepare Linkage with Regional International and Foreign Institutions to Enable Exchange of Biodiversity Information.
2. Provide Linkage with ASEAN-EU's ASEAN Regional Center on Biodiversity Conservation (ARCBC)
3. Provide Linkage with Clearing House Mechanism of The Convention on Biological Diversity (CBD)

Detail of the Action Plan are stated in the following pages.

Policy 1: Promote Biodiversity Data Management at National Level

Measures	Activities	Responsible institutions	Period	Budget
1. Establish Biodiversity Information Network (BINET)	1. Establish Data Transferring Coordinator (hub) as a mechanism for coordinate and exchange information between institutions.	Office of Environmental Policy and Planning (OEPP), National Biodiversity Center	1997 - 1999	
	2. Establish Working Group on Biodiversity Data Management to supervise the BINET and Operation team to operate the hub	National Committee on the Convention on Biological Diversity	1997 - 1999	
	3. Encourage participation in BINET.	Data Transferring Coordinator (hub)		
2. Formulate Criteria for Participating in BINET, Services of Data Transferring Coordinator (hub) and Agreement between the hub and Information Custodians (BINET members).	Compile biodiversity data management handbook for Thailand.	Data Transferring Coordinator (hub)	1997 - 1999	

Measures	Activities	Responsible institutions	Period	Budget
3. Encourage Information Custodians to Appropriately Manage Their Own Biodiversity Information	1. Establish a sector/division in institutions, with biodiversity information, responsible for collecting and managing the information as well as coordinating with BINET's hub.	Information Custodians	1997 - 1999	
	2. Identify information necessary for management of biodiversity and systematically compile such information for specific area of interest ie. marine ecosystem, agriculture etc.	Information Custodians	1997 - 1999	
	3. Investigate all available b&diversity information and establish databases for the information with linkage to databases of other institutions.	Information Custodians	1997 - 1999	
	4. Acquire and develop tools and equipments necessary for compilation of information, and establishment of databases.	Information Custodians (BINET's members may be supported by the hub)	1997 - 1999	
	5. Send selected staff to short-training courses on data management.	Information Custodians	1997 - 1999	

Measures	Activities	Responsible institutions	Period	Budget
4. Encourage Publishing of Information\News Related to Surveys and Monitoring of Biodiversity Information in Newsletters or Magazines'on Regular Basis.	1. Investigate various types of information requested by users in order to determine types of information demanded by general public. 2. Publish newsletters or report enlisting available information using Biodiversity Data Management Standard (BDMS) as guide.	Information Custodians Information Custodians	1-2 time/year 1-2 time/year	
5. Encourage Communication and Information Exchange between Institutions as well as Appropriate Use of Information.	1. Formulate regulation/guideline on access to information including process for submitting request for information. 2. Organize consultation meeting on types of biodiversity information by required users. 3. Provide financial assistance for compiling reports on information required by users. The reports should be submitted to hub on regular basis.	Data Transferring Coordinator, Information Custodians Data Transferring Coodinator Data Transferring Coodinator	1997 - 1999 1997 - 1999 1997 - 1999	

Measures	Activities	Responsible institutions	Period	Budget
i. Encourage Communication and Information Exchange between Institutions as well as Appropriate Use of Information (Continue).	4. Organize annual meetings to present information from reports of BINET members and other collected information in order to formulate appropriate means and systems for information exchange (is. E-mail).	Data Transferring Coordinators	1997 - 1999	
	5. Compile reports on all available databases of BINET members and distribute to users.	Data Transferring Coordinator	1997 - 1999	
	6. Compile resource inventory of Thailand from collected information and data from BINET's members.	Data Transferring Coordinator	1997 - 1999	
	7. Create Internet Homepage to present the national resource inventory.	Data Transferring Coordinator	1997 - 1999	
	8. Develop on-line networking system between the hub and BINET members as well as interested users.,	Data Transferring Coordinator	1997 - 1999	
	9. produce various information products including published lists, CD-ROMs, maps, videos to meet the need of users.	Data Transferring Coordinator	1997 - 1999	
	10. Updating information and improve data quality.	Data Transferring Coordinator	1997 - 1999	

Policy 2: Promote Development of Efficiency in Biodiversity Data Management at National Level

Measures	Activities	Responsible institutions	Period	Budget
1. Continuously Survey Status of Biodiversity Data Management (Including Equipments and Personnel).	1. Draft and distribute forms for reporting of status of biodiversity data management to BINET's members as well as non-member institutions.	Office of Environmental Policy and Planning, Data Transferring Coordinator	every 1 - 2 years	
	2. Evaluate results of the survey from returned forms in order to select institutions, both BINET member and non-member institutions, with sufficient capacity for appropriate data management.	Data Transferring Coordinator	every 1 - 2 years	
	3. Organize annual meetings to report on status of national biodiversity data management.	Data Transferring Coordinator	every 1 - 2 years	

Measures	Activities	Responsible institutions	Period	Budget
2. Strengthen Data Management Capacity of BINET's Members.	1. Ranking BINET's member institutions in accordance to the institution's need for financial and equipment support. Importance. of information in the institutions and cooperation in exchanging information are the main criteria for the ranking.	Data Transferring Coordinator	1999 - 2001	
	2. Ranking of equipments, and software need by the institutions.	Data Transferring Coordinator	1999 - 2001	
	3. Present the ranking of institutions and equipments/software to the Working Group on Biodiversity Data Management for consideration and proposing budget for possible financial assistance.	Data Transferring Coordinator	1999 - 2001	
	4. Introduce equipments wtih useful application for biodiversity data management to BINET's member institutions.	Data Transferring Coordinator	1991 - 2001	

Measures	Activities	Responsible institutions	Period	Budget
2. Strengthen Data Management Capacity of BINET's Members.	5. Provide/introduce software with useful applications for biodiversity data management to BINET's member institutions.	Data Transferring Coordinator	1999 - 2001	
	6. Introduce reference systems developed by international organizations such as Species 2000 to institutions, both BINET's members and non-members, to promote harmonization of database.	Data Transferring Coordinator	1999 - 2001	
	7. Arrange trainning courses for management biodiversity data personnel from institutions to ensure management of information with common standard and introduce new technology.	Data Transferring Coordinator	1999 - 2001	
	8. Introduce funding sources, both domestic and international, that BINET's members can request for possible assistance to strengthen their data management and coordinate, assist and advice the members in doing so	Data Transferring Coordinator	1999 - 2001	

Measures	Activities	Responsible institutions	Period	Budget
3. Strengthening Data Management Capacity of Non-BINET's Member Institution.	1. Organize short training courses on biodiversity data management for personnel of concerned institutions.	Data Transferring Coordinator	1999 - 2001	
	2. Provide biodiversity data management experts to institutions that are without sufficient data management capacity.	Data Transferring Coordinator	1999 - 2001	
	3. Provide equipments and software where possible.	Data Transferring Coordinator	1999 - 2001	
4. Encourage Implementation of Joint Projects, with Other Countries or International Organizations, that are Related to Transfer of Technology for Biodiversity Data Management.	Coordinate with international organizations and/or foreign agencies in implementing joint projects or in transferring data management technologies that are available.	Data Transferring Coordinator and Information Custodians	1997 - 1999	

Policy 3 : Promote Development of Biodiversity Data Management Personnel

Measures	Activities	Responsible institutions	Period	Budget
1. Provide Supports for Training and Education Program on Biodiversity Data Management.	1. Conduct surveys on the need for develpment of data management capacity of personnel in BINET's member institutions.	Data Transferring Coordinator	1997- 1999	
	2. Set priority for training topics for personnel of BINET's member institutions and present to the Working Group on Biodiversity Data Management for consideration.	Data Transferring Coordinator	1997- 1999	
	3. Organize trainings on data management topics selected by the Working Group on Biodiversity Data Management. 2 - 3 trainning workshops may be organized annually.	Data Transferring Coordinator	1997- 1999	
	4. Produce undergraduates and post graduates on' biodiversity data management through provision of scholarship for undergraduate and master degree students.	Ministry of University Affairs, Office of the Civil Service Commission	1997- 1999	
	5. Ask university and educational institutions to provide additional basic computer courses in faculty/school of biology related subjects.	Ministry of University Affairs	1997- 1999	

Measures	Activities	Responsible institutions	Period	Budget
1. Provide Supports for Training and Education Program on Biodiversity Data Management.	6. Organize training courses at national level through cooperation with foreign\international organization related to biodiversity data management.	Data Transferring Coordinator	1997 - 1999	
2. Increase Number of Data Management Personnel in Institutions.	1. Enlisting biodiversity data management as required expertize in all concerned institutions. 2. Encourage hiring of data management and information analysis personnel in sections/divisions responsible for collecting and managing information.	Office of the Civil Service Commission, Information Custodians Data Transferring Coordinator	1997 - 1999 1997 - 1999	
3. Encourage Exchange of Knowledge, Opinions and Experiences between Personnels and Experts on Biodiversity Data Management	1. Collect and disseminate data exchange statistic in BINET to find appropriate approachs to improve data exchange. 2. Provide opportunity and funding for personnels to participate in meetings/seminars oversea. 3. Encourage involved institutions to organize seminars on biodiversity data management within or between institutions at least once a year.	Data Transferring Coordinator Data Transferring Coordinator Data Transferring Coordinator	1997 - 1999 1997 - 1999 1997 - 1999	

Policy 4: Promote Regional and International Cooperation

Measures	Activities	Responsible institutions	Period	Budget
1. Prepare Linkage with Regional International and Foriegn Institutions to Enable Exchange of Biodiversity Information	1. Organize national consultation meeting to classify information with access conditions and information in public domain. 2. Monitor progress of biodiversity data transfer mechanisms at regional and international level.	Working Group on Biodiversity Data Management Office of Environmental Policy and Planning	1999 - 2002	
2. Provide Linkage with ASEAN-EU's ASEAN Regional Center on Biodiversity Conservation (ARCBC)	Coordinate, through ASEAN Working Group on Nature Conservation, with ARCBC network.	Office of Environmental Policy and Planning	1999 - 2002	
3. Provide Linkage with Clearing House Mechanism of Convention on Biological Diversity (CBD)	Coordinate wtih Subsidary Body on Scientific, Technology and Technical Advice, Conference of the Parties as well as CBD Secretariat on transfer and exchange of biodiversity information and related technology, possibly through the Clearing House Mechanism.	National Committee on the Convention on Biological Diversity, Office of Environmental Policy and Planning	1999 - 2002	