Forest Inventory and Planning Institute
with assistance from
BirdLife International Vietnam Programme
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Guidelines for Feasibility Studies and Investment Plans for the Designation of Special-use Forests

Conservation Report
Number 19

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Guidelines for Feasibility Studies and Investment Plans for the Designation of Special-use Forests

by

Forest Inventory and Planning Institute

with assistance from

BirdLife International Vietnam Programme

This is a technical report for the project entitled:
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Introduction

This report is an English-language version of the guidelines for Feasibility Studies and Investment Plans for designating Special-use Forests. These guidelines have been formulated by the Forest Inventory and Planning Institute (FIPI), with assistance from the BirdLife International Vietnam Programme, as part of the European-Union-funded project *Expanding the protected areas network in Vietnam for the 21st Century*.

The purpose of these guidelines is to provide clear guidance to the authors of Feasibility Studies and Investment Plans, the official documents upon which decision makers at the provincial and central levels base decisions on whether to establish and provide funding for Special-use Forests. The intended audience of these guidelines is the authors of Feasibility Studies and Investment Plans, at both Vietnamese government institutions and national and international non-governmental organisations (NGOs). While these guidelines are specific to Special-use Forests (national parks, nature reserves and cultural and historical sites), they may also be of use to the authors of Feasibility Studies and Investment Plans for other categories of protected area, such as coastal and marine protected areas.

Previously, most Feasibility Studies and Investment Plans for Special-use Forests produced by government institutions followed Decision 1171/QD of the Minister of Forestry, dated 30 December 1986. While this decision provided some guidance to the authors of Feasibility Studies and Investment Plans, the information presented in these reports was often lacking in depth and scope. Consequently, FIPI, with the assistance of BirdLife and financial support for the European Union, embarked upon a process to formulate a new set of guidelines, in order to ensure that decision makers are provided with more detailed and relevant information, and that resources available for the establishment and management of Special-use Forests are targeted more efficiently.

The process to formulate the new set of guidelines began in April 1999. Decision 1171/QD of the Minister of Forestry formed the foundation of the guidelines, to which elements of Feasibility Studies and Investment Plans for protected areas in other countries were included. The process involved consultations with several government institutions and international NGOs with experience of writing Feasibility Studies and Investment Plans. On 9 September 1999, a first draft of the guidelines was discussed at a workshop hosted by FIPI, and attended by representatives of international NGOs and government institutions involved in the process of surveying and establishing protected areas. Following this workshop, the guidelines underwent several further rounds of revisions.

In December 2000, the guidelines were submitted to the Ministry of Agriculture and Rural Development (MARD). It is hoped that, upon approval by MARD, the guidelines will be issued in the form of an official ministerial decision. Government institutions will then be required to follow the guidelines when producing Feasibility Studies and Investment Plans.

This report contains two documents: an English-language version of the draft guidelines submitted to MARD, and a technical annex. The purpose of the technical annex is to provide a greater depth of detail to assist the authors of Feasibility Studies and Investment Plans. It is likely that, during the approval process, the guidelines will undergo further minor revisions. Consequently, this report should be considered to be only a working draft. Upon approval by MARD, it is intended that the final guidelines will be published in Vietnamese and English.

GUIDELINES FOR FEASIBILITY STUDIES AND INVESTMENT PLANS FOR THE DESIGNATION OF SPECIAL-USE FORESTS

Forest Inventory and Planning Institute

with

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Introduction

This document outlines the required contents of 'Feasibility Studies' and 'Investment Plans' for the designation of Special-use Forests: national parks, nature reserves, and cultural and historical sites.

Feasibility Studies provide information to enable decision-makers to decide whether a particular site should become a candidate for inclusion on the list of Special-use Forests. Feasibility Studies may, therefore, conclude that an area is either suitable OR unsuitable for inclusion. The role of Feasibility Studies is, therefore, to provide an objective assessment and evaluation of the biodiversity importance of a site for discussion at the local, provincial and national level. Feasibility Studies also summarise the socio-economic characteristics of a site, and may sometimes propose Special-use Forest boundaries. If a Feasibility Study concludes that an area is a suitable candidate site for designation as a Special-use Forest, it must be approved at the provincial level before an Investment Plan can be prepared.

Investment Plans comprise applications for funding to establish Special-use Forests. They should provide sufficient information to allow decision makers to determine whether this is the best use of available funds and to assess the benefits and costs of establishing a Special-use Forest. They should provide a greater level of depth than Feasibility Studies on the socio-economic characteristics of the area and existing uses of forest resources. They should also clearly indicate the proposed boundaries of the Special-use Forest and buffer zone, and the estimated costs of staffing and establishing the basic infrastructure of the Special-use Forest.

Report Presentation

Title, authorship and date

The title should define clearly whether the report is a Feasibility Study or Investment Plan, and contain the name of the Special-use Forest and province(s) concerned. The authors of the report, the institutions involved and the date of publication should also be clearly indicated.

Executive summary

The executive summary should contain a brief description of the site, an overview of biological and socio-economic features and a summary of recommendations.

Chapter 1: Introduction

1.1 Location and description

This section should give both the political and geographical location of the site. The latitudinal and longitudinal extent of the site should also be defined.

1.2 Objectives

This section should state the purpose and objectives of the report in the context of the Special-use Forest establishment process.

1.3 Past and current management of the area

This section should summarise the land-use and management histories of the site, and give the current management of the site.

1.4 Legal and scientific justification

This section should summarise:

- the scientific justification for preparing the Feasibility Study or Investment Plan;
- key findings of previous surveys in the area;
- all official documents (Prime Ministerial Decrees, Ministerial Guidelines, proposals, *etc*.) pertaining to the site in question (for example Decision No. 194/CT of the Chairman of the Council of Ministers, dated 9 August 1986); and
- the area and location of the site specified in the relevant decree(s).

Reference should be made to any national plans (such as the Biodiversity Action Plan, the Tropical Forestry Action Plan and the Vietnam National Plan for Environment and Sustainable Development) that refer to the site.

1.5 External context

This section should briefly describe nearby protected areas (including those in neighbouring countries) and highlight potential linkages. This section should mention additional factors that may affect the conservation importance of the site, such as transboundary issues, location within an Endemic Bird Area, and potential for designation under international conventions. This section should also include summaries of other conservation, development and infrastructure projects, and national and local programmes that may have impacts on the site now or in the future.

Chapter 2: Physical and biological description

2.1 Site features

2.1.1 Biogeography

This section should describe the location of the site according to one or more biogeographical classifications.

2.1.2 Topography

This section should describe the topography of the site.

2.1.3 Geology

This section should describe the geology of the site.

2.1.4 Soil

This section should describe the characteristics and distribution of the main soil types at the site, with reference to the major habitat types present.

2.1.5 Climate/meteorology

This section should describe the climate and meteorological conditions at the site.

2.1.6 Hydrology

This section should describe the major hydrological features of the site.

2.2 Vegetation

2.2.1 Habitat types and condition

This section should describe the habitats present at the site and assess their condition. This section should include information on:

- species composition (e.g. dominant tree species, composition of the ground flora, *etc*.);
- structure (e.g. number of forest layers, height of the canopy layer, canopy cover, standing timber volume, density of mature trees, *etc*.);
- distribution (e.g. altitudinal range, underlying geology and soil type, topography, *etc*.); and
- condition (e.g. level of past and present disturbance, stage of regeneration, *etc*.).

This section should also include a summary table showing the total area of each habitat type at the site.

2.2.2 Flora and plant resources

This section should summarise the known plant diversity at the site. The total number of species, genera and families recorded at the site should be given, as well as a list of the most species-rich families. A list of threatened and endemic species should also be given. This section should also summarise the number of plants with known economic uses, either for wood, medicine, food or ornament.

2.3 Fauna

This section should summarise the known faunal diversity at the site.

2.3.1 Mammals

This section should summarise the known mammal diversity at the site. The total number of mammal species should be given, as should a list of threatened and endemic species.

2.3.2 Birds

This section should summarise the known bird diversity at the site. The total number of bird species should be given, as should a list of threatened, endemic and restricted-range species.

2.3.3 Reptiles and amphibians

This section should summarise the known reptile and amphibian diversity at the site. The total number of reptile and amphibian species should be given, as should a list of threatened and endemic species.

2.3.4 Fish

This section should only be included where relevant. This section should summarise the known fish diversity at the site. The total number of fish species should be given, as should a summary of species with economic value.

2.3.5 Invertebrates

This section should summarise the diversity of selected invertebrate taxa at the site. The total number of species and number of endemic species should be given, as should a list of threatened species.

2.4 Landscape, historical and cultural features

This section should contain a description of the landscape, historical and cultural features of the site. Consideration should be given to those features that might be of value for tourism development. The

length of this section will vary according to the Special-use Forest category of the site: in the case of national parks and cultural and historical sites, it will be necessary to provide a greater amount of detail than in the case of nature reserves.

Chapter 3 Socio-economic features

The information in this chapter should be compiled using a combination of information gained from commune, district and provincial sources, combined with information derived from the use of participatory approaches, such as stakeholder analysis and participatory rural appraisal (PRA).

3.1 Summary of key socio-economic features

This section should provide a one-page (maximum) profile of the key socio-economic features of the buffer zone and Special-use Forest, based on the information included in sections 3.2 to 3.6 below.

3.2 Population, demographics and ethnicity

This section should outline population numbers in the buffer zone and, where relevant, the Special-use Forest. This section should describe the population distribution throughout these areas, highlight important demographic trends, and summarise ethnic composition.

3.3 Public health and reproductive health services

3.3.1 Summary of health issues

This section should include a summary of the key public health issues in the buffer zone and, where relevant, the Special-use Forest.

3.3.2 Access to health and reproductive health services

This section should summarise the *accessibility* of health and reproductive health services.

3.4 Education

3.4.1 Summary of education issues

This section should summarise the status of educational services in the buffer zone.

3.4.2 Access to education services

This section should summarise the *accessibility* of education services.

3.5 Infrastructure

This section should summarise issues such as access to transport (rail, road, river), communications and electricity.

3.6 Economic activities

This section should summarise important economic activities in the buffer zone and Special-use Forest. Particular attention should be focussed on economic activities that use resources from the Special-use Forest (for example charcoal manufacture, honey collecting, seasonal livestock grazing, collection and trade of non-timber forest products (NTFPs)).

3.7 Use of natural resources

This section should describe the existing uses of natural resources in and around the Special-use Forest. Particular attention should be paid to uses of natural resources that may impact, directly or indirectly, and in the short or long term, on the resources of the Special-use Forest. For the purposes of Feasibility Studies and Investment Plans, natural resources include agricultural and agro-ecological resources, livestock and forest resources. These are outlined below:

3.7.1 Agricultural and agro-ecological resources

This section should describe the main agricultural uses of the buffer zone and, where relevant, the Special-use Forest. It should include summaries of:

- main crop types, seasonal patterns of agricultural activity and cropping;
- land tenure;
- shifting cultivation systems;
- the main constraints to agriculture in the area (such as poor access to markets, technology, land shortages, *etc.*) and how these constraints might be overcome; and
- the food security status of the area.

This section should also outline key trends and processes of change in agricultural patterns in and around the Special-use Forest.

3.7.2 Livestock

This section should cover information on the rearing of cattle, buffaloes, pigs, poultry and goats, and arrangements for ownership and grazing rights. Particular attention should be given to the interaction between livestock and the Special-use Forest.

3.7.3 Forest resources

Tenure and access rights

This section should include details of traditional and official rights and tenure over agricultural and forest land and resources.

Forest products and uses

This section should describe and summarise the existing *uses* of forest resources derived from the Special-use Forest and buffer zone.

Forest services

The section should also discuss the *services* that the forest might provide to people within the catchment. These might include maintaining water quality, augmenting dry season water flows, slope stabilisation, providing recreational resources, *etc*.

Social forestry and agroforestry activities

This section should include information on social forestry and agroforestry activities in the buffer zone and Special-use Forest, particularly initiatives that seek to change forest management arrangements (for example, through forest protection contracts).

3.7.4 Dependency of local communities on natural resources

This section should link patterns of resource use to the livelihood strategies of those who live in the Special-use Forest and buffer zone.

Chapter 4: Stakeholders

4.1 Description of stakeholders

Stakeholders encompass all government agencies, beneficiaries, commercial companies, and other formal or informal groups associated with a project. Stakeholders also include other projects in the Special-use Forest and buffer zone, whether implemented by the government or NGOs. This section should list and describe all stakeholders relevant to the management of the Special-use Forest.

4.2 Key stakeholders

Based on the stakeholders listed in Section 4.1, this section should identify key stakeholder groups relevant to the Special-use Forest.

4.3 Stakeholder capacities

This section should review/comment on the capacity of key stakeholders to fulfil their responsibilities and/or address their objectives.

Chapter 5 Evaluation

5.1 Biodiversity evaluation

This section should evaluate the biodiversity value of the Special-use Forest in comparison to other Special-use Forests. This should use criteria such as the presence of globally threatened, nationally threatened, restricted-range or endemic species.

5.2 Threat evaluation

This section should provide a prioritized review of threats to the conservation of the Special-use Forest and a short description of the underlying causes.

5.3 Institutional evaluation

This section should review the areas in which key project institutions need additional strengthening. This should include a review of training, equipment and staffing needs, and detail the level of commitment by local institutions to the Special-use Forest.

5.4 Economic evaluation

This section should provide a qualitative justification for why this Special-use Forest is the least-cost alternative for conserving the given biodiversity. This section should also evaluate the ‘opportunity cost’ of designating the area as a special use forest. Opportunity cost is a measure of the loss of benefits that could otherwise be gained from managing the area in an alternative way.

5.5 Evaluation of other potential benefits

This section should review potential values of the Special-use Forest for watershed protection, NTFP production, tourism, and maintaining genetic resources.

5.6 Financial evaluation

This section should only be included in an Investment Plan. This section should use cost-benefit analysis to summarise the projected annual operating budget required for the Special-use Forest, including operations and maintenance. This should show the total annual operating cost over a 10-year period.

Chapter 6: Special-use Forest planning

6.1 Special-use Forest name

This section should specify the name of the Special-use Forest.

6.2 Rationale for designation of Special-use Forest category

This section should propose an appropriate Special-use Forest category for the site and give the justification for this proposal.

6.3 Management aim and objectives of the Special-use Forest

This section should define the overall aim and the specific management objectives of the Special-use Forest. The management objectives should be consistent with relevant government decisions and ministerial guidelines.

6.4 Management responsibility for the Special-use Forest

This section should state the official body that will have management responsibility for the Special-use Forest. In most cases, national government agencies will have responsibility for the management of national parks, whereas provincial people's committees will have responsibility for nature reserves and cultural and historical sites.

6.5 Physical description of boundaries and justification

This section should define the boundary of the Special-use Forest (i.e. excluding the buffer zone) and describe the rationale for boundary delineation. Feasibility Studies and draft Investment Plans can propose several options for the boundary for discussion at provincial and national workshops. However, final versions of Investment Plans, which are submitted to the Ministry of Agriculture and Rural Development, should include only one option. This section should also give both the total area and the area of natural forest within the boundary.

6.6 Management zoning

This section should define the extent of the strict protection, forest rehabilitation and administration and services areas. This should follow relevant government decisions and ministerial guidelines.

6.7 Definition of boundary and objectives of buffer zone

This section should define the boundaries of the buffer zone. Ministry of Forestry Circular 1586/LN/KL (dated 13 July 1993) defines buffer zones as:

> *"…[areas]… contiguous to but outside of Special-use Forests. Generally, they comprise the communes included within the Special-use Forest and those adjacent to it. Activities are implemented in buffer zones to reduce or mitigate the effects of human activities with a negative impact on the Special-use Forest"*

The objectives of the buffer zone should be defined, and the management regime should be outlined, following relevant government decisions and ministerial guidelines.

Chapter 7: Proposed project activities and indicative costs

This chapter should only be included in an Investment Plan. This chapter should outline the project activities that are necessary to establish and manage the Special-use Forest for a five-year period. For each investment programme, the objectives should be stated and the project activities outlined. For each project activity outlined, the estimated cost should be given.

7.1 Protection programme

7.1.1 Infrastructure development programme

This programme should provide the necessary infrastructure to manage and protect the Special-use Forest.

7.1.2 Conservation and protection programme

This programme should manage and protect the Special-use Forest, following the management objectives laid out in Section 6.3.

7.2 Rehabilitation programme

This programme should only be included if appropriate. This programme should manage the forest rehabilitation area with the objective of restoring areas of degraded habitat to a natural condition and increasing populations of animal and plant species of conservation importance. Project activities must not include captive breeding programmes

7.3 Scientific research programme

The objectives of this programme should be to provide biological information to assist with the protection and management of the Special-use Forest, and to monitor habitat condition and extent, and levels of biodiversity.

7.4 Education, awareness and extension programme

The objectives of this programme should be to raise awareness of the aims and management regulations of the Special-use Forest among local people and the Special-use Forest staff, to involve local people in conservation, and to promote the sustainable use of natural resources.

7.5 Socio-economic development programme

The objective of the socio-economic development programme should be to reduce the dependence of the buffer zone inhabitants on the natural resources of the Special-use Forest.

7.5.1 Special-use Forest socio-economic development programme

This programme should be implemented in villages within the Special-use Forest boundary (if any). Project activities should be managed by the Special-use Forest management board, and the Investment Plan should specify which institution(s) should be responsible for implementation. The Investment Plan should highlight any potential socio-economic impacts of Special-use Forest establishment. Where impacts could be significant, the Investment Plan should make specific recommendations for their adequate assessment and evaluation. This might include recommendations for a social impact assessment.

7.5.2 Buffer zone socio-economic development programme

This section should make recommendations for project activities to be implemented in the buffer zone, which could include social forestry schemes, agricultural extension, infrastructure development (e.g. irrigation, electricity, roads, *etc*.), provision of education, *etc*. This section should recommend which institution(s) should be responsible for management and implementation of each project activity. The buffer zone development programme should be outlined in more detail in a separate buffer zone investment plan.

7.6 Tourism development programme

This programme should only be included in an Investment Plan for a national park or cultural and historical site. This section should set out a timetable for tourism development over a five-year period, including estimated visitor numbers. Where tourism development proposals are included, the Investment Plan should provide an outline of potential environmental impacts.

Chapter 8: Special-use Forest management structure and finance

8.1 Special-use Forest management structure

This section should set out the proposed staffing structure and management board composition for the Special-use Forest. This section should also outline the main responsibilities of each member of staff.

8.2 Finance

This section should only be included in an Investment Plan. This section should summarise the investment capital requested for the establishment and management of the Special-use Forest for a five-year period. This section should also propose the source(s) of funds for each of the investment programmes (i.e. the proportions that will come from the national government budget, the provincial government, favourable interest loans and international donors). This section should also identify potential sources of funding from international donors or government programmes.

Chapter 9: Summary of project benefits

This chapter should only be included in an Investment Plan, and should briefly summarise the conservation and economic benefits of establishing the Special-use Forest.

Chapter 10: Recommendations

This chapter should summarise the recommendations made in the report. This chapter should outline the next steps for establishment of the Special-use Forest in question. In the case of Feasibility Studies that recommend that a Special-use Forest should not be established, this chapter should make appropriate recommendations for the future management of the site.

GUIDELINES FOR FEASIBILITY STUDIES AND INVESTMENT PLANS FOR THE DESIGNATION OF SPECIAL-USE FORESTS

TECHNICAL ANNEX

Forest Inventory and Planning Institute

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Introduction

The purpose of this document

The government of Vietnam has committed itself to expanding the national network of Special-use Forests to 2 million hectares by 2010. At present, Special-use Forests comprise national parks, nature reserves and cultural and historical sites.

With this commitment comes a need to ensure that new proposals for sites to be included in the system of Special-use Forests are subjected to careful assessment and evaluation. Existing guidelines are now dated and in need of revision. The purpose of this document is to provide clear guidance to planners, practitioners and decision makers to assist in the compilation of two key documents required to designate Special-use Forests: the 'Feasibility Study' and the 'Investment Plan'. This document provides guidance relevant to the designation of national parks, nature reserves, and cultural and historical sites.

Recent experience has shown that Feasibility Studies and Investment Plans have been of variable quality, and have often failed to cover the range of forest characteristics and issues that are required for good decision-making. Improving the quality of Investment Plans will contribute to improved targeting of the scarce resources available to manage the system of Special-use Forests in Vietnam. Thus, it is hoped that these guidelines will help ensure that resources available for the establishment and management of Special-use Forests are used more efficiently.

Steps in the establishment process

The different steps involved in the establishment of new Special-use Forests are shown in Figure 1. Central to this process is the compilation of two documents required for decision-making: the 'Feasibility Study' and the 'Investment Plan'. The contents of these key documents are the focus of these guidelines. The term 'Investment Plan' is used synonymously with the term 'Management Plan' in the official documents concerned. This often leads to confusion, especially among international organisations and donors, as the information that should be included in an Investment Plan is quite different in scope and detail from information that would be included in a Management Plan for a protected area in most countries.

The official government decision relating to Special-use Forest establishment dates back to 1986 and outlines, in general terms, the issues and topics that should be covered (see Box 1).

The *de facto* functions of Feasibility Studies and Investment Plans are summarised below:

- ***Feasibility Studies*** allow decision-makers to decide whether a site should become a candidate for inclusion on the list of Special-use Forests. Feasibility Studies may, therefore, conclude that an area is either suitable OR unsuitable for inclusion. The role of Feasibility Studies is, therefore, to provide an assessment and evaluation of the biodiversity importance of an area so that this information can be discussed at the local, provincial and national levels. Feasibility Studies also summarise the socio-economic characteristics of an area and may sometimes include proposed boundaries for the Special-use Forest. If a Feasibility Study concludes that an area is a suitable candidate site for designation as a Special-use Forest, it must be approved at the provincial level before an Investment Plan can be prepared.

- ***Investment Plans*** comprise applications for funding to establish Special-use Forests. They should provide information that allows decision-makers to determine whether this is the best use of available funds, and to assess the benefits and costs of establishing a Special-use Forest. They should provide a greater level of depth than Feasibility Studies on the socio-economic characteristics of the area and existing uses of forest resources. They should also clearly indicate the proposed boundaries of the Special-use Forest and buffer zone, and costs for staffing and establishing the basic infrastructure of the Special-use Forest.

Box 1: Key articles relating to Investment Plans for Special-use Forests in Decision 1171/QD of the Minister of Forestry, dated 30 December 1986

Chapter II includes the following articles:

"Article 6: each Special-use Forest should have one management plan or investment project which was confirmed by high power level according to proposal of [the Ministry of Forestry] and connected local authorities.

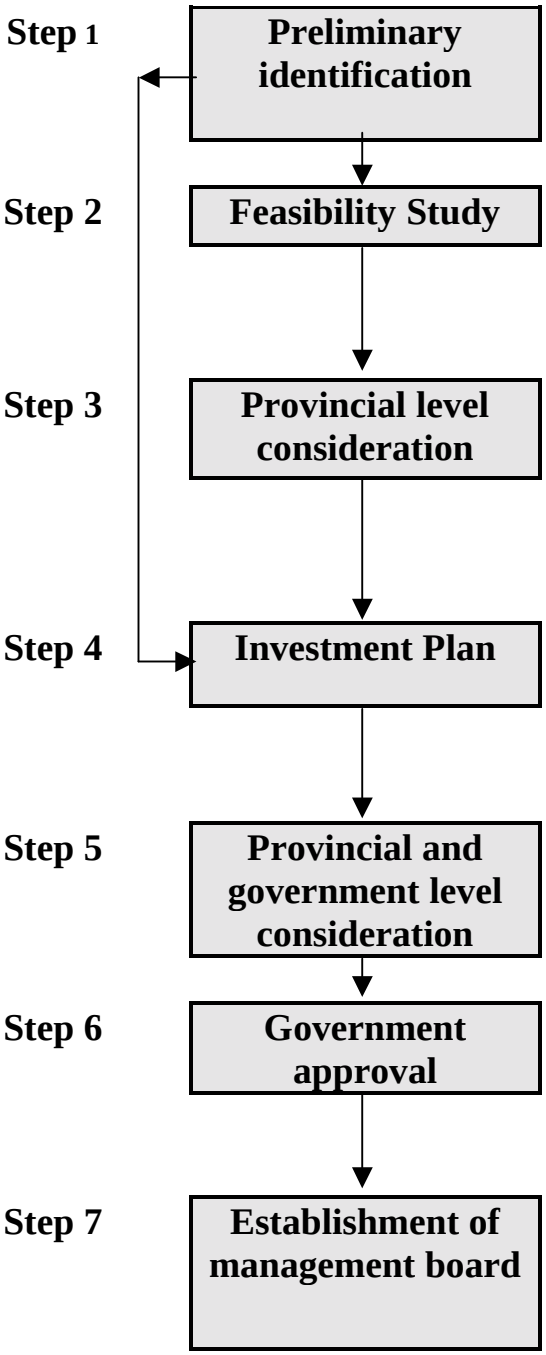
Article 7: the main content of management or investment project consists of:

- basic information; assessing natural resources; cultural, historical, scientific values and other available capacities of forest area;
- information on socio-economics in the proposed area for establishing the Special-use Forest;
- land-use information;
- the objectives, category and name of the Special-use Forest;
- management zoning; necessary infrastructure (buildings, roads, houses, *etc.*);
- location of headquarters and sub-stations;
- plan and programme: timetable of activities; labour, equipment and capital requirements;
- promoting necessary measures… to work in collaboration with units/offices and authorities;
- outputs (different aspects, such as economic, culture, environment, health, *etc.*);
- an implementation plan (at different levels)."

Other legal documents that concern Feasibility Studies and Investment Plans are Government Decision ND/52 (1999) and Government Decision ND/87 (1997). If the total funding for Special-use Forest establishment requested in an Investment Plan is under VND15 billion (US1 million approx.), the Ministry of Agriculture and Rural Development (MARD) can approve its establishment. If the total requested is between VND15 billion and VND100 billion (US$1 million to US$7 million approx.), the Ministry of Planning and Investment (MPI) must also approve it. If the total requested is above VND100 billion (US$7 million approx.), the government must also approve it[1].

[1] This information was provided by Mr. Tran Tung of the Department of Planning and Investment of MARD at the FIPI/BirdLife workshop on the Guidelines for Feasibility Studies and Investment Plans for Designating Special-use Forests, hosted by FIPI, 9 September 1999, Hanoi

Figure 1: Steps in the Special-use Forest establishment process



Usually based on existing information, such as forest cover maps, supplemented by scoping information on biodiversity values derived from rapid field and household surveys.

The principal purpose of the document is to provide an assessment and evaluation of the biodiversity importance of the area for consideration and discussion at the local, provincial and national levels. The Feasibility Study is then submitted to the provincial people's committee (PPC).

The PPC reviews the Feasibility Study and invites concerned stakeholders to discuss proposals for Special-use Forest establishment. On the basis of these discussions, the PPC will decide to approve or reject the Feasibility Study. If approved, the PPC will submit the Feasibility Study to MARD for approval, along with a request for the release of funds from MARD for the preparation of an Investment Plan.

The Investment Plan should provide a greater level of depth on the socio-economic characteristics of the area, and existing uses of forest resources. It should also clearly indicate the proposed boundaries of the Special-use Forest and buffer zone, and costs for staffing and establishing the basic infrastructure of the Special-use Forest.

The Investment Plan is usually considered at a provincial-level workshop, convened by the PPC. A decision is usually taken during or shortly after the workshop. If the PPC approves the Investment Plan, the PPC will send a letter of approval with the Investment Plan to MARD.

Once approved at the provincial level, key decision makers in government will usually consider the Investment Plan at a specially convened workshop. Minor changes may then be incorporated and MARD will then decide to approve or reject the Investment Plan. In the case of a proposed national park, MARD will then send documents to MPI.

This final step formally establishes a management board and government funding. For a nature reserve, the PPC will establish a management board once it receives an approval letter from MARD. For a national park: the PPC will establish a management board once it receives an approval letter from MPI.

SECTION-BY-SECTION GUIDE

Report presentation

Title, authorship and date

The title should define clearly whether the report is a Feasibility Study or Investment Plan, and contain the name of the Special-use Forest and province(s) concerned. The authors of the report and the institutions involved should be indicated, and the date of publication should be given.

Executive summary

The executive summary should be a two-to-three-page summary of the report. It should contain a brief description of the site, an overview of the biological and socio-economic features, and a summary of recommendations.

Chapter 1: Introduction

1.1 Location and description

This section should give both the political and geographical location of the site. The latitudinal and longitudinal extent of the site should also be defined. This section should also include a brief description of the proposed Special-use Forest.

1.2 Objectives

This section should state the purpose and objectives of the report in the context of the Special-use Forest establishment process.

1.3 Past and current management of the area

This section should summarise the land-use and management histories of the site, and give the current management of the site.

1.4 Legal and scientific justification

This section should summarise:

- the scientific justification for preparing the Feasibility Study or Investment Plan. This should only include only scientific data available *prior* to the field survey and not refer to the results of the field survey;
- key findings of previous surveys in the area;
- all official documents (Prime Ministerial Decrees, Ministerial Guidelines, proposals, *etc.*) pertaining to the site in question (for example Decision No. 194/CT of the Chairman of the Council of Ministers, dated 9 August 1986); and
- the area and location of the site specified in the relevant decree(s).

Reference should be made to any national plans (such as the Biodiversity Action Plan, the Tropical Forestry Action Plan and the Vietnam National Plan for Environment and Sustainable Development) that refer to the site.

1.5 External context

This section should place the site in the context of Vietnam's protected areas system. It should briefly describe nearby protected areas (including those in neighbouring countries) and highlight potential linkages. This section should mention any additional factors that may affect the conservation importance of the site. These might include:

- transboundary issues;
- location within an Endemic Bird Area (see Stattersfield *et al.* 1998); and
- potential for designation under international conventions, such as the World Heritage Convention or the Convention on Wetlands of International Importance (commonly known as the Ramsar Convention).

This section should also include summaries of other conservation, development and infrastructure projects, and national and local programmes that may have impacts on the site now or in the future.

Chapter 2: Physical and biological description

2.1 Site features

2.1.1 Biogeography

This section should briefly describe the location of the site according to one or more biogeographical classifications. Suitable classifications include MacKinnon (1997) and Wikramanayake *et al.* (1997) (see Annex 4).

2.1.2 Topography

This section should describe the topography of the site. The maximum and minimum elevations at the site should be given. Also, if possible, a table should be included showing the total area and the extent of natural forest within each elevation zone.

2.1.3 Geology

This section should describe the geology of the site. An attempt should be made to link the underlying geology with the habitat types present. In most cases, it will not be possible to collect geological data in the field. Instead, relevant information should be collated from published literature and maps. The source for this information should be given. Suitable references include Nguyen Trong Dieu (1995), Nguyen Xuan Bao (1985), and Tran Duc Luong and Nguyen Xuan Bao eds. (1992).

2.1.4 Soil

This section should describe the characteristics and distribution of the main soil types at the site, with reference to the major habitat types present. Soil data can be collected during the field survey or compiled from published literature and maps. The information source should be given. A useful source is Cao Liem and Nguyen Ba Nhuan (1985).

2.1.5 Climate/meteorology

This section should briefly describe the climate of and meteorological conditions at the site. This section should describe seasonality in temperature and rainfall, and variation in climate within the site, particularly with regard to altitude and aspect. If the site experiences special meteorological conditions, such as typhoons, monsoons or hot winds, these should be described. This section should present meteorological data on absolute maximum, absolute minimum and annual mean temperature; maximum monthly, minimum monthly and total annual rainfall; total annual number of rainy days; and annual mean humidity. Meteorological data should be compiled from weather stations at or near the site using data collected within the last five years. The source of any data presented in this section should be given.

2.1.6 Hydrology

This section should describe the major hydrological features of the site. Most importantly, all major river systems of which the site protects all or part of the watershed should be described. These descriptions should include qualitative information about the economic importance (irrigation, domestic use, hydroelectricity generation, *etc*.) of these river systems. If appropriate, hydrological data from these river systems can be presented.

2.2 Vegetation

2.2.1 Habitat types and condition

Ideally, data on habitat types and extent should be based on ground-truthed remote sensing data (satellite images or aerial photographs). Where remote sensing data is unavailable, habitat data should be based on

habitat maps produced by ground survey. District or provincial land-use maps should not be used as these do not employ vegetation classifications appropriate for conservation planning.

Habitat types should be classified according to a suitable classification, such as that given in Appendix 5. This section should include a summary table showing the total area of each habitat type at the site.

This section should give a detailed description of each habitat type, including the following information:

- species composition (e.g. dominant tree species, composition of the ground flora, *etc*.);
- structure (e.g. number of forest layers, height of the canopy layer, canopy cover, standing timber volume, density of mature trees, *etc*.);
- distribution (e.g. altitudinal range, underlying geology, soil type, topography, *etc*.); and
- condition (e.g. level of past and present disturbance, stage of regeneration, *etc*.).

The above data should be collected by means of vegetation plots and transects. At least one plot and one transect should be carried out in each major habitat type at the site. However, if sufficient resources are available, it is preferable to carry out several plots and transects in each habitat type. Vegetation plots and transects should cover the full range of altitudinal variation at the site.

Vegetation plots should be used to collect data on species composition. Plots should measure 40 by 40 m and cover an area of 1,600 m^2. Except in flat areas, it will be necessary to adjust for slope. Within each plot, all trees with diameter at breast height (diameter 1.3 m from the ground) greater than 10 cm should be identified. A series of 2 by 2 m quadrats should be used to obtain data on species composition of the ground flora.

Vegetation transects are used to collect data on structure. Transects should measure 10 by 60 m and cover an area of 600 m^2. Within each transect, all trees with diameter at breast height greater than 10 cm should be identified, and their positions, heights and canopy extents should be recorded.

In non-forest habitats, such as scrub and grassland, it is not necessary to use vegetation plots and transects. Instead, a series of 2 by 2 m quadrats should be used to obtain data on species composition and structure.

2.2.2 Flora and plant resources

Data on vascular plant diversity at the site should be collected during the field survey. Data on non-vascular plants should only be collected where relevant and feasible. Where possible, voucher specimens should be made, in order that identifications can be verified at a later stage if necessary[2]. Preliminary identifications based upon field observations are of less value. In general, data from past reports should not be included, unless voucher specimens exist and can be checked. Otherwise, there is a danger of reinforcing incorrect identifications.

Collecting effort within each habitat type should be in proportion to its extent at the site. It should be recognised that, within the scope of a single field survey, it is impossible to make a comprehensive survey of floral diversity. Therefore, collecting effort should concentrate on the dominant species and species of particular conservation importance. At minimum, the field survey team should collect specimens of all endemic and threatened plant species at the site.

This section should summarise the known plant diversity at the site. The total number of species, genera and families recorded at the site should be given, as well as a list of the most species-rich families. A list of threatened plant species should be given, following IUCN (1997) and/or Anon. (1996). A list of species endemic to Vietnam and/or the site should also be given. Furthermore, this section should summarise the number of plants with known economic uses, either for wood, medicine, food or ornament. Annex 1 provides guidance on the organisation and presentation of plant lists.

[2] Voucher specimens are plant specimens collected in the field, identified by a recognised authority and stored in a reference collection, such as a herbarium. Voucher specimens allow initial determinations to be verified at a later stage.

2.3 Fauna

Data on faunal diversity at the site should be collected during the field survey. Additional data from past reports can be included if the source is considered to be reliable; however, it is not acceptable to rely wholly on past reports because the status of some species (particularly mammals) at the site may have changed in the time since the report was produced. When including data from past reports, it is essential to clearly indicate the source of the data. Annex 1 provides guidance on the organisation and presentation of lists of fauna.

2.3.1 Mammals

Data on mammal diversity and distribution can be collected by a variety of means, including observation, camera trapping, study of tracks and traces, interview, study of hunting trophies and other specimens, and, in the case of small mammals and bats, specimen collection. Particular care must be taken in the case of interview data: firstly, to ensure that the information collected is accurate; and, secondly, to distinguish between species currently present at the site and species present in the past but now locally extinct.

When studying hunting trophies and other specimens, it is important to make a photograph or detailed drawing of each specimen so that preliminary identifications can be confirmed at a later date. Ideally, a small number of specimens should be collected, although local people should not be paid for specimens as this is illegal in the case of several species and might encourage future hunting.

Mammal observation, camera trapping and study of tracks and traces should concentrate on those areas of the site supporting suitable habitat for large and medium-sized mammals, and where human disturbance is believed to be lowest. Many Vietnamese mammal species are nocturnal or crepuscular, so it is necessary to make mammal observations during the night as well as during the day.

This section should summarise the known mammal diversity at the site. The total number of mammal species should be given, as should a list of threatened species, following IUCN (1996) and/or Anon. (1992). A list of endemic species should also be given.

Individual accounts should be given for mammal species of particular conservation significance. These accounts should briefly summarise the available information on the status and distribution of these species at the site. Also, these accounts should provide details about the source(s) of information on these species.

2.3.2 Birds

This section should summarise the known bird diversity at the site. The total number of bird species should be given, as should a list of threatened species, following IUCN (1996) and/or Anon. (1992). A list of endemic species should also be given, as should a list of restricted-range species, following Stattersfield *et al.* (1998).

Data on bird diversity can be collected by observation, identification of calls, mist netting, and, in the case of large, easily recognisable species, interview.

If possible, data should be collected on the distribution of bird species at the site, with respect to habitat type and elevation. These data should be summarised in this section.

Individual accounts should be given for bird species of particular conservation significance. These accounts should briefly summarise the available information on the status and distribution of these species at the site. Also, these accounts should provide more detail on the source(s) of information on these species.

2.3.3 Reptiles and amphibians

Data on reptile and amphibian diversity should primarily be obtained by specimen collection. In the case of turtles, monitor lizards and some families of snakes, it may be possible to collect additional data by interview, although care must be taken to ensure that the information collected is accurate.

This section should summarise the known reptile and amphibian diversity at the site. The total number of reptile and amphibian species should be given, as should a list of threatened species, following IUCN (1996) and/or Anon. (1992). A list of endemic species should also be given. If possible, data should be collected on the distribution of reptile and amphibian species at the site, with respect to habitat type and elevation. These data should be summarised in this section.

2.3.4 Fish

This section should only be included where relevant. Data on fish diversity can be collected by specimen collection and market surveys. Although, in the case of market surveys, care must be taken to ensure that the species on sale were collected at the site. At sites where non-native species have been released (deliberately or accidentally) into rivers and lakes, these should be clearly distinguished from native species, in both this section and the appendix.

This section should summarise the known fish diversity at the site. The total number of fish species should be given, as should a summary of species with economic value. A list of endemic species should also be given, as should a list of threatened species, following IUCN (1996) and/or Anon. (1992). If possible, data should be collected on the distribution of fish species at the site, with respect to habitat type and elevation. These data should be summarised in this section.

2.3.5 Invertebrates

This section should summarise the diversity of selected invertebrate taxa at the site. Which taxa are appropriate will vary according to the nature of the site and the availability of suitable taxonomic expertise. Appropriate taxa may include butterflies, moths, soil invertebrates or freshwater invertebrates.

For each taxon, this section should summarise the known diversity at the site. The total number of species and number of endemic species should be given, as should a list of threatened species, following IUCN (1996) and/or Anon. (1992). If possible, data should be collected on the distribution of species at the site, with respect to habitat type and elevation. These data should be summarised in this section.

2.4 Landscape, historical and cultural features

The landscape, historical and cultural features of the site should be described with regard to the development of tourism. The length of this section will vary according to the Special-use Forest category of the site: in the case of national parks and cultural and historical sites, it will be necessary to provide a greater amount of detail than in the case of nature reserves.

Relevant landscape features could include waterfalls, lakes, caves or scenic vistas; relevant cultural features could include historical sites, ethnic minority villages or archaeological sites. If appropriate, a map showing the location of the relevant features could be included.

Chapter 3 Socio-economic features

Conventionally, socio-economic information has been compiled from statistics collected at the provincial, district and commune levels, and through interviews and discussions with relevant government officials. To ensure that the information derived from these sources is verified at the local level and is useful for Special-use Forest management purposes, it will often be necessary to complement this with information derived from the use of *participatory tools* (see Box 2).

Box 2: Using participatory tools for protected area planning

A number of tools and methods can be used to compile the information required for Chapter 3. Observations and interviews in markets, villages and households are simple methods of collecting basic information on some forms of natural resource use. The use of participatory tools can often provide the most useful information on which protected area/buffer zone planning and development activities can be based. For example:

Ranking and scoring can be used to determine the species most sought by hunters at different times of the year, or to explore levels of dependence upon certain forest products throughout the year;

Wealth/well-being ranking can be used to identify different wealth groupings within villages and communes. Different techniques can then be used to improve understanding of the impact of new rules or regulations on these different groups;

Mapping can be used to determine spatial issues, for example, areas particularly rich in animals; boundaries of village lands in relation to protected area boundaries; areas where soils or forest resources have been degraded by logging; areas where forest guard stations might be located; *etc*.

Seasonal calendars are an extremely useful tool that can be used to determine when people engage in particular activities (for example, the collection of non-timber forest products or agricultural activities). These might include exploring differences in cropping patterns throughout the year; seasonal abundance of different animals in the forest; seasonal damage to farmers' crops caused by wild animals; seasonal food shortages, *etc*. They can also be used to compare and verify information collated from other sources. For example, to compare the amount of time spent by children at school with the amount spent doing activities such as rice sowing, harvesting, *etc*.

Timelines and village histories can be used to develop a picture of change over time. Resource management patterns can then be related to particular events, such as periods of in-migration, warfare, protected area designation, *etc*.

3.1 Summary of key socio-economic features

This section should provide a one-page (maximum) profile of the key socio-economic features of the buffer zone and Special-use Forest, based on the information included in sections 3.2 to 3.6 below.

3.2 Population, demographics and ethnicity

This section should outline population numbers in the buffer zone and, where relevant, the Special-use Forest. This section should describe the population distribution throughout these areas, highlight important demographic trends, and summarise ethnic composition. Baseline information on population size and distribution can usually be collected from provincial, district and commune sources. Trends and verification can also be sought using participatory tools (see Box 2), for example using timeline analysis, compiling village histories or compiling oral histories at the village level. These latter techniques often provide information of more use to management, since they can be used to relate demographic trends (such as in- and out-migration, population growth and shifts in ethnic composition) to patterns of resource use.

3.3 Public health and reproductive health services

3.3.1 Summary of health issues

This section should include a summary of the key public health issues in the buffer zone and Special-use Forest. For example, it should cover access to clean potable water, prevalence of vector-borne diseases (e.g. malaria and dengue fever), other illnesses (e.g. goitre and diarrhoea) and nutritional status. In some cases, the management of the Special-use Forest may have a direct bearing on these factors. For example:

- loss of catchment forests can dramatically reduce downstream water quality;
- 'wild meat' derived from hunting (or fishing) often supplements diets that are already low in animal protein; and
- pollution of natural wetlands can exacerbate problems of water-borne and vector-borne diseases.

3.3.2 Access to health and reproductive health services

This section should summarise the *accessibility* of health and reproductive services. Baseline statistics (e.g. for numbers of clinics, doctors, *etc*.) can often be obtained from provincial, district and commune authorities. However, these data will need to be supplemented and verified for accuracy if they are to be useful for management purposes. Participatory techniques can be used to collect information at the village and commune levels, which can complement statistical information and make this more useful for planning (e.g. by answering questions such as *'do cultural or household economic factors prevent access to clean drinking water, health and reproductive services?*').

3.4 Education

3.4.1 Summary of education issues

This section should summarise the status of education services in the buffer zone of the Special-use Forest. Baseline statistics (e.g. number of primary and secondary schools, number of teachers, *etc*.) can often be obtained from provincial, district and commune authorities.

3.4.2 Access to education services

As in the case of health services, statistical data will need to be complemented by information collected at the commune and village levels if they are to be useful for development planning around the Special-use Forest. Participatory techniques can be used to collect information, which can complement statistical information and make this more useful for this purpose (see above). Box 3 provides examples of key questions relevant to assessing access to education services.

Box 3: Key questions relevant to assessing access to education services

These might include:

- *'do different ethnic groups have different levels of access to educational services?';*
- *'what factors constrain households sending their children to school?';*
- *'how could educational services better serve the needs of people in the buffer zone?';* and
- *'how can the proposed Special-use Forest be used as an educational resource for the people of the buffer zone*?'

3.5 Infrastructure

This section should summarise issues such as access to transport (rail, road, river), communications and electricity.

3.6 Economic activities

This section should summarise other important economic activities in the buffer zone. These might include trading, livestock, manufacturing, *etc*. Particular attention should be focussed on economic activities that use resources from the Special-use Forest such as charcoal manufacture, honey making, seasonal livestock grazing, and collection and trade of non-timber forest products (NTFPs).

3.7 Use of natural resources

This section should describe existing uses of natural resources in and around the Special-use Forest. Particular attention should be paid to uses of natural resources that may impact, directly or indirectly, and over the short or long term, on the resources of the Special-use Forest. For the purposes of Feasibility Studies and Investment Plans, natural resources include agricultural and agro-ecological resources, livestock, and forest resources. These are outlined below:

3.7.1 Agricultural and agro-ecological resources

This section should describe the main agricultural activities in the buffer zone and, where relevant, within the Special-use Forest as well. It should include summaries of:

- the main crop types, seasonal patterns of agricultural activity and cropping;
- land tenure;
- shifting cultivation systems;
- the main constraints to agriculture in the area (such as poor access to markets, technology, land shortages, *etc.*) and how these constraints might be overcome; and
- the food security status of the area.

This section should also outline key trends in agricultural patterns around the Special-use Forest, for example, the increasing prevalence of specific cash crops (such as sugar cane, tea or coffee).

3.7.2 Livestock

This section should include information on the rearing of cattle, buffaloes, pigs, poultry and goats, and arrangements for ownership and grazing rights. Particular attention should be given to the interaction between livestock and the Special-use Forest, for example, grazing within the Special-use Forest, and the cutting and collection of fodder and feed for stall-reared livestock.

3.7.3 Forest resources

Forest tenure and access rights

This section should include details of traditional and official rights and tenure over forest land and resources. This should include details of land *allocated* (for example, under decree 02/CP) to organisations, households and individuals; and *forest protection contracts* issued for Special-use Forest. This section should also include details of *traditional* forest management and access rights.

Forest products and uses

This section should describe and summarise the existing *uses* of forest resources derived from the Special-use Forest and buffer zone. These might include:

- hunting/trapping of animals (for meat supply and trade);
- harvesting of other NTFPs, such as honey, rattan, medicinal plants, fodder (see Box 4);
- timber cutting and removal;
- livestock grazing; and
- support of traditional land-use systems.

Box 4: Non-timber forest products

Non-timber forest products (NTFPs) include such products as bamboo, rattans, forest fruits, medicinal plants, tree bark and resins. Wild animals are also considered to be NTFPs. One study in Rattanakiri province, Cambodia suggests that the economic returns from NTFP use can exceed those of logging and timber extraction (Bann 1997). Some studies have shown that these can have considerable economic value, and, with careful management, NTFP harvesting can represent a sustainable economic incentive for forest management. Unfortunately, levels of NTFP harvesting in many areas of Vietnam are unsustainable, with the result that many types of NTFP are reduced in abundance and overall economic value. Many mammal species are particularly vulnerable to over-exploitation through hunting. An example of information collected on NTFP use, taken from the Feasibility Study for Ngoc Linh (Quang Nam) Nature Reserve, is given in Annex 2.

Forest services

This section should discuss the *services* that the forest might provide to people within the catchment. These might include maintenance of water quality, augmentation of dry season water flows, slope stabilisation, provision of recreational resources, *etc*.

Social forestry and agroforestry activities

This section should include information on social forestry and agroforestry activities in the buffer zone and/or Special-use Forest. This section should focus particularly on initiatives that seek to change forest management arrangements (for example, forest protection contracts).

3.7.4 Dependency of local communities on natural resources

This section should link patterns of resource use to the livelihood strategies of those who live in the Special-use Forest and buffer zone. For example, it is important to understand the importance of NTFPs to households at different times of the year, and to understand the impacts of external factors (for example, in-migration) on patterns of natural resource use.

Chapter 4: Stakeholders

4.1 Description of stakeholders

This section should identify stakeholders relevant to the Special-use Forest. Stakeholders encompass all government agencies, beneficiaries, commercial companies, and other formal or informal groups associated with a project. Stakeholders also include other projects in the Special-use Forest and buffer zone, whether implemented by the government or NGOs. An effective way of analysing stakeholder issues is to use a technique called 'stakeholder analysis' (see Box 5).

Box 5: Stakeholder analysis

Stakeholder analysis is a process that allows planners to widen the involvement of people and institutions in project planning. It is an important means of identifying which stakeholders should be included within the protected area establishment and planning process, and determining how the establishment and management of the protected area might impact upon the interests (or 'stakes') of different groups. Stakeholder analysis involves:

- identifying and listing all potential stakeholders;
- identifying their interests in relation to protected area establishment and management;
- assessing the likely impact of protected area establishment and management on these interests; and
- assessing the relative importance of each stakeholder to the management of the protected area.

4.2 Key stakeholders

Based on the stakeholders listed in Section 4.1, this section should identify key stakeholders relevant to the establishment and management of the Special-use Forest. Some of the key stakeholder groups are listed in Table 1.

Table 1: Examples of key stakeholders in Special-use Forest establishment and management

Stakeholder	Stake/responsibility
Central government	
Ministry of Agriculture and Rural Development (MARD)	Overall responsibility for agriculture and rural development, including forest resources. MARD has to approve all Investment Plans for Special-use Forests. MARD also has responsibility for managing national parks through FPD.
Forest Protection Department (FPD) within MARD	Administers management of Special-use Forests, including wildlife resources, particularly threatened species. Provides technical support to provincial FPDs on management of forest resources as well as forest-fire prevention. FPD also has responsibility for some wetland Special-use Forests, such as Xuan Thuy and Dat Mui Nature Reserves, and Tram Chim National Park.
Forest Development Department (FDD) within MARD	Administers management of production forest and protection forest. Endorses state forest enterprises' logging plans annually prior to approval by MARD, and approves plans for forest plantations.
Department of Planning and Investment (DPI) within MARD	Approves budgets for Special-use Forest establishment and management. Provides annual budgets for implementing Special-use Forest Investment Plans.
Ministry of Planning and Investment (MPI)	Gives final approval to budget allocations for Special-use Forest establishment and management (if over VND15 billion).
Forest Inventory and Planning Institute (FIPI) (including six sub-FIPIs)	Responsible for inventories of forest resources, and for preparing Feasibility Studies and Investment Plans for Special-use Forests.
Ministry of Science, Technology and Environment (MOSTE)	Potential future role in marine and coastal protected areas. Responsible for threatened species and the compilation of Vietnamese Red Data Books. Responsible for the assessment of the impact of herbicides.

Stakeholder	Stake/responsibility
National Environment Agency (NEA) of MOSTE	Responsible for certain aspects of planning and conservation of wetland protected areas.
Provincial and district	
Provincial people's committee	Oversees management of all projects implemented in province. Establishes management boards for Special-use Forests in province.
District people's committee	Oversees management of all projects implemented in district.
Provincial and district FPDs	Responsible for management of Special-use Forests. Responsible for enforcement of Special-use Forest management regulations. Responsible for allocating forest land and issuing forest protection contracts.
Department of Agriculture and Rural Development (DARD)	Responsibilities and authority vary according to province. Sometimes responsible for Special-use Forest management. Sometimes assumes responsibility for FPD and/or FDD activities at provincial level; in other provinces, FDD and FPD might work independently of each other. Sometimes responsible for allocating forest land and issuing forest protection contracts. At district level, plays an important role in agricultural extension and has a potential role in implementing buffer zone activities
State forest enterprises	Play an important role in the management of forest land, including the establishment of plantations and timber extraction from production forests.
Fixed Residency and Settlement Department	Implements relocation, resettlement and poverty eradication programmes.
Department of Planning and Investment	Approves provincial-level budgets, including funds for Special-use Forest management boards. Obtains funds from MARD and/or MPI for Special-use Forest Investment Plans.
Commune	
Commune people's committee and commune members	Commune leaders currently do not play a decision-making role in Special-use Forest management. However, commune members are often key stakeholders (both positive and negative) in Special-use Forest establishment and management.
Research/academic	
Institute of Ecology and Biological Resources (IEBR)	Conducts biological and ecological research that often contributes to Investment Plans and Feasibility Studies for Special-use Forests.
Forest Science Institute of Vietnam (FSIV)	Conducts forestry research.
Universities	Conduct research in various fields.
Donors	
Bilateral and multilateral agencies	Various. Often support attainment of agreed national and international commitments to biodiversity conservation. May also support socio-economic development projects around Special-use Forests.
NGOs	
International and national NGOs	As above. Often implement donor-supported projects

It should also be noted that a number of other stakeholders can play an important role in managing forest lands, including the armed forces and the prison service.

4.3 Stakeholder capacities

This section should review/comment on the capacity of key stakeholders to fulfil their responsibilities and/or address their objectives. For example, it should comment on the availability of human, financial and capital resources, as well as skills and expertise levels.

Chapter 5 Evaluation

5.1 Biodiversity evaluation

This section shows the biodiversity value of the Special-use Forest in comparison to other Special-use Forests, and how the Special-use Forest fits into Vietnam's system of Special-use Forests.

Comparing biodiversity values from site to site is problematic. Sites that have been well studied often have a greater number of species when compared to little-studied sites; yet little-studied sites may have greater biodiversity value.

Table 2: Comparison of mammal and bird diversity at four montane nature reserves

Nature Reserve	Mammals	Birds
Ngoc Linh	52	191
Mom Ray	76	208
Chu Yang Sin	46	203
Hoang Lien	33	208

There are insufficient resources to conserve all sites. Thus there is a need to prioritise investments in Special-use Forests. One frequently used method of comparing biodiversity values is to compare the total number of species within particular taxa and the number listed as threatened (see Table 2). This can only be done if faunistic and floristic inventories have been completed at the Special-use Forests in question.

Comparisons are best done between sites within the same ecoregion or vegetation type. Mangrove forests, for example, may support fewer species than moist tropical forests.

There is also a need to examine whether the key features supported by the Special-use Forest are already well represented within the Special-use Forests system. Priority should be given to extending Special-use Forest status to vegetation types, altitudinal zones, ecoregions and species that are under-represented within the current system. Wege *et al.* (1999) provide a guide to the extent of coverage of different vegetation types, altitudinal zones, ecoregions and species within the Special-use Forests system.

5.2 Threat evaluation

This section should provide a prioritised review of threats to biodiversity at the Special-use Forest and a short description of the underlying causes (see Table 3). This section uses the socio-economic information collected in Chapter 3 to compile a list of threats to biodiversity and possible underlying causes. Without a list of threats, it is impossible to effectively implement conservation management.

Table 3: Example of prioritised review of threats to biodiversity

Priority Ranking	Threat	Possible Underlying Cause
1	In-migration	Population pressures
2	Clearance of forest for cultivation	Shifting agriculture
3	Hunting	Subsistence needs
4	Trapping	Income needed from live animal trade
5	Logging	House construction
6	Road construction	National or local plans
7	Mining	Outsiders prospecting for gold

5.3 Institutional evaluation

Based upon Section 4.3, this section should review the areas in which key project institutions need additional strengthening. This should include a review of training, equipment and staffing needs. Using Table 1, stakeholders who are vital to the sustainable management of the area should be identified, and constraints on these institutions to implement their roles should be described.

Furthermore, this section should include an assessment of the level of commitment that key institutions are likely to have towards establishing and managing the Special-use Forest. The views of these institutions on proposals for Special-use Forest establishment should be included in this section.

5.4 Economic evaluation

This section should provide a qualitative justification for why the Special-use Forest is the least-cost alternative for conserving a particular set of natural resources. Because of the difficulty of quantifying the economic benefits of a Special-use Forest, authors of Feasibility Studies and Investment Plans should show that the Special-use Forest is the least-cost alternative to protect the given biodiversity. This requires a short, qualitative review of other potential sites where the same biodiversity can be protected. An example of such an evaluation is given in Annex 3.

This section should also evaluate the 'opportunity cost' of designating the area as a special use forest. Opportunity cost is a measure of the loss of benefits that could otherwise be gained from managing the area in an alternative way, for example, through conversion to another land use, or through different means of maintaining permanent forest cover.

5.5 Evaluation of other potential benefits

This section should review the potential values of the Special-use Forest for watershed protection, NTFP production, tourism and maintenance of genetic resources. This should be a qualitative assessment of the Special-use Forest's potential. It can include forestry/agroforestry, flood/erosion control, medicinal and ornamental plants, eco-tourism, genetic resources and research.

5.6 Financial evaluation

This section should only be included in an Investment Plan. This section should use a cost-benefit analysis to summarise the projected annual operating budget required for the Special-use Forest, broken down into capital costs, and operating and maintenance costs. A table should show these costs annually, over a 10-year period. Annual income should also be shown over this period, broken down according to source (see Table 4).

Table 4: Simplified example of an annual operating budget

	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Costs										
Capital costs	560	600	100	0	0	0	0	0	0	0
Operating and maintenance costs	60	70	70	70	70	70	70	70	70	70
Income										
Tourism	4	6	8	10	12	14	16	18	20	22
NTFP collection permits	0	0	1	1	1	1	1	1	1	1
Net (subsidy)	620	664	161	59	57	55	53	51	49	47

Chapter 6: Special-use Forest planning

6.1 Special-use Forest name

This section should specify the name of the site and give the justification for this name. In most cases, the name should follow that in the relevant government decree.

6.2 Rationale for designation of Special-use Forest category

This section should propose an appropriate Special-use Forest category for the site and give the justification for this proposal. If a Feasibility Study concludes that a site does not qualify for Special-use Forest status, a suitable alternative management category should be proposed (e.g. watershed protection forest or production forest).

6.3 Management aim and objectives of the Special-use Forest

This section should define the overall aim and the specific management objectives of the Special-use Forest. The management objectives should be consistent with relevant government decisions and ministerial guidelines.

6.4 Management responsibility for the Special-use Forest

This section should state the official body that will have management responsibility for the Special-use Forest. In most cases, national government agencies will have responsibility for the management of national parks, whereas provincial people's committees will have responsibility for nature reserves and cultural and historical sites.

6.5 Physical description of boundaries and justification

This section should define the boundary of the Special-use Forest (excluding the buffer zone). The boundary should, where possible, follow existing landscape features, such as rivers, ridge lines, roads and administrative boundaries. The boundary should be based upon the results of biological and socio-economic surveys of the site, as well as discussions with key stakeholders at all levels, including local communities. Feasibility Studies and draft Investment Plans can propose several options for the boundary for discussion at provincial and national workshops. However, final versions of Investment Plans that are submitted to MARD should include only one option.

When proposing the boundary, authors of Feasibility Studies and Investment Plans should try to meet the following objectives:

- the boundary should contain all important habitats represented at the site;
- at least 70% of the area of the Special-use Forest should be natural forest; and
- there should be no villages within the boundary.

This section should give the total area and total area of natural forest within the boundary. If the boundary includes land currently under the management of a forest enterprise or watershed protection forest management board, the total area of land that must be transferred to the Special-use Forest should be given.

This section should end with the justification for the boundary. In particular, justification should be given for areas of natural habitat that are excluded from the Special-use Forest, and for areas of non-natural habitat that are included. If the area of the Special-use Forest differs significantly from that specified in the relevant government decree, justification must be provided. If any villages are included within the boundary, a detailed description of these villages and justification for their inclusion should be given.

6.6 Management zoning

This section should define the extent of the strict protection, forest rehabilitation, and administration and services areas. In the case of larger Special-use Forests, these areas may be divided into sub-areas, to facilitate more effective management. For each area, the following information should be given: total area and area of each habitat type; management aim and objectives; and management regime.

6.7 Definition of boundary and objectives of buffer zone

Ministry of Forestry Circular 1586/LN/KL, dated 13 July 1993, defines buffer zones as:

> *"…[areas]… contiguous to but outside of Special-use Forests. Generally, they comprise the communes included within the Special-use Forest and those adjacent to it. Activities are implemented in buffer zones to reduce or mitigate the effects of human activities with a negative impact on the Special-use Forest"*

The buffer zone should include the remaining parts of all communes that are included within the Special-use Forest, as well as all communes that are adjacent to the Special-use Forest. Except in the case of national parks, communes adjacent to the Special-use Forest that are in another province should not be included in the buffer zone. To facilitate effective management and disbursement of funds, the boundary of the buffer zone should follow existing commune boundaries.

This section should define the boundary of the buffer zone and give the total area, broken down by commune. The objectives of the buffer zone should be defined, and the management regime should be outlined, following relevant government decisions and ministerial guidelines. A useful review of the main issues concerning buffer zones is given in Gilmour and Nguyen Van San (1999).

Chapter 7: Proposed project activities and indicative costs

This chapter should only be included in an Investment Plan. This chapter should outline the project activities that are necessary to establish and manage the Special-use Forest for a five-year period. The project activities outlined in this chapter should only relate to activities in the Special-use Forest; funds for activities in the buffer zone must be requested in a separate Investment Plan. However, a Special-use Forest Investment Plan can make general recommendations for the activities that should be included in the buffer zone Investment Plan, based upon the conclusions of Chapter 5.

Appropriate project activities should be formulated through discussions with forest protection department staff, provincial, district and commune people's committees, and representatives of local communities. Project activities should be grouped into several investment programmes. For each investment programme, the objectives should be stated and the project activities outlined. For each project activity outlined, a detailed breakdown of the estimated cost should be given.

7.1 Protection programme

7.1.1 Infrastructure development programme

This programme should provide the necessary infrastructure to manage and protect the Special-use Forest. Project activities can include headquarters and guard station construction, road and trail upgrading, provision of electricity and water supplies, purchase and operation of vehicles, purchase of office equipment, and establishment of a communications system.

7.1.2 Conservation and protection programme

This programme should manage and protect the Special-use Forest, following the management objectives laid out in Section 6.3. Project activities can include boundary demarcation, purchase of equipment for forest guards (but not staff salaries), and staff training. Also included in this programme should be a project activity to issue forest protection contracts.

7.2 Rehabilitation programme

If appropriate, this programme should manage the forest rehabilitation area with the objectives of restoring areas of degraded habitat to a natural condition, and increasing populations of animal and plant species of conservation importance. Project activities can include land allocation for regeneration or reforestation with native tree species, forestry extension, establishment of tree nurseries, habitat restoration and creation of habitat corridors. However, this programme must focus on *in situ* conservation, and project activities should not include captive breeding programmes.

7.3 Scientific research programme

The objectives of this programme should be to provide biological information to assist with the protection and management of the Special-use Forest, and to monitor habitat condition and extent and levels of biodiversity. Project activities can include baseline biodiversity studies, studies on species of high conservation importance, ecological monitoring, studies of regeneration and habitat restoration, and training of scientific staff in biodiversity survey and ecological monitoring techniques.

7.4 Education, awareness and extension programme

The objectives of this programme should be to raise awareness of the aims and management regulations of the Special-use Forest among both local people and the Special-use Forest staff, to involve local people in conservation, and to promote the sustainable use of natural resources. This programme should establish mechanisms whereby local communities can be involved in the establishment and management of the Special-use Forest. Other project activities can include production and distribution of awareness materials, conservation training courses for local people and Special-use Forest staff, and school-based

environmental education. This section should specify which institution(s) should be responsible for management and implementation of this programme.

7.5 Socio-economic development programme

The objective of the socio-economic development programme should be to reduce the dependence of the buffer zone inhabitants on the resources of the Special-use Forest. This programme should focus only on those human activities that have a significant negative impact on biodiversity. Project activities should provide alternatives or incentives to encourage local people to cease these activities.

The Investment Plan should only request funding for project activities that will take place within the Special-use Forest. The Investment Plan should only make general recommendations for activities in the buffer zone, which should be included in a separate Investment Plan.

7.5.1 Special-use Forest socio-economic development programme

This programme should be implemented in villages within the Special-use Forest boundary (if any). Project activities should be managed by the Special-use Forest management board, and the Investment Plan should specify which institution(s) will be responsible for implementation. Examples of project activities include social forestry schemes, agricultural extension, infrastructure development (e.g. irrigation, electricity, roads, *etc*.), and provision of education, health care and family planning.

The Investment Plan should highlight any potential socio-economic impacts of Special-use Forest establishment. Where impacts could be significant, the Investment Plan should make specific recommendations for their adequate assessment and evaluation. These might include recommendations for a social impact assessment.

7.5.2 Buffer zone socio-economic development programme

This programme should be implemented in villages in the buffer zone. This section should recommend which institution(s) should be responsible for management and implementation of each project activity. This section should make recommendations for project activities, which could include social forestry schemes, agricultural extension, infrastructure development (e.g. irrigation, electricity, roads, *etc*.), and provision of education, health care and family planning. The buffer zone development programme should be outlined in more detail in a separate buffer zone investment plan.

7.6 Tourism development programme

This programme should only be included in Investment Plans for national parks or cultural and historical sites. This section should set out a timetable for tourism development over a five-year period, including estimated visitor numbers. Necessary project activities could include visitor infrastructure construction, road and trail construction, training for tour guides, and development of visitor orientation and interpretation facilities. Where tourism development proposals are included, Investment Plans should provide an outline of potential environmental impacts. Based on this preliminary assessment, recommendations should be made to undertake environmental impact assessments (EIAs) of proposed tourism developments.

Chapter 8: Special-use Forest management structure and finance

8.1 Special-use Forest management structure

This section should set out the proposed staffing structure and management board composition for the Special-use Forest. This section should also outline the main responsibilities of each member of staff, and include a schematic diagram of the staff hierarchy. The number and location of forest guard stations and the principal duties of each guard team should also be specified. Finally, this section should outline the main responsibilities of the management board.

8.2 Finance

This section should only be included in an Investment Plan. This section should summarise the investment capital requested for the establishment and management of the Special-use Forest for a five-year period. The investment capital requested should cover all aspects of Special-use Forest establishment and management, apart from staff wages, salaries of the Special-use Forest management board, and the buffer zone development programme.

A summary cost table should be produced, showing cost estimates for each of the project activities outlined in Chapter 7. For each activity, the quantity, unit price and total cost should be given (see Annex 6). A second table should show the disbursement schedule for each project activity, showing how funds will be spent during each of the first five years (see Annex 6). The figures in this table should be summarised in the form of an investment schedule (see Annex 6).

This section should also propose the source(s) of funds for each of the investment programmes (i.e. the proportions that will come from the national government budget, the provincial people’s committee, favourable interest loans and international donors). This section should identify potential sources of funding from international donors or government programmes.

Chapter 9: Summary of project benefits

This chapter should only be included in an Investment Plan, and should briefly summarise the conservation, social and economic benefits of establishing the Special-use Forest.

Chapter 10: Recommendations

This section should summarise the recommendations made in the report. This section should outline the next steps for establishment of the Special-use Forest in question. In the case of Feasibility Studies that recommend that a Special-use Forest should not be established, this section should make appropriate recommendations for the future management of the site.

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Annex 1: Lists of flora and fauna

Flora lists

This appendix should be in the form of a table listing all plant species recorded at the site. It is essential that scientific (Latin) names and authorities are given; Vietnamese names are optional. Scientific names, sequence and species limits should follow a single reference work (e.g. Pham Hoang Ho 1991), and this should be stated at the foot of the table. Where appropriate, the table should also include information on known economic uses (i.e. timber, medicinal, food and ornamental species); categories of threat following the *IUCN Red List of Threatened Plants* (IUCN 1997) and/or the *Red Data Book of Vietnam, Volume 2: Plants* (Anon. 1996); and data on endemism. If voucher specimens exist, their code numbers should be included in the table and a footnote inserted to explain where they are held. Alternatively, if identifications are based upon observation only, this should be stated.

Example flora list

Scientific Name	Vietnamese Name	Voucher No.	Uses	Anon. 1996	IUCN 1997	End.
Pinophyta:	**Ngành Thông**					
Gnetaceae	**Họ Dây gắm**					
Gnetum gnemon L. var. *griffithii* Margf.	Rau bép	observed	E			
G. montanum Margf.	Gắm	observed				
Pinaceae	**Họ Thông**					
Pinus dalatensis Ferre	Thông đà lạt	observed	W,M	R	E	EV
Podocarpaceae	**Họ Kim Giao**					
Podocarpus imbricatus (Blume) De Laub.	Thông nàng	VA924	W,M,O			
P. neriifolius D. Don	Thông tre lá ngắn	observed	W	R		
Decussocarpus fleuyri (Hickel) De Laub.	Kim giao fleurey	VA920	M	V	V	
Dacrydium elatum (Roxb.) Wall.	Hoàng đàn gà giả	VA933	W,M			

Follows Pham Hoang Ho (1991).
Uses: E = Edible, W = Wood, M = Medicinal, O = Ornamental.
Status: V = Vulnerable, R = Rare as per Anon. (1996); E = Endangered, V = Vulnerable as per IUCN (1997).
Endemism: EV = Endemic to Vietnam.
Voucher specimens are held at the Institute of Ecology and Biological Resources herbarium; duplicates are held at the Missouri Botanical Garden.

Fauna lists

Fauna lists should be included for each of the groups of animals included in Section 2.3. Each list should be in the form of a table listing all the species recorded at the site. It is essential that scientific (Latin) names are given. English and/or Vietnamese names should be given where appropriate. Scientific names, sequence and species limits should follow a single reference work and this should be stated at the foot of the table. Appropriate reference works include the following:

For mammals: Corbet and Hill (1992)

For birds: Inskipp *et al,* (1996); Robson (2000); Sibley and Monroe (1990); Vo Quy and Nguyen Cu (1995)

For reptiles and amphibians: Nguyen Van Sang and Ho Thu Cuc (1996)

For fish: Mai Dinh Yen (1978); Mai Dinh Yen *et al.* (1992)

For butterflies: Corbet and Pendlebury (1992); Pinratana (1977-1988)

Where appropriate, the tables should include categories of threat following the *IUCN Red List of Threatened Animals* (IUCN 1996) and/or the *Red Data Book of Vietnam, Volume 1: Animals* (Anon. 1992), and data on endemism. Where information is available regarding the distribution of an animal species within the site (e.g. with respect to habitat type or altitude), this should also be included.

For both flora and fauna lists, it is essential that the data source for each record is included. For instance, notes should be used to distinguish between records based upon interview data and specimen records. If specimens are collected, a footnote should explain where they are held. Wherever possible, biodiversity data should be collected from field survey and not collated from past reports. However, where data from past reports are included in species lists, they should be clearly identified, and the source of the data be given in a footnote.

Example mammal list

Common Name	Scientific Name	Data Source	Habitat	Anon. 1992	IUCN 1996	End.
Primates:	**Primates:**					
Old-world Monkeys	**Cercopithecidae**					
Crab-eating Macaque	*Macaca fascicularis*	O	1		NT	
Bear Macaque	*M. arctoides*	S,T	1,2	V	VU	
Black-shanked Douc Langur	*Pygathrix nemaeus nigripes*	I	1	V	EN	EI
Gibbons	**Hylobatidae**					
Buff-cheeked Gibbon	*Hylobates gabriellae*	H,I	2		DD	EI

Follows Corbet and Hill (1992).
Data Source: O = Observed in the wild; S = Specimen; T = Tracks or traces; H = Heard; I = Interview.
Habitat: 1 = Lowland evergreen forest; 2 = Lower montane evergreen forest.
Status: V = Vulnerable as per Anon. (1992); EN = Endangered; VU = Vulnerable; NT = Near Threatened; DD = Data Deficient as per IUCN (1996).
Endemism: EI = Endemic to Indochina.

Additional socio-economic information (if appropriate)

Detailed socio-economic information that is summarised or referred to in Chapter 3 can be included in full here.

Forest structure data (if appropriate)

Quantitative vegetation data that are summarised or referred to in Section 2.2 can be included in full here. For example:

- tables showing tree species composition of vegetation plots;
- charts showing distribution of tree heights or diameters within vegetation plots;
- profile diagrams showing forest structure; and
- plan diagrams showing canopy cover.

Maps

All maps should have a scale, a north arrow, and gridlines labelled with latitude and longitude. The data source should be given at the bottom of the map. The scale of the maps will depend upon the size of the Special-use Forest, but an appropriate scale would typically be in the range 1:50,000 to 1:250,000. Where appropriate, maps showing geology, soil type and topography at the site can be included but these are optional.

Location

This map should show the location of the site in relation to political (e.g. provincial and national borders), physical (e.g. coastlines and major rivers) and biogeographic boundaries (e.g. ecoregion boundaries). It should show the location of the site relative to nearby Special-use Forests and proposed Special-use Forests.

Habitat types

This map should show the distribution of different habitat types at the site. The habitat classification should follow that used in Section 2.2; and, for each habitat type, the extent, and, where possible, the level of disturbance should be shown. Wherever possible, the habitat map should be based upon remote

sensing data (i.e. satellite images or aerial photographs) supported by ground truthing with hand-held GPS units. Where this is not possible, the habitat map should be based upon ground survey. Habitat maps based upon land-use maps prepared by district or provincial forest protection or agriculture and rural development departments are of limited use as these employ forestry classifications based upon standing timber volume, which do not distinguish between natural forest types.

The purpose of the habitat map is to provide biological justification for the design of the Special-use Forest boundary. Therefore, it is important that habitat data are shown for areas outside as well as within the Special-use Forest. Potential forest corridors and linkages with other Special-use Forests should be shown where appropriate.

Distribution of key species (optional)

This map, or series of maps, should show the distribution of key species (e.g. endemic and globally threatened species) in and around the site. The purpose of this map is to provide biological justification for the design of the Special-use Forest boundary. It is important, therefore, to include distribution data from outside as well as inside the boundary of the Special-use Forest. Distributions of key species can be shown as points depicting confirmed locality records, or as polygons depicting expected occurrence extrapolated from locality records and/or the habitat requirements of the species concerned. The nature and source of the distributional data should be given at the bottom of the map.

Population distribution and ethnic composition

This map should show all communes in the Special-use Forest and buffer zone. For each commune, the name, the border, and the location of all villages and the people's committee should be shown. For each commune, population density should be shown by means of shading the commune area, and ethnic composition should be shown by means of a pie chart placed in the centre of the commune. This map should show the boundaries of the Special-use Forest and buffer zone. The boundaries of any forest enterprises that lie within, or adjacent to, the Special-use Forest or buffer zone should also be shown.

The purpose of the population distribution and ethnic composition map is to provide socio-economic justification for the design of the boundaries of the Special-use Forest and buffer zone, and to indicate variation in level of human impact throughout the site.

Planning

This map should show the proposed boundaries of the Special-use Forest and buffer zone. If a Feasibility Study is presenting several options for the boundary, these must be clearly labelled. If the Special-use Forest is zoned into strict protection and forest rehabilitation areas and/or sub-areas, their boundaries should be shown. The boundaries of forest compartments within the Special-use Forest should be also shown, as should the position of the headquarters and guard stations.

Annex 2: Example of NTFP use in the buffer zone of Ngoc Linh, (Quang Nam) Nature Reserve

NTFP	Part	Where Collected	Months	Who Collects	Sell	Use	Status	
							Past	Now
Rattan	stem	Medium and good forest	all year	men	yes	yes	+++	+
Bamboo	stem	Bamboo forest	all year	men	no	yes	++	++
Bamboo	shoot	Bamboo forest	11-12	men and women	no	yes	+++	+++
Honey	honey	Medium and good forest	7-8	young men	yes	no	++	+
Zingiberaceae	fruit	medium and good forest	6	men and women	yes	no	++	+
Scaphium macropodium	fruit	good forest	7-8	young men	yes	no	++	+
Canarium sp.	fruit	good forest	-	young men	yes	no	++	+
Litsea sp.	bark	Medium/ good forest	all year	men and women	yes	no	++	+
Firewood	stem, branch	forest near village	all year	Women	no	yes	+++	+++
Wild pig	animal	fields and forest	all year	Men	no	yes	+++	++
Muntjac	animal	fields and forest	all year	men	no	yes	+++	++
Tiger	animal	fields and forest	all year	men	yes	no	++	+
Wild dog	animal	forest	all year	men	no	yes	++	+
Monkey	animal	Medium/ good forest	all year	men	yes	yes	+++	++
Gibbon	animal	good forest	all year	men	no	yes	++	++
Deer	animal	good forest	all year	men	no	yes	++	+
Serow	animal	good forest	all year	men	no	yes	++	+
Bear	animal	good forest	all year	men	yes	yes	++	++
Civet	animal	forest	all year	men	no	yes	+++	++
Squirrel	animal	forest	all year	men	no	yes	+++	++
Red junglefowl	animal	fields and forest	all year	men	no	yes	+++	+++
Porcupine	animal	fields and forest	all year	men	yes	yes	+++	++

Source: RRA data from villages no. 2 and no. 4, Tra Tap commune. Status: +++ = Abundant; ++ = Common; + = Scarce

Annex 3: Example least-cost alternative evaluation for Ngoc Linh (Quang Nam) Nature Reserve

If the costs associated with establishing and managing Ngoc Linh (Quang Nam) Nature Reserve are lower than for other sites of comparable conservation value, it should be given priority for establishment, in order to ensure the most efficient use of the limited funds available for conservation in Vietnam. Furthermore, if the cost of establishing and managing the nature reserve is low, resources available for conservation, either from the province, the government or international donors, can be allocated more effectively.

Factors that can be expected to reduce the cost of establishing and managing Ngoc Linh (Quang Nam) Nature Reserve include the following:

- current threats to conservation are low relative to many other sites in Vietnam, therefore less conservation effort is required;
- access to the proposed nature reserve from the west is limited by a mountain ridge backed by a nature reserve, therefore guard stations are only required on the northern and eastern sides;
- recruitment of forest protection staff not necessary, as existing staff will be transferred to the nature reserve from within Quang Nam province;
- the road between Tra My town and the nature reserve headquarters is being upgraded under the project to develop a new economic zone at Tac Po village;
- measures to actively rehabilitate degraded habitats unnecessary as natural regeneration is the most appropriate method for the forest rehabilitation area;
- there are no villages within the strict protection area, therefore there is no need to relocate villages;
- the buffer zone development programme will be relatively inexpensive because the major focus will be on extension and awareness activities, and there will be little expenditure on infrastructure development;
- community development activities are already being implemented in the buffer zone by the Rural Infrastructure Development Unit;
- funds from the 661 Programme have been allocated for social forestry activities in the buffer zone; and
- Ngoc Linh (Quang Nam) is attractive to NGOs and international donors.

Factors that can be expected to increase the cost of establishing and managing Ngoc Linh (Quang Nam) Nature Reserve include the following:

- the remoteness of many areas within the nature reserve will make the construction and maintenance of some guard stations expensive;
- the lack of experience in Special-use Forest management amongst FPD personnel in Quang Nam province will require investment in staff training;
- investment to increase the capacity of Tra My District DARD and other institutions which will be involved in the buffer zone development programme will be required; and
- Ngoc Linh (Quang Nam) will have to compete for provincial resources with Song Thanh-Dakpring and the "Green Corridor" project along the A Vuong River, which may make reliance on central government resources greater.

In summary, Ngoc Linh (Quang Nam) can be considered to be a relatively low-cost option for establishing a Special-use Forest to protect montane habitats in the Western Highlands.

Example opportunity cost

If Ngoc Linh (Quang Nam) Nature Reserve is established, the provincial and district authorities will experience an opportunity cost, measured in terms of loss of benefits that could otherwise be gained from managing the area in an alternative way. The opportunity cost of not designating the proposed nature reserve as production forest can be considered to be minimal because Tra My Forest Enterprise currently meets the local demand for timber, and because the proposed nature reserve is less suitable for timber

extraction than other areas in Tra My district due to its inaccessibility and the relatively low timber volume of forest at high altitudes.

The opportunity cost of prohibiting gold prospecting and other forms of mineral extraction in the proposed nature reserve is unquantifiable. The fact that gold prospecting is currently occurring in Tra Leng commune suggests that there may be pressure to prospect for minerals in the proposed nature reserve in the future. However, the negative impacts to the environment and public health arising from gold prospecting mean that the net benefits of this activity are questionable in any case.

Potentially, the most significant opportunity costs are those associated with the establishment of a new economic zone at Tac Po village. One of the main objectives of the nature reserve management board will be to prevent settlement of migrants into the buffer zone. If restrictions on settlement are implemented, they are likely to constrain development around Tac Po new economic zone, which borders Tra Tap and Tra Cang communes in the buffer zone. The effects this will have depend upon the exact nature of the plans that the district and provincial authorities have for the new economic zone. If it is intended as a focus for economic activity in the south of Tra My district, then the effects will be limited. However, if the district and provincial authorities intend to settle migrants, either from within Tra My district or from elsewhere in Vietnam, in the area, then the establishment of the nature reserve will have a high opportunity cost.

Annex 4: Biogeographical classifications for Vietnam

MacKinnon (1997) – Protected areas system review of the Indo-Malayan Realm

According to the classification of MacKinnon (1997), Vietnam is located in the Indo-Chinese sub-region of the Indo-Malayan Realm. Vietnam is divided into four biogeographical units and 10 biogeographical sub-units (see Map 1).

Unit		Sub-unit	
05	Coastal Indochina	05a	Mekong Delta
		05b	South Annam
		05c	North Annam
		05d	Cardamom Mountains
06	South China	06a	Tropical South China
M	Annam Mountains	Ma	Central Annam Mountains
		Mb	Dalat Plateau
10	Indochina	10a	Central Indochina
		10b	Northern Indochina
		10c	Indochina Transition

Wikramanayake et al. *(1997) – A conservation assessment of the terrestrial ecoregions of the Indo-Pacific Region*

According to Wikramanayake *et al.* (1997), Vietnam is located in the Indo-Malayan Realm, and is divided into 16 ecoregions (see Map 2).

Ecoregion
Northeast Indochina Montane Forests
Bolovans-Kon Tum Montane Forests
Annamite Range Moist Forests
Cardomom Mountains Moist Forests
Northern Vietnam Coastal Moist Forests
Da Lat-Phnom Lyr Montane Forests
Southern Vietnam Coastal Forests
Eastern Indochina Moist Forests
Tonle Sap-Mekong Peat Swamp Forests
Tonle Sap Freshwater Swamp Forests
Red River Freshwater Swamp Forests
Central Indochina Dry Forests
Northern Indochina Subtropical Forests
Eastern Indochina Pine Forests
Gulf of Thailand Mangroves
Gulf of Tonkin Mangroves

Annex 5: Habitat classification for Vietnam

Habitats in Vietnam can be broadly divided into three categories: terrestrial, wetland and marine. For the purposes of Feasibility Studies and Investment Plans for Special-use Forests, classifications are only required for terrestrial and wetland habitats. No classification can cover the full range of habitat diversity in Vietnam and there will be several habitats that do not fall neatly into one of the following categories. This classification is, therefore, intended only as a guide; authors of Feasibility Studies and Investment Plans may need to adapt the classification somewhat when applying it at particular sites.

Habitat classification for terrestrial habitats

In this classification, habitat types are defined according to the major factors that define distribution of plant, mammal and bird species: level of disturbance, elevation and vegetation type. It is recognised that the level of resolution provided by this classification may not be suitable for other groups, such as invertebrates.

Primary habitats are defined as natural habitats that have never been cleared/converted by human activity, even if they have been exposed to human disturbance. Therefore, forest that has been selectively logged would qualify as a primary habitat, providing that it has never been cleared.

Secondary habitats are defined as anthropogenic habitats, developed following the clearance/conversion of the original habitat type.

Following Whitmore (1975), habitats below 700 m are classified as lowland and habitats above 700 m are classified as montane. Montane habitats are further divided into lower montane habitats, below 1,500 m, and upper montane habitats, above this elevation. In most areas of Vietnam, the transitions between lowland and lower montane and between lower montane and upper montane habitats are gradual, and take place at varying elevations, depending upon local climatic, topographic and edaphic conditions. Authors of Feasibility Studies and Investment Plans may need to be flexible when applying this classification at particular sites.

Forest is here defined as vegetation dominated by woody trees, with a canopy cover of over 70% and (except in the case of elfin forest) a canopy height of over 10 m. It is recognised that this is an arbitrary definition, which authors of Feasibility Studies and Investment Plans may need to exercise flexibility when applying.

Following Thai Van Trung (1978), evergreen forest is here defined as forest where greater than 75% of trees are evergreen. This vegetation type occurs in areas where there is no prolonged annual dry season. Evergreen forest is widely distributed throughout Vietnam, in both lowland and montane areas.

Following Thai Van Trung (1978), semi-deciduous (semi-evergreen) forest is here defined as forest where 50 to 75% of the trees are evergreen. In Vietnam, this vegetation type has a limited distribution, and is mainly found in Dac Lac and Gia Lai provinces.

Following Thai Van Trung (1978), deciduous forest is here defined as forest where more than 50% of trees are deciduous. This vegetation type is dominated by members of the Dipterocarpaceae and occurs in areas that experience a prolonged annual dry season. In Vietnam, this vegetation type is distributed in the Western Highlands, in Binh Thuan and Ninh Thuan provinces, and in small pockets along the Cambodian border.

Coniferous forest is here defined as forest where most trees (>50%) are coniferous. This vegetation type is distributed in montane areas. In Vietnam, this vegetation type is restricted to the Da Lat plateau.

Limestone forest is here defined as forest distributed on limestone karst. Limestone forest is a subtype of evergreen forest but is here considered separately because it is a habitat of a particular set of plant and animal species. Limestone forest is widely distributed in northern and central Vietnam.

Elfin forest is here defined as montane evergreen forest with a canopy height of less than 10 m. Elfin forest is a subtype of evergreen forest but is here considered separately because it is a habitat of a particular set of plant and animal species. Elfin forest is distributed in montane areas throughout Vietnam.

Bamboo is here defined as vegetation dominated by bamboo with few or no woody trees. Primary bamboo is limited to high elevations on the highest mountains in Vietnam. Secondary bamboo occurs in areas that have been cleared of natural forest and is widely distributed in Vietnam.

Natural savanna is here defined as primary vegetation with a canopy cover of less than 70%. This vegetation type includes natural grasslands and certain types of open forest.

Grassland is here defined as secondary vegetation with a canopy cover of woody plants of less than 70% that is dominated by grasses. In Vietnam, this vegetation type is often dominated by *Imperata cylindica* and is widely distributed throughout the country.

Scrub is here defined as secondary vegetation with a canopy cover of woody plants of less than 70% that is dominated by non-grass vegetation. As defined here, this is a very broad category, and authors of Feasibility Studies and Investment Plans may need to subdivide this vegetation type.

Limestone karst without forest is here defined as areas of limestone karst with a canopy cover of woody plants of less than 70%. This vegetation type is widely distributed in northern and central Vietnam.

Plantation forest is here defined as plantations of native or non-native tree species. This vegetation type excludes areas of secondary forest formed by assisted or natural regeneration. In Vietnam, the commonest trees used in plantation forest are *Acacia mangium*, *Eucalyptus* spp. and *Pinus* spp. This vegetation type is distributed throughout Vietnam.

Agricultural land is here defined as land used for the cultivation of crops. This land includes wet rice land, hill fields and perennial crop land but excludes land primarily used for grazing livestock. Authors of Feasibility Studies and Investment Plans may need to subdivide this vegetation type, for instance to distinguish between coffee plantations and wet rice land.

Rural habitation is here defined as areas of, usually low density, human habitation that contain primarily anthropogenic vegetation, such as gardens.

Urban/industrial is here defined as built-up areas containing little or no primary or secondary vegetation. Urban/industrial habitats include cities, ports, mines and industrial zones.

Disturbance	Vegetation type/subtype	Elevation
Primary	Evergreen forest	Lowland Lower montane Upper montane
	Semi-deciduous forest	Lowland Lower montane
	Deciduous forest	Lowland Lower montane
	Coniferous forest	Lower montane Upper montane
	Limestone forest	Lowland Lower montane Upper montane
	Elfin forest	Lower montane Upper montane
	Bamboo	Upper montane
	Natural savanna	Lowland Lower montane
Secondary	Evergreen forest	Lowland Lower montane Upper montane
	Semi-deciduous forest	Lowland Lower montane
	Deciduous forest	Lowland Lower montane
	Coniferous forest	Lower montane Upper montane
	Limestone forest	Lowland Lower montane Upper montane
	Elfin forest	Lower montane Upper montane
	Bamboo	Lowland Lower montane Upper montane
	Grassland	Lowland Lower montane Upper montane

Disturbance	Vegetation type/subtype	Elevation
	Scrub	Lowland Lower montane Upper montane
	Limestone karst without forest	Lowland Lower montane Upper montane
	Plantation forest	Lowland Lower montane Upper montane
	Agricultural land	Lowland Lower montane Upper montane
	Rural habitation	Lowland Lower montane Upper montane
	Urban/industrial	Lowland Lower montane

Notes:

1. Mixed bamboo and timber forest is a subtype of several forest types, often resulting from disturbance. It is not considered separately here.
2. Mixed coniferous and evergreen forest is a naturally occurring subtype of evergreen forest. It is not considered separately here.

Habitat classification for wetland habitats

The Ramsar Convention[3], to which Vietnam is a signatory, provides the most widely accepted definition of a wetland. Ramsar defines wetlands as:

> *'… areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six meters.'*

Wetlands comprise a range of habitat types, and can be broadly divided into freshwater and saltwater wetlands.

Some freshwater wetlands comprise permanent water bodies, such as rivers, lakes, ponds and marshes, and habitats that are dry during certain times of the year, such as *Melaleuca* plantations and seasonally inundated grasslands.

Saltwater wetlands include both marine wetlands, such as shallow coastal bays, and estuarine wetlands, such as mangroves (e.g. those on the Ca Mau peninsular in the Mekong Delta), and tidal mudflats (e.g. those at Xuan Thuy Nature Reserve in the Red River delta).

[3] The full name of this convention is the 'The International Convention on Wetlands of International Importance (especially as waterfowl habitat)'.

Wetlands can either be natural or man-made in nature. Man-made wetlands include reservoirs, rice paddies and irrigation ponds.

The following classification is adapted from Scott (1989).

Freshwater/saltwater	Natural/man-made	Habitat type
Freshwater	Natural	Permanent rivers
		Seasonal rivers
		Permanent streams
		Seasonal streams
		Oxbow lakes and riverine marshes
		Freshwater lakes and associated marshes
		Freshwater ponds (under 8 ha), marshes and swamps
		Seasonally inundated grassland
	Man-made	Canals
		Reservoirs
		Rice paddies
		Flooded arable land
		Melaleuca plantation
Saltwater	Natural	Shallow sea bays and straits
		Estuaries and deltas
		Small offshore islands and islets
		Rocky sea coasts and sea cliffs
		Sea beaches (sand or pebbles)
		Sand dunes
		Intertidal mudflats
		Sand flats
		Natural mangrove swamps
		Natural mangrove forest
		Coastal brackish/saline lagoons
		Salt marshes
		Reed beds
		Sedge beds
	Man-made	Salt pans
		Aquacultural ponds with mangroves
		Aquacultural ponds without mangroves
		Mangrove plantation
		Casuarina equisetifolia plantation

Annex 6: Example financial tables

Example summary cost table

Item	Quantity	Unit Price	Cost
1. Infrastructure Development Programme			**2,669**
Demarcation workshops	3	15	45
Boundary pillars	150	0.5	75
Regulation boards	15	2	30
Headquarters	500 m^2	1.5	750
Guard stations	420 m^2	1.2	504
Road repairs	25 km	2.5	62.5
Car	1	350	350
Motorbikes	10	15	150
Vehicle registration and maintenance			150
Petrol and oil			150
Generator for headquarters	1	15	15
Generators for guard stations	7	7.5	52.5
15W mobile phone	1	10	10
6W mobile phones	10	5	50
Binoculars	10	5	50
Compasses	10	0.5	5
Cameras	2	10	20
Office equipment			200
2. Conservation Protection Programme			**10,883**
Land allocation for protection	13,213 ha	0.27	3,567
Land allocation for regeneration	3,972 ha	0.41	1,628
Reforestation with native species	784 ha	7	5,488
Nurseries	4 ha	50	200
3. Science and Research Programme			**2,600**
Primary assessment	3 yrs	200	600
Studies of Ngoc Linh Ginseng	3 yrs	200	600
Studies of regeneration	3 yrs	100	300
Studies of mammals	3 yrs	100	300
Studies of restricted-range birds	3 yrs	100	300
Training	5 yrs	100	500
4. Education and Awareness Programme			**165**
Materials			100
Camera	1	15	15
TVs	2	5	10
Video recorders	2	5	10
Slide projector	1	15	15
Overhead projector	1	15	15
Total			**16,317**

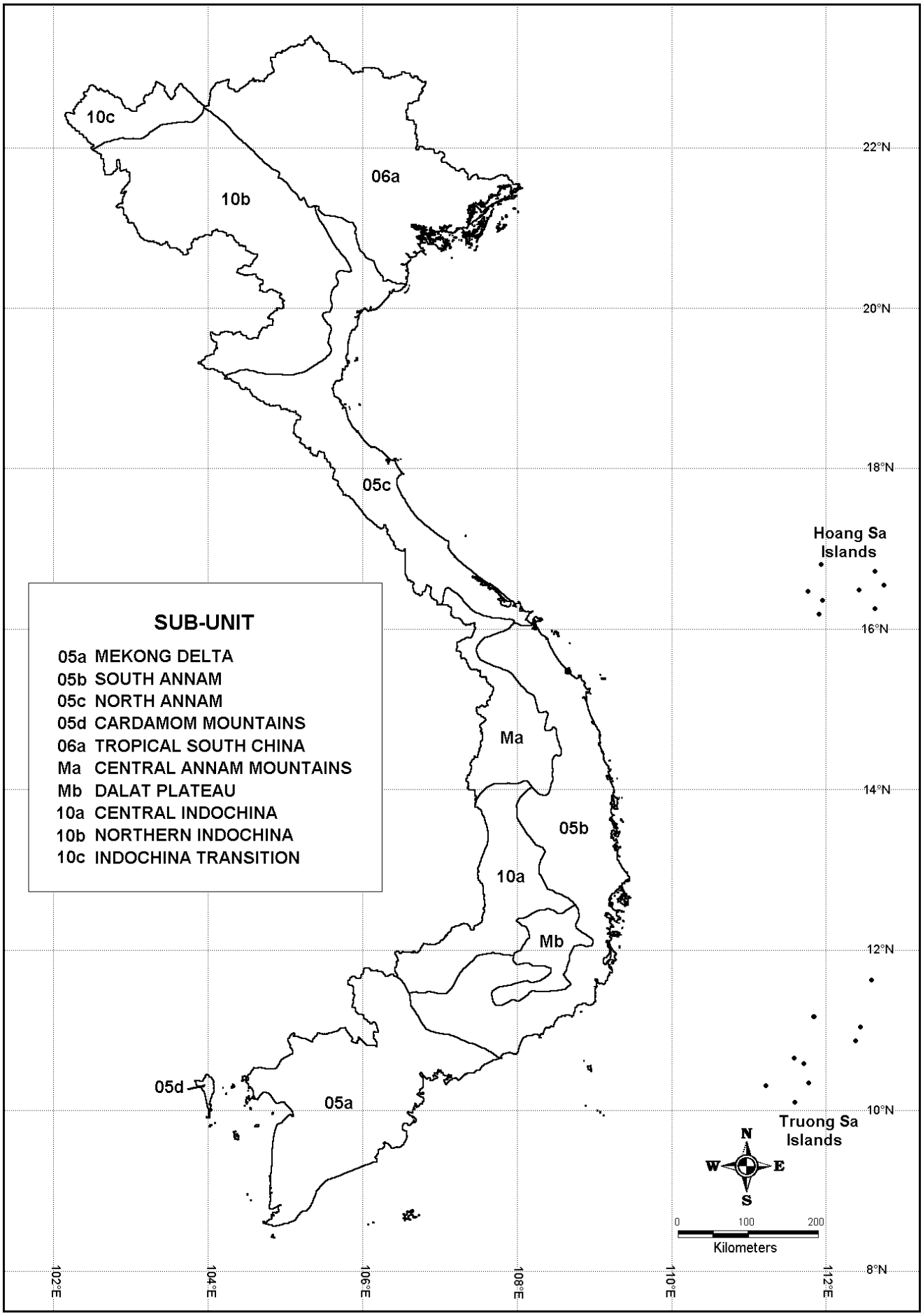
Example disbursement schedule

Item	1999	2000	2001-2003	Total
1. Infrastructure Development Programme	**1,613**	**761**	**295**	**2,669**
Demarcation workshops	45	-	-	45
Boundary pillars	75	-	-	75
Regulation boards	30	-	-	30
Headquarters	450	300	-	750
Guard stations	288	216	-	504
Road repairs	25	37.5	-	62.5
Car	350	-	-	350
Motorbikes	100	50	-	150
Vehicle registration and maintenance	10	35	105	150
Petrol and oil	30	30	90	150
Generator for headquarter	15	-	-	15
Generators for guard stations	30	22.5	-	52.5
15W mobile phone	10	-	-	10
6W mobile phone	50	-	-	50
Binoculars	30	20	-	50
Compasses	5	-	-	5
Cameras	20	-	-	20
Office equipment	50	50	100	200
2. Conservation Protection Programme	**1,282**	**2,450**	**7,151**	**10,883**
Land allocation for protection	925	660	1982	3,567
Land allocation for regeneration	357	318	953	1,628
Reforestation with native species		1,372	4,116	5,488
Nurseries		100	100	200
3. Science and Research Programme	**100**	**300**	**2,200**	**2,600**
Primary assessment			600	600
Studies of Ngoc Linh Ginseng		200	400	600
Studies of regeneration			300	300
Studies of mammals			300	300
Studies of restricted-range birds			300	300
Training	100	100	300	500
4. Education and Awareness Programme	**20**	**55**	**60**	**165**
Materials	20	20	30	50
Equipment		35	30	65
Total	**3,015**	**3,566**	**9,736**	**16,317**

Example investment schedule

Programme	1999	2000	2001-2003	Total
1. Protection	1,613	761	295	2,669
2. Regeneration	1,282	2,450	7,151	10,883
3. Research	100	300	2,200	2,600
4. Education	20	55	90	165
Total	**3,015**	**3,566**	**9,736**	**16,317**

Map 1: The biogeographical sub-units of Vietnam, following MacKinnon (1997)



Map 2: The ecoregions of Vietnam, following Wikramanayake *et al.* (1997)