

STRATEGY FOR BIODIVERSITY CONSERVATION IN CAMBODIA

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1- INTRODUCTION

The Indo-Malayan Biogeographic Realm extends over much of south of south and Southeast Asia. Cambodia, along with Laos, Vietnam and eastern Thailand comprise what is termed the Indo-Chinese Sub-Region of this larger Realm. Through Cambodia shares the ecological sub region with these other countries, its natural systems are assuming greater global significance because unsustainable levels of resource exploitation have resulted in significant degradation and loss of natural systems in Thailand and Vietnam.

Cambodia comprises seven major bio-geoclimatic regions. The landscape of the country is centered a round the floodplains of the Tonle Sap (Great Lake) and the lower Mekong River. To the southwest of these floodplains are the Elephant and Cardamom Mountains, which rise to an elevation of approximately 1800m, and a coastal zone consisting of plain and offshore islands. To the northwest and northeast of Tonle Sap and the lower Mekong are rolling lowland plains, hills and plateaus rising gently to the Dangrek Mountains and Northeastern (Annamite) Mountains on the borders with Thailand and Laos/ Vietnam respectively. The climate is dominated by southwest monsoon lasting from May to October, which brings the majority or the annual rainfall, and the northeast monsoon from November to April, with brings a pronounced dry season. Because of the direction of the southwest monsoon, the wettest area of the country, with up to 4000 mm of precipitation, occurs on the windward slopes of the Elephant and Cardamom Mountains. Precipitation is relatively low in the Tonle Sap and Mekong floodplains because their position in the "rain-shadow" of the southwestern mountains, and increases progressively to the north and east towards the border mountain ranges.

The interaction of climate and topography results in a rich floral mosaic, including wetland communities, such as mangroves, fresh and brackish water swamps and swamp forests, and five major dryland forest types ranging from wet and moist evergreen forests through dry semi-deciduous and deciduous forests to sub-tropical montane forests. The swamps and flooded forests of the Tonle Sap and the Mekong floodplain are the most extensive freshwater wetlands in Southeast Asia, providing critical habitat for large numbers of waterbirds and a very important national fishery. The dry semi-deciduous and deciduous forest formations are known to constitute one of the last great refuges of large ungulates and associated predators in all of Southeast Asia.

It should be noted that Cambodia is not a global biodiversity "hotspot" and that for most biological groups it is not rich in species, has relatively low endemism and is relatively low in geographic diversity. Exceptions to these generalizations are freshwater fish, some vascular plant communities, possibly some invertebrate groups and the lowland deciduous Dipterocarp forests. However, Cambodia is of exceptional importance for some specific components of faunal biodiversity that have become extinct or greatly reduced in

other countries of the region. A few examples of animals in this category include Eld's Deer, Banteng, Jungle Cat, Bengal Florican, Eastern Sarus Crane, Giant Ibis, Greater Adjutant, Estuarine Terrapin and Siamese Crocodile. It is the fact that Cambodia is the last refuge, rather than the centre of biodiversity, for such species that makes the country so important for global conservation. Floral diversity also represents one of the country's most important long-term resources. Many of the tree species are of high timber value, particularly in a world that is rapidly running out of quality decorative hardwoods, others are tapped for resin, some provide growth support for harvestable rattan, still others provide livestock fodder, and almost all can be used for fuel. Local people appear to have a long tradition of subsistence forest use. Studies to date have identified about 930 plant species commonly harvested, many for several different purposes. In addition to plant resources, hunting and fishing for native animals provide important sources of protein for many indigenous communities. A very important consideration in forest concession management will be to protect, and maintain limited access to, these important subsistence, economic and cultural resources for local communities, and to ensure that all use is sustainable.

2- LEVELS OF BIODIVERSITY PLANNING IN NATURAL FORESTS

Natural biodiversity cannot be conserved and managed only at one level. Protected areas will ultimately become mere isolated relics if they are left as islands in a sea of human altered-ecosystems. To effectively conserve a country's natural heritage, biodiversity conservation must function at a variety of scales- regional (province), sub-regional (forest concession or forest management unit), landscape (forest compartment) and stand (annual coupe and cut block).

2-1 Biodiversity considerations at the regional level

Issues

The primary issues of biodiversity conservation at the regional scale will be:

- incremental, unplanned loss of natural forest lands, often the result of unsanctioned and illegal forest conversion activities such as for agriculture, timber exploitation and settlement;
- loss of biodiversity through the conversion of important regional-scale habitats (i.e wetlands, old growth forests, etc.); and
- loss of connectivity between protected areas, and general habitat fragmentation.

Management Measures

The primary vehicle for biodiversity management at the provincial level will be the effective enforcement of laws and regulations and integrated resource management and land use plans that intergrate goals and objectives between sectors. Such plans will usually be developed through multi-party planning processes involving government, private industry and local communities and NGOs, resulting in land use zoning between sector and allocation of either management responsibility or tenure (private sector, local communities).

Common land use designations will be national protected areas, the national forest estate (which will include watershed protection areas, special management areas such as buffer zones and regional ecological corridors, and forest management units), intensive tree-crop plantations, agricultural lands, urban/industrial areas, and critical (degraded) lands requiring priority rehabilitation.

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The provincial landscape that will emerge from such planning is a combination of four broad land use types:

- 1- core protected areas;
- 2- "light-touch" natural resource management areas buffering the protected areas;
- 3- regional ecological corridors linking protected areas; and
- 4- lands devoted to intensive human use.

Monitoring

Principle monitoring tools for this level of planning will be:

Environmental Condition Monitoring: national and regional scale (1: 100,000-1:250,000), regularly updated (every 5 years), land use/land cover/land administration maps.

Compliance Monitoring: a regime of regular inspections and surveillance by government staff to curtail illegal land and resource use activities.

2-2 Biodiversity conservation at the sub-regional; or forest management unit level

Issues

The purpose of forest management units, whether private forest concessions or community forests, is to balance sustainable forest commodity production with the maintenance of ecological services, biodiversity and forest landscape stability. Forest management units will not only have an important biodiversity conservation function on their own, but also provide buffers around, and genetic corridors between the system of national protected areas. Thus forest management unit planning will have to look both internally and to the regional scale in its compartment designations and management prescriptions. Additionally, forest concessions or management units are often very large and diverse land areas (typically between 75,000 and 300,000 ha) that will almost invariably contain land and biodiversity resources of significant cultural, subsistence and economic value to local communities.

Management Measures

From a biodiversity perspective, forest management unit planning must focus on three main areas:

- The designation of major ecological, watershed, traditional-use and stream protection compartments and their interconnection in a Biodiversity Conservation Network (BCN);
- The maintenance of a near-natural range of age classes, forest stand composition and structure, and spatial distribution of important plant communities within the production forest compartments; and
- The protection of wildlife to maintain a full, natural composition of species at ecologically-functioning levels.

Monitoring

Environmental Condition Monitoring: principle environmental monitoring tools at the forest management unit level will be:

- GIS-based forest change mapping of major forest types and habitats at scales of 1:50,000 to 1:100,000; and
- periodic (2-5 year) biological surveys focusing on the key components of biodiversity identified by the original ecological baseline assessment.

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This monitoring should be carefully linked to the environmental baseline established in the long-term forest management plan, and designed to reflect the management objectives of the forest management unit.

Compliance monitoring: compliance monitoring programs should include:

- the regular recording of annual harvest (legal and illegal) compared against predicted AAC;
- the outcomes of regular community consultation activities;
- general estimates of the annual distribution and intensity of traditional forest products harvest (wildlife, food plants, medicinal plants and commercial products); and
- frequent inspections and patrols by forest management unit workers, government staff and local communities of boundaries and the BCN to ensure that no illegal harvesting or hunting activities are taking place.

2-3 Biodiversity conservation at the compartment level

Issues

The principal issues at the compartment level will relate to major access construction and silvicultural operations, and include:

- environmental degradation (particular of aquatic ecosystems) due to poor road building and stream-crossing practices;
- habitat fragmentation due to excessive road clearing widths and road densities;
- increased hunting of wildlife and exploitation of plant resources as a result of increased forest access; and
- loss of forest structure and composition and introduction of exotic species due to inappropriate silvicultural practices.

Management Measures

The principle mitigation measure at the compartment level relates to the development of medium-term (5 years, rolling) forest development plans for the production forest compartment(s), prepared in accordance with codes-of-best-forest-practice. This type of planning provides the opportunity to rationalize the design, location, construction, maintenance, control and decommissioning of major access roads in order to avoid or minimize environmental impacts. Excessive right-of-way clearing is a major environmental impact in tropical forests and a major cause of habitat fragmentation and genetic isolation of arboreal wildlife species. Roads should be the minimum width possible, consistent with safety and extraction efficiency

Monitoring

Environmental Condition Monitoring: At the compartment level, environmental monitoring will consist of pre- and post-harvesting forest stand and vegetation surveys carried out as part of normal forest inventory programs. Specially-designed pre- and post-harvesting inventories and surveys should be undertaken to monitor the status of wildlife and plant species that are particularly vulnerable to over-exploitation and other forms of disturbance associated with forest harvesting activities.

Compliance Monitoring: “Active” compartments should be inspected regularly to ensure compliance with approved access development and silvicultural plans. Camp and residence areas should be inspected frequently to control the hunting and live capture of wildlife. Staff found in possession of dead or live animals should be disciplined and dismissed for repeat offenses. Frequent foot and road patrols, and inspections of local

markets by government and forest management unit staff, with the assistance of local communities, should be carried out to curtail illegal activities.

2-4 Biodiversity conservation at the forest coupe and block levels

Issues

The principle issues at the annual coupe and cut block levels of planning will be:

- limiting soil and site disturbance;
- ensuring that annual coupe boundaries respect higher-level forest management unit zoning;
- ensuring that the size of openings (gap) is consistent with silvicultural and ecological objectives; and
- protecting and retaining stand-level biodiversity values, especially identified “ecological keystones”.

Management Measures

The major planning tools at the operational level will be:

- 1- annual harvesting plans prepared in accordance with compartment-level objectives and codes-of-best-forest-practice prescriptions that emphasize “reduced-impact logging” techniques; and
- 2- plans for post-harvesting site rehabilitation.

Biodiversity considerations at the coupe and block levels will focus on maintaining stand structure and vegetation species composition, and identifying and protecting “keystone” ecological features.

Monitoring

Environmental Condition Monitoring: Not applicable, since environmental condition monitoring is a longer-term and more extensive activity than is consistent with the annual operational planning level. Environmental condition monitoring activities, including pre- and post-harvesting surveys, should be coordinated and implemented at the compartment level of planning.

Compliance monitoring: Compliance monitoring at this level will focus on ensuring compliance with approved harvesting plans and permits. Government staff should carry out frequent inspections during felling and extraction operations to ensure that biodiversity values are retained and felling prescriptions complied with. Government staff must have the ability to issue and enforce “stop-work” orders where violations are detected. Subsequent to harvesting, the felling coupe should be posted and regularly patrolled by concession/government staff to protect the residual forest stand and biodiversity values from illegal harvesting of logs and other forest products; and to enforce hunting restrictions. Particular attention should be paid during routine foot and road patrols and inspections to the use of snares, traps and mines for hunting, and poisoning, explosives and electrocuting for fishing.

3- CONCLUSION

Biodiversity conservation in Cambodia is serious duties of the Government to be protected and conserved on national resource in the country. The conservation is considered not only to protected area, wildlife century, and multiuse zones but also to productive forest with different levels such as Concession, Compartment and Coupe levels.

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This strategy has been developed under the provisions of the Cambodian Forest Act and the Sub-decree on Forest Concession Planning, Management and Control.

They should be implemented in association with existing guidelines on Forest Management Planning, Social Forestry, Timber Theft Management, and Forest Engineering Works, the Cambodian Forest Harvesting Codes-of-Practice and the Forest Concession Management Planning Manual.

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