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Watershed Management in the Lower Mekong Basin

A Component of the Agriculture, Irrigation and Forestry Programme of the Mekong River Commission

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Appraisal Report

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MRC-GTZ Cooperation Programme
Agriculture, Irrigation and Forestry Programme
Watershed Management Component

Watershed Management in the Lower Mekong Basin

Report on the Appraisal Mission

Commissioned by

Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)

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TABLE OF CONTENTS

7 ASSUMPTIONS AND RISKS

Annex:

1 Terms of Reference
2 Agreed Minutes
3 Proposed Target Areas
4 Relevant Programmes and Projects
5 Work programme of the mission and people met
6 List of Documents used

Report on
Catchment Management in Cambodia

For

GTZ Mission Appraising
the Sustainable Land and Water Use Programme of the MRC
(Agriculture, Irrigation and Forestry Programme)

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Phnom Penh, February 2002

Table of Contents

List of Abbreviations and Acronyms

ADB	Asian Development Bank
AIFP	Agriculture, Irrigation and Forestry Programme
CBNRM	Community-Based Natural Resource Management
CCSP	Commune Council Support Project
CD	Community Development
CF	Community Forestry
CDRI	Cambodian Development Resources Institute
CIDSE	Cooperation Internationale pour le Development et la Solidarte
CFNG	Community Forestry Networking Group
CNMC	Cambodian National Mekong Committee
DAALI	Department of Agronomy and Agricultural Land Improvement
DANIDA	Danish International Development Assistance
DCG	General Department of Cadastre and Geography
DFW	Department of Forestry and Wildlife
DLA	Department of Local Administration
DLMUP	General Department of Land Management and Urban Planning
DNCP	Department of Nature Conservation and Protection
DPPR	Department of Planning and Public Relations
DWRMC	Department of Water Resource Management and Conservation
FAO	Food and Agriculture Organization
GTZ	(German Agency for technical Development)
IDRC	International Development Research Centre
IMC	Inter-Ministerial Council
IPRSP	Interim Poverty Reduction Strategy Paper
MAFF	Ministry of Agriculture, Forestry and Fisheries
MIME	Ministry of Industry, Mines and Energy
MLMUPC	Ministry of land Management, Urban Planning and Construction
MOE	Ministry of Environment
MOI	Ministry of Interior
MOP	Ministry of Planning
MRC	Mekong River Commission
MRD	Ministry of Rural Development
MWRM	Ministry of Water Resources and Meteorology
NGO	Non-Government Organization
NRM	Natural Resource Management
NTFP	Non-Timber Forest Products
PLUP	Participatory Land-Use Planning
RECOFTC	Regional Community Forestry Training Center
RGC	Royal Government of Cambodia
RUA	Royal University of Agriculture
SEDP II	Second Socioeconomic Development Plan 2001-2005
SMRP	Sustainable Management of Resources in the Lower Mekong Basin Project
UNDP	United Nations Development Programme
UNOPS	United Nations Office for Project Services
WWF	World Wide Fund for Nature

1. Introduction

Like many developing countries, Cambodia has lost important forest resources over the last three decades. Between 1969 and 1997 the forest cover decline from 73% to 58% of the country areas. This resulted in reduced biodiversity, increased soil erosion, higher river silt levels, and changes to the shape of the Mekong River, Tonle Sap River and Tonle Sap Great Lake, which have contributed in recent years to extensive flooding.

These changes and others have prompted the use of development strategies aimed at both more participatory and broader-scale, integrated planning. One result has been the promotion of catchment/watershed management. Although defined differently by different stakeholders, in this report, catchment/watershed management is a process in which *(1) the focus is on natural resource management in the area of a catchment; (2) participatory planning, implementation and monitoring take place for resource utilization; (3) all major stakeholders are involved; (4) recognized decentralized decision making, transparency, and good governance are guiding principles; and (5) aims at poverty alleviation while maintaining an ecological balance.*

There are many watersheds in Cambodia, existing within the country and crossing its boundaries. This report presents an overview of Catchment-Based Management in Cambodia. It was created based on input from officials and institutions in Phnom Penh (Annex1) and Ratanakiri province (Annex 2) and a review of relevant documents (Annex 3). It identifies the main legal framework and institutions and organizations working with natural resources in catchments in Cambodia and presents a brief analysis of these. It ends with several recommendations for catchment management in Cambodia.

2. National policies, sub-decree and laws relevant to major catchment

The government has many policies that focus on rural development. The main ones involved with catchment based management cover natural resource management and poverty reduction. Furthermore, the government has also committed to uphold a number of international laws, treaties and conventions (See Annex 4).

2.1 Forest resources

In Cambodia, there are different Ministries with jurisdiction of forested land. The bulk of all forested land falls under the jurisdiction of Ministry of Agriculture, Forestry and Fisheries (MAFF). The MAFF/Department of Forestry and Wildlife (DFW) is responsible for all forest land not controlled by other Ministries. The flooded forest is the responsibility of MAFF/Department of Fisheries, and the Ministry of Environment (MOE)/ Department of Nature Conservation and Protection is responsible for the 23 protected areas.

a. Forest policy

There is a lack of a comprehensive national forest policy that builds upon the available forest legislation and is harmonised among major stakeholders. Essential fragments of policies relating to forestry are available in a number of forest sector analysis documents. However the development of a comprehensive national forest policy based upon a consultative policy formulation process including all stakeholders still has to be initiated.
The RGC is committed to developing a comprehensive forest policy framework over the medium-term.

b. Forestry law

The DFW formulated the committee to draft, discuss and revise the forestry law. After the discussion and agreement at the ministerial level it was revised and adopted by the

Council of Ministers in the beginning of August 2001 and submitted to the National Assembly for approval. Ratification is expected at the beginning of 2002 after approval by the Senate and the Constitutional Council.

The Law defines the framework for management, harvesting, use, development and conservation of the forest in the Kingdom of Cambodia. The objective of this law is to ensure for present and future generations, the sustainable development of these forests for their social, economic and environmental benefits, including conservation of biological diversity and cultural heritage.

On Article 10, B of the law said that MAFF shall classify and set boundaries for all forestland within the Permanent Forest Estate. In carrying out this action, MAFF shall coordinate with local communities, authorities, stakeholders, and the MLMUPC and assist in registration of community land title and preparation of the national land use map

c. Law on water resources management
Currently the law on water resources management was drafted and will be discussed soon among the ministry concerned. Like other laws, the law on water resource management and catchment management will be submitted to and discussed at the ministerial level before it is submitted to the National Assembly for endorsement.

The Goal of this law is to develop and enhance the sustainable use of water resources in the Kingdom of Cambodia toward the socio-economic and health development of the people. The law identified: (1) right and duty of the user; (2) main policies for the management of water resources; (3) institution responsible for the execution and implementation of this law; and (4) the participation of the water user communities for sustainable development.

They were unable to supply a recent draft copy in English version.

d. Royal Decree on Watershed Management
The royal decree on watershed management was prepared by the DFW and it was approved on 11 January 1999. This Royal decree aims at protection and management of forests within the watersheds.

e. Sub-Decree on Community Forest Management
With the technical supports from MRC/GTZ-Sustainable Management of Resources Project, Concern Worldwide and the World Bank, since June 2001 a Task Force, including international advisors and law advisors, has been working on the Community Forestry Sub-Decree. Provincial participants from the 14 provinces concerned and from the NGOs Forum participated in a number of discussions. In the meantime, the task force is working and incorporating comments from government, international organizations and NGOs into the sub-decree. It is expected that there will be several more meetings until the sub-decree is finalized.

The objectives of this sub decree include: (1) to implement the forestry law and other legislation regarding community management of forest resources; (2) to define the roles and responsibilities of the government authorities, communities and other stakeholders involved in community forestry management; (3) to establish mechanisms and procedures to enable communities to lawfully manage, use and benefit from forest resources, to preserve their culture, and improve their livelihoods; (4) to determine and ensure access and user rights for communities under a Community Forest Agreement; (5) to continue the implementation of the Royal Government of Cambodia policies of poverty alleviation, decentralization and sustainable management of natural resources; and (6) to provide an

effective means for communities to participate in the rehabilitation, regeneration and conservation of natural resources and biodiversity in Cambodia.

f. Sub-decree on forest concession management
The Sub-decree was prepared by the DFW and was approved by the Prime Minister on 07 February 2000. The Sub-decree gives the process for applying for and approving forest concessions, planning and managing the concessions, and monitoring compliance with laws and regulations.

g. Sub-decree on environmental impact assessment (EIA)
The sub-decree was prepared by the MOE and was approved on 11 July 1999. The purpose of the Sub-decree is to identify the project and activities which need EIA, outline the process for EIA and charges the MOE with evaluating EIA.

h. Law on environmental protection and natural resource management
This law was created by the Ministry of Environment and endorsed in November 1996. The objectives of the this law are: (1) to monitor, stop, reduce the pollution in order to protect and improve the quality of the environment and the people's health; (2) to assess the environmental impact before issuing any government regulations for the proposed projects; (3) to ensure the existing of the conservation, development, management and reasonable and sustainable use of the natural resources in the Kingdom of Cambodia; (4) encourage and make it possible for the people to participate in the environmental protection and natural resource management; and (5) crack down any activities that may have negative impact on the environment.

This law is being implemented within the 23 protected areas of the MOE.

2.2 Land use planning

The Land Law was prepared by the Ministry of Land Management, Urban Planning and Construction (MLMUPC) and endorsed in August 2001. The land law aims to clarify previous legislation governing the use and ownership of land and other natural resources, regulates basic issues of land management and tenure. It provides for legal allocation of user rights to communes and private households or individuals.

With regard to land use, the ministry has been working in cooperation with other ministries such as MAFF, MOE and so on to create a master plan on land demarcation. This will take a longer time than was expected due to lack of equipment, transportation and capability. When the draft master plan on land demarcation is completed, it will need to be discussed with the ministries concerned.

2.3 Agriculture

At this time the agriculture sector is guided by the second Five-Year Socio-Economic Development Plan (2001-2005) and the Agricultural Development Plan (2001-2005). Most policy, laws and sub-decrees are still being formulated. The Agricultural Development Plan for 2001-2005 aims to increase the productivities of the agricultural crops to achieve and secure food security and conserve natural resources.

2.4 Decentralization and devolution

The law on the management of commune governance aims to manage all the communes in the Kingdom of Cambodia according to the decentralization policy. The law was created by the Ministry of the Interior (MOI)/Department of Local Administration (DLA) and assisted by the experts from UNDP, GTZ and Partnership on Local Governance. The first objective

of decentralization is to strengthen democracy, especially at the local level. This means that the leaders of the commune will be elected freely by the people in the commune itself. The people have the right to decide on what to do to develop their commune and they have the right to participate in any commune activities. The second objective is to develop human capacity at the local level with financial and technical support from the Ministry of Interior and other donor agencies for sustainable development.

Currently the MOI/DLA only have the *Law on Commune Administration Management*. In order to fulfil the above objectives the MOI/DLA have been preparing: (1) terms of reference of the commune that need to be approved by the Ministry of Interior; (2) the planning processes for development of communes that have to be joined approved by MOI and Ministry of Planning; and (3) other regulations, Prakas relevant to commune development.

A major vehicle for implementation of decentralization in Cambodia is the Seila programme, a Cambodian government programme, which is a collective undertaking of seven Ministries managed by a national Seila Task Force. A new phase has been approved (2001-2005) and the outputs aim for locally managed infrastructure and services, improved institutions for public sector and community development management and related capacities at provincial and commune levels, and decentralisation policy lessons and statements. (Annex 2)

2.5 Poverty alleviation

The eradication of poverty is the most important item on the agenda of the Royal Government of Cambodia. Guiding this process is the Second (2001-2005) Socio-Economic Development Plans (SEDPII), and the present draft Interim Poverty Reduction Strategy Paper (IPRSP). The RGC Council for Social Development has the coordinating role concerning poverty alleviation.

The SEDPII presents main issues of food security as access to land, lack of physical infrastructure, and different forms of social exclusion. It lays out three development objectives and bases them upon a range of governance reforms. Better governance is to be realized through effective implementation of the Government Action Plan 2001, which includes a section specifically dealing with natural resource management. The objectives are Sustainable Broad Based Economic Growth, Social and Cultural Development, and Sustainable Use of Natural Resources and the Environment.

The IPRSP also places emphasis on good governance as a necessary condition of any sustainable poverty alleviation program. It focuses in three areas: promoting broad-based economic growth and opportunities, creating economic and social security, and strengthening capabilities and generating empowerment.

The *Cambodia Poverty Assessment* put out by the Ministry of Planning lists the issues in rural poverty as low agriculture productivity, inadequate rural infrastructure, poor marketing and distribution and inadequate access to credit and land for the country as a whole. When focusing on the upland areas, the greatest needs are land security and security of tenure of resource, improved health/health care, access to formal/informal education.

RGC and the WFP have been working together for five years researching into poverty and food security to understand the location of the poor and better plan adequate poverty alleviation measures. Maps based on data from three successive Cambodia Socio-Economic Surveys (last in 1999) and the National Population Census 1998 help to target WFP FFW schemes. These maps will guide WFP and RGC in the future. (It should be noted that Ratanikiri, Mondulkiri and Steung Treung provinces fall outside of WFP's priority

areas for 2001-2003. This is due in part to the low population densities and poor infrastructure in the provinces. However, those provinces within the Seila program are eligible for FFW and other WFP activities.)

2.6 Ethnic minority issues

The ethnic minority population is small in Cambodia (less that 2%), but ethnic minority peoples make up the majority of the population in Ratanakiri, Mondulkiri and Steung Treung provinces. The Inter-Ministerial Council (IMC) was set up in the late 90's to oversee ethnic minority development and was supported by the UNDP Highland peoples programme. It produced a draft policy for Ethnic Minority Peoples' development, but the paper was never passed by the Council of Ministers. The UNDP Highland Peoples Programme closed in Cambodia in early 2001, and IMC has remained but is not presently an influential council.

3. Organizations and institutions relevant to catchment management in Cambodia

3.1 Government organizations

Council for the Development of Cambodia
The Council for the Development of Cambodia (CDC) is responsible for making decisions regarding the rehabilitation, development and investment projects in the country. CDC is also responsible for guiding the development of development strategies, coordinating donor support, facilitating inter-ministerial activities, and providing guidance on the utilization of all public and private resources in the country. The CDC is headed by an executive committee that includes the Prime Minister as chairperson. With respect to NRE management, CDC's role as an investment approval body makes the council responsible for ensuring that foreign investment projects follow the Cambodian requirements including environmental procedures.

Cambodia National Mekong Committee
CNMC is under direct supervision of the Council of Ministers. The structure of the CNMC consists of General Secretariat covering 3 departments. They are: Policy and Planning Department, Administration and Finance, and Project Department. The CNMC plays an important role in coordinating between the MRC and the government line agencies concerned. Currently there are 10 ministries that have joined the CNMC as members.

Ministry of Agriculture, Forestry and Fisheries (MAFF)
MAFF is responsible for managing and controlling the exploitation of natural resources within Cambodia's major primary production activities, i.e. agriculture, aqua-culture, fisheries, forestry and wildlife. The ministry consists of consist of 12 departments including the Department of Forestry and Wildlife (DFW) and the Department of Agronomy and Agricultural Land Improvement (DAALI). At the provincial level, the Departments form offices under the Provincial departments of Agriculture, which are accountable to the Provincial Governor, who passes reports on to the MAF. The mandate of the MAFF includes:

- Technology development, which includes dissemination of information to help farmers adopt improved farm technologies and apply new techniques in the management of soil, water and natural vegetation.
- Provision of needed infrastructure such as water supply systems for rural communities and irrigation and flood control systems
- Creation of a positive policy environment that encourages private sector investment
- Provision of agricultural extension services
- Establishment of production zoning

MAFF/Department of Forestry and Wildlife
DFW is divided into 6 offices, 2 companies, and one research institute. A GIS section is under the direct supervision from the Director. A Secretariat for national committee for development and implementation of the forest policy is chaired by the Prime Minister. The Director of DFW is the Executed Secretary. There are over 700 staff members allocated in the offices, companies and research institute. The DFW is responsible for the management of all forest estates not covered by other Ministries and Departments. This includes the majority of forest resources in Cambodia. (The flooded forests are the responsibility of the Department of Fisheries and the MOE manages the 23 protected areas).

MAFF/Department of Agronomy and Agricultural Land Improvement (DAALI)
The primary role of DAALI is to deal with all matters to do with plants in agricultural production and plant cover in agricultural land management and improvement. It has responsibility for all technical and regulatory services concerned with plant production (except rubber and improved pastures) and agricultural land improvement in Cambodia. Its technical and regulatory services relate to Agronomy, Seeds and Plant Production, and Agricultural Land Improvement.

Ministry of Water Resources Management (MWRM)
The RGC has given the missions to the MWRM to conduct and manage the water resources and meteorology in the Kingdom of Cambodia.

The Department of Water Resource Management and Conservation (DWRMC) is one of 9 departments under the General Directorate of Technical Affairs of the Ministry of Water Resources and Meteorology. The DWRMC is responsible for managing and protecting water resources for sustainable use. The DWRMC is made up of 3 offices and consist of 27 staff members working for 3 departments. They are (1) watershed management, (2) water policy and extension, and (3) hydrology and flood control.

On the Viet Nam side of the Se San basin, opposite Rattanakiri province, planning is going on for construction of hydropower dam. An assessment of natural and social environmental impact of the Cambodian side of the Se San River from the border to Veun Say district has been prepared.

Ministry Of Interior (MOI)
There are many departments exist under the MOI, however, the Department of Local Administration (DLA) is the one who responsible for decentralization and creation of commune councils. Therefore, it is important to include this department in catchment management.

Ministry of Land Management, Urban Planning and Construction (MLMUPC)
The MLMUPC consists of a cabinet, the secretariat, a laboratory, a training center and four general departments. The General Department of Land Management and Urban Planning (DLMUP) and the General Department of Cadastre and Geography (DCG) are two actively involved in NRM. The MLMUPC's mandate is quite broad and for rural areas involves:

- studying all activities relating to land management
- implementing the Land Management Policy in cooperation with MRD and other line ministries
- conduct research and make rules and regulations related to land management and allocation
- carry out cadastral surveys and issue land tenure certificates

Ministry Of Environment (MOE)
The MOE is responsible for the 23 protected areas that declared by the Royal Decree. The Department of Nature Conservation and Protection (DNCP) is one of six departments in the MOE. The DNCP located at the MOE in Phnom Penh with field offices in each province. The DNCP is responsible for the management and protection of Cambodia's 23 protected areas.

Ministry Of Planning (MOP)
The Ministry of Planning is responsible for guidance and managing socio-economic development planning and statistics in the Kingdom of Cambodia. Its responsibilities include

- formulating concepts, strategies and policies and determining priorities for national development
- Preparing long, medium and short term plans and national programmes by coordinating with all relevant Ministries/Institutions

Ministry of Rural Development (MRD)
MRD consists of 3 general departments, 8 departments, a financial control unit and Cabinet advisors. There are Departments of Rural Development at the provincial level and District Offices at the district level. At the local level MRD is represented by Commune Development Committees and Village Development Committees.

MRD's mandate is to:

- coordinate, implement, monitor and evaluate rural development programmes and projects
- coordinate the operational efforts of Line Ministries and assistance programmes at the provincial level
- undertake research initiatives to develop rural areas of Cambodia

Ministry of Health

- responsible for provide health services

Ministry of Education

- responsible for provide educational services

Ministry of Public Works

- responsible for infrastructure development

3.2 Multi-lateral and bi-lateral donors:

A number of donors are active in the areas involved with Catchment management. They are:

Asian Development Bank

- supported to the Cambodian Forest Sustainable Forest Management project
- support to wetlands project in Tonle Sap area
- support to MRD to implement the Northeast Village Development Project
- support to community based fisheries and buffer-zone management in ream National Park

Belgian Government

- support to the FAO project in Siem Reap
- support to community development in Kampong Cham province

Danish Government/DANIDA

- support to MRC's Wetlands Inventory Project and Fisheries Management Project
- support to environment and natural resource management in coastal and wetland areas

European Union

- support to rural development in six provinces through PRASAC II

FAO

- support to Tonle Sap programme, Biodiversity Action Plan, Integrated Pest Management and food security projects

German Government

- support to SMRP
- a forestry extension project
- rural development in Kampot and Kampong Thom provinces
- support to Cambodian-German Forestry Project

Swiss Government

- support to watershed classification project which was executed by the MRC and implemented in the 4 riparian countries.

UNDP/UNOPS

- manager of trust fund for "forest Crimes Monitoring Project"
- ,manager for GEF funds for biodiversity activities
- support to Seila programme

The World Bank

- support to forestry sector to implement a community-managed forestry demonstration project in a degraded concession in Kampot province
- provide loan for the RGC to demonstrate of Forest Concession Management and Control Pilot Project
- support to MLMUPC and a land management project
- support to implement the Agricultural Productivity Improvement project of the MAFF
- Provide loan for a biodiversity project in Virachey National Park in Ratanakiri Province

3.3 Non-Government Organizations:

A number of International and Cambodian NGOs are active in rural development in Cambodia. The most important and their relevant activities are listed below.

CIDSE – Commune Council Support Project (CCSP), Community Development in Ratanakiri
Concern Worldwide – Community Forestry Programme, PLUP, CCSP
NGO Forum – Environmental Working Group,
NGO network in Ratanakiri – coalition of NGOs working in Ratanakiri province
NTFP – Cambodian NGO with many projects in Ratanakiri
Oxfam America – Inland Aquatic Resources/Livelihoods and the Land Study Projects, CBNRM,
Oxfam GB – Cambodia Land Study Project, CCSP
RECOFT – support to Cambodia Community Forestry Training Team and PLUP
World Wide Fund for Nature – Community-Based NRM and other projects

3.4 Research Organizations:

Several institutes and organizations undertake research on NRM in Cambodia.

- DFW/Research Institute for Forests and Wildlife
- MAFF/Royal University for Agriculture
- Royal University of Phnom Penh
- Cambodian Development Research Institute
- IDRC – Many projects in NE Cambodia

3.5 Networks active in the NRM sector

The Community Forestry Networking Group (CFNG):
CFNG was established during the CEMP Project and continues to meet every 3 months. It provides a forum to organizations and individuals interested in CF to share experiences. It is coordinated by Concern Worldwide.

Sub-Group on Natural Resources:
This group is made up of the major donor organizations and NGOs, and meets regularly. Previously it monitored progress made and set benchmarks for the development of the necessary framework for reform of the forestry sector. Since August of 2000 its mandate covers monitoring and supporting development of all natural resources.

Environment Working Group of the NGO Forum:
This working group is made of concerned NGOs and individuals and meets monthly at the NGO Forum to share information on environmental issues and deal with environmental advocacy issues.

4. List and inventory of selected watersheds in Cambodia.

Several important watersheds have their outlets in Cambodia and their headwaters in other countries, while many others are wholly within Cambodia. The RGC has been working with MRC and others in promoting watershed/catchment management projects and programs to manage and protect these watersheds. Selection of watersheds for activities has created a range of principles and criteria to guide the selection process (See Annex 3). The principles and criteria cover most aspects of poverty alleviation and natural resources management, as well as several related dimensions such as cross-border contexts, ethnic minorities, and local government and community interest and capacity.

The watersheds selected for consideration for activity implementation in these projects/programmes included:

- Stung Se San
- Stung Se Kong
- Stung Sre Pok
- Stung Mongkol Borey
- Stung Pursat
- Stung Sreng
- Stung Sen

The detailed information may be referred to Figure 1 and Table 1 (Also See Annex 4).

Key criteria for selection of watersheds for Catchment Management activities in this analysis will remain those of the AIFP, and put priority on:

- Trans-boundary areas
- Presence or high probability of environmental and/or social stress
- Poverty alleviation
- CBNRM (land tenure, resource rights, sustainable forest management)
- Environmental issues such as biodiversity
- Local government and community interest and capacity

Of the seven watersheds previously identified by RGC, only four represent support for the cross-boundary criteria: Stung Se San, Stung Se Kong, Stung Mongkol Borey and Stung Sre Pok. Mongkol Borey and the Se San rivers have the highest local capacity for catchment planning, many local partners, and are scheduled to have Seila/DANIDA support soon subject to the availability of funds. The catchment of Pursat rivers was also to have schedule for Seila/DANIDA support. The three watersheds in the NE of the country (Se San, Se Kong, Sre Pok) are the most remote, and are facing serious situations with regard to protecting and preserving biodiversity. The Se San, while being targeted for ADB support, is experiencing serious environmental effects blamed by some stakeholderson cross-border hydro-power generation.

Table 1: Description of Watersheds						
1 Stung Sen (72)	**2 Stung Pursat (70)**	**Stung Mongkol Borey (69)**	**Stung Sreng (74)**	**Stung Se Kong (52)**	**Stung Se San (59)**	**Stung Sre Pok (78)**
Total area: 16360 sq. km. Cambodia: 100% <u>Provinces:</u> Preah Vihear 63%, Kampong Thum 28%, Siem Reap 6%, Otdar Mean Chey 2%, Kampong Chhnang 1%	Total area: 5965 sq. km. Cambodia: 100% <u>Provinces:</u> Pursat: 100%	Total area: 14966 sq. km. Cambodia: 73% Thailand: 27% <u>Provinces:</u> Banteay Mean Chey 37%, Battambang 30%, Krong Palin 5%, and Otdar Mean Chey 1%	Total area: 9986 sq. km. Cambodia: 99% Thailand: 1% <u>Provinces:</u> 48% Otdar Mean Chey, 45% Siem Reap, 6% Banteay Mean Chey, and 1% Battambang	Total area: 28815 sq. km. Cambodia: 19% Lao PDR: 78% Vietnam: 3% <u>Provinces:</u> 19% Steung Treung and 1% Ratanakiri	Total area: 18888 Cambodia: 40% Vietnam: 60% <u>Provinces:</u> 35% Ratanakiri and 5% Stueng Treung	Total area: 30942 sq. km. Cambodia: 41% Vietnam: 59% <u>Provinces:</u> 21% Mondulkiri, 16%Ratanakiri, 4% Steung Trueng, and 0% Kracheh
River outlet: 5 MaS High Point: 802 MaS Majority between: 5-100 <1% of area critical concerning the risk of soil erosion	River outlet: 5 MaS High Piont: 1700 Mas Majority between: 5-300 <1% of area critical concerning the risk of soil erosion	River outlet: 10 MaS High Piont: 510 MaS Majority between: 100-200 < 1% of area critical concerning the risk of soil erosion	River outlet: 5 MaS High Piont: 671 MaS Majority between: 5-100 < 1% of area critical concerning the risk of soil erosion	River outlet: 46 MaS High Piont: 2174 MaS Majority between: ND 11% of area critical concerning the risk of soil erosion	River outlet: 46 MaS High Piont: 2397 MaS Majority between: 100-800 11% of area critical concerning the risk of soil erosion	River outlet: 46 MaS High Piont: 2145 MaS Majority between: 100-500 3.2% of area critical concerning the risk of soil erosion
Agriculture./grassland: 14% Shrubs/forestland: 85%	Agriculture./grassland: 18% Shrubs/forestland: 82%	Agriculture./grassland: 54% Shrubs/forestland: 46%	Agriculture./grassland: 29% Shrubs/forestland: 71%	Agriculture./grassland: 9% Shrubs/forestland: 91%	Agriculture./grassland: 23% Shrubs/forestland: 75%	Agriculture./grassland: 22% Shrubs/forestland: 78%
Protected areas: Cambodia: 27.9%	Protected areas: Cambodia: 26.3%	Protected areas: Cambodia: 18% Thailand: 2%	Protected areas: Cambodia: 11.7%	Protected areas: Cambodia: 3.8% Lao PDR: 18% Vietnam: 1.5%	Protected areas: Cambodia: 9% Vietnam: 11%	Protected areas: Cambodia: 12.4% Vietnam: 18%
Communes: ND Villages: 457 Population 97: 319,291 Density: 20p/sq. km.	Communes: 27 Villages: 260 Population 97: 177,912 Density: 30p/sq. km.	Communes: 80 Villages: ND Population 97: 903,846 Density: 80p/sq.km.	Communes: 65 Villages: 450 Population 97: 316,144 Density: 31p/sq.km.	Communes: ND Villages: 600 Population 97: 197,090 Density: 7p/sq. km.	Communes: 38 Villages: 164 Population 97: 57,695 Density: 3p/sq. km.	Communes: ND Villages: 146 Population 97: 61,443 Density: 2p/sq. km.
Opportunities: Single province watershed Reduced extension Potential for ecotourism Potential for CB forestry Potential for CB fisheries	Opportunities: Single province watershed Reduced extension Potential for ecotourism Cardamoms wildlife reserve Potential for CB forestry Potential for CB fisheries Endangered species	Opportunities: Fast growing economy Cooperation w/Thailand Emerging entrepreneurship Potential for ecotourism Potential for CB forestry Major National relevance Well established LUPU	Opportunities: Interaction up-low lands Potential for CB forestry Potential for CB fisheries RAMSAR zone Articulation with Angkhor tourism zone	Opportunities: Intense NRE activities WB support to Virachey NP	Opportunities: Intense NRE activity Abundance of partners WB support to Virachey NP Strong LUMU Developing ecotourism CBNRM: a reality	Opportunities: Intense NRE activities GTZ, UNDP active in area
Challenges: Coordinate four provinces Important wildlife trade Important logging Land grabbing	Challenges: Shifting cultivation Important wildlife trade Erosion/floods No pre-existing land use unit Important logging Land grabbing	Challenges: Coordinate three provinces Pailin economic integration Important watershed size No access to Tonle Sap Little prior NRE experience Main rice zone Land Grabbing Population density	Challenges: OTD.M. weakness No LUPU capacity Hydropower project Intense deforestation Illegal logging	Challenges: Important wildlife trade Shifting cultivation Isolation from the national level Lack of regional strategy Important logging Few Partners	Challenges: Cooperation w/Vietnam Concession vs. Tribe's rights Shifting cultivation Intense land grabbing Isolation from the national level Lack of regional strategy Important wildlife trade Important logging	Challenges: Concession vs. Tribe's rights Shifting cultivation Intense land grabbing Isolation from the national level Lack of regional strategy Important wildlife trade Important logging Few Partners

5. Prioritised policies and organisations for catchment management in Cambodia

Catchment management planning is an interdisciplinary activity that provides a rational basis for optimising the use of the resources of the watershed for the local communities in the area and for the country as a whole. With the focus on natural resource management in the area of a catchment, those policies that directly affect and those institutions that have direct responsibility to manage the forests and wildlife, water, and other natural resources are selected as most important.

5.1 Guiding policies, laws and sub-decrees

5.1.1 Guiding policies, laws and sub-decrees

- forestry policy (under revision, draft is not available)
- forestry law
- land law
- law on water resources management and catchment management (draft)
- royal decree on watershed management
- sub-decree on community forest management
- sub-decree on forest concession management
- law on environment protection and natural resource management
- sub-decree on environmental impact assessment

5.1.2 Relevant policy

- law of commune administrative management
- action program for development of agriculture in Cambodia 2001 - 2010
- agricultural development plan 2001 - 2005

5.1.3 Within framework policies

- RGC Second Five Year Socioeconomic Development Plan 2001-2005
- Interim Poverty Reduction Strategy Paper

Because many policies, laws and rules and regulations are in draft stages and many policies and laws already passes await more legislation before they can be implemented. These two documents are important guides for all development work.

5.2 Government Partners/Organization

5.2.1 Essential

CNMC
MAFF/DFW
MWRM/DWRMC
MLMUPC/GDLMUP & GDCG
MOE/DNCP

5.2.2 Wanted

MOI
MIME
MAFF/DAALI
MRD
MOP

5.2.3 Observed

Cambodian Development Council
MOE
MOH
MPW
RUA

6. Conclusions and Recommendations

The main conclusion the authors reached is that catchment management as a concept is somewhat to very well understood at local levels, but its meaning becomes more varied and is more difficult to clarify at the large watershed and trans-boundary watershed levels. At this time in Cambodia, there are many activities promoting locally based planning which integrate NRM issues into the planning process, and RGC has plans to spread such activities nationwide. But, as the scale of planning increases, political planning boundaries dominate those of watersheds.

When development activities are community-based or require the participation of the resource users, there is a need for watershed management that focuses on more that the management of natural resources. Non-formal and formal education, health, income generation and so on are interrelated with CBNRM. Thus, linking with and supporting, where possible, efforts in other sectors of development is needed.

With limited government and community capacity and resources, greater skills and knowledge are needed at all levels to support development. This is especially true regarding newer planning approaches such as catchment-based planning and management. However, the activities that support these catchment-based approaches should learn from and add to a large number of ongoing programmes and projects already working in CBNRM.

The main recommendations are:

- To work in one or all of the watersheds in the NE of Cambodia: Se San. Se Kong, Sre Pok.
- To collaborate or network with all government and non-government partners in the watershed.
- To build on and support ongoing programmes and projects that support increasing participation and community-based user access to the resource base.
- To provide appropriate skills and knowledge to strengthen local governance and planning capacity.
- To continue spreading awareness of the Watershed/Catchment Management concept at all levels.

Annex 1: List of persons met

Name	Position	Organization & Address	3 Contact
Mr. Pich Dun, Mr. An Pich Hatda, Mr. Heng Phearith, Mr. Ou Sophana, Mr. Watt Botkosal	Director of the Department Focal point BDP National Env. Program Coordinator Technical staff Focal Point for MRC-SMRP Program	Cambodia National Mekong Committee St. Mao Tse Toung Phnom Penh	Tel. 855 23 218506 **4** HP. 855 11 871387
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Mr. Hoy Sythikun Mr. Ouk Touch	Deputy Director	MOP/ Department of Economic Planning	
Mr. Pich Sam Ang Mr. Nhep Phan,	Director Deputy Director	MRD/ Department of Planning and Public Relation	
Mr. Am Norin	Deputy Director	MWRM/ Department of	

		Watershed Management and Conservation	
Mr. Lars Lund Mr. Loeung Kesaro	Natural Resource Programme Coordinator Programme Officer	DANIDA/ CDC Government Palace Sisowath Quay P.O.Box 877 Phnom Penh	Tel. 855 23 981 197 HP. 855 12 961 583 Email. Nre_coor@bigpond.com.kh
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Mr. Scott Leiper	Program Manager	UNOPS Seila Program Partnership for local Governance CDC Building "E" Government Palace Sisowath Quay P.O.Box 877 Phnom Penh	HP. 855 12 830 288 Tel. 855 23 362 175 855 23 361 900 Fax. 855 23 210 569
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Mr. Toby Carson Mr. Marc Giochot	Technical Advisor CBNRM Regional Advisor	WWF #28, street 9 Tonle basac P.O Box. 2467 Phnom Penh	HP. 855 16 828 528 Tel. 855 23 218 034 Fax. 855 23 218 909 Email. tobyc@bigpond.com.kh
Dr. Hans Helmrich, Mr. Michael Gluck, Mr. Min Bunnera	Chief Technical Advisor Technical Advisor Liaison Officer for Cambodia	MRC/SMRP/GTZ #92 St 63 P.O.Box 1690 Phnom Penh	Tel. 855 23 212 494 Email: mrcgtzhh@bigpond.com.kh

Annex 2 - Summary of Field Trip to Ratanakiri

Mr. Min Bunnara and Mr. Ken Irwin flew to Ratanakiri province on January 10. That afternoon they met at the Seila office with Mr. Sang Polrith, Mr. Nhem Sovanna and Mr. Ashish Joshia Ingty John. That evening at dinner they again met with these people and were joined by Mr. Graham Brown, Mr. Gordon Patterson and Mr. Jeremy.

The next morning they met with Mr. Kham Khoen, the First Governor of Ratanakiri. That afternoon they met with representatives from all department at the weekly Provincial Rural Development meeting, and received input from Mr. Hor Hong, Director of the Ratanakiri Provincial Department of Environment and Mr. Yat Sokhan, Director of the Ratanakiri Provincial Department of Planning. The meetings all went well.

During this short trip to Ratanakiri, the team learned the issues, activities, and government/NGO capacity, and mechanisms for and benefits from cross-border cooperation, and the understanding of the watershed/catchment management. Most issues revolve around NRM. Important trans-boundary issues include illegal trade in NTFP and wildlife, flooding, and water quality. The Provincial government/Seila and several NGOs have several programs building capacity at all levels (village to provincial), increasing awareness of NRM issues (including health and education), improving local governance, and improving local planning skills and processes. In most areas, capacity for NRM, governance and communication is limited, as is the number of personnel to carry out effective government services and training needs.

There is a road link between Vietnam and Cambodia with a locally significant amount of trade crossing it. Ratanakiri is part of the “Triangle Development Region” along with the bordering Provinces in Vietnam and Lao PDR. They will meet in February 2002 to share their 5-year development plans and explore opportunities for cooperation to boost the region as a whole.

Watershed/catchment issues and planning are understood at local levels, but there is less understanding as the size of the catchment increases to the size of the Se San or Sre Pok. Increasing this understanding along with capacity building activities to improve local planning and governance would be welcome, as well as more trans-boundary exchange of information and experiences.

Annex 3: List Of All Used Documents

ADB, **Se Kong – Se San and Nam Theun River Basins Hydropower Study: Final Report: Volume 1 – Main Report**, (excerpts only) July 1999

ADB, **Se Kong – Se San and Nam Theun River Basins Hydropower Study: Final Report: Volume 2 – Technical Data, Surveys and Analysis**, July 1999

ADB, **Se Kong – Se San and Nam Theun River Basins Hydropower Study: Final Report: Volume 4 – Environmental and Social Aspects Report**, July 1999

ADB, RETA 5771 (Phase I), **A Review of National Social Policies**, by John Dennis, (no date)

ADB, RETA 5771 (Phase I), **A Review of Policies and Institutions Related to Management of Upper Watershed Catchments: Cambodia**, by Esa Puustjarvi, (no date)

ADB, RETA 5771 (Phase II) – **Final Report: A Proposal for Project Interventions: Se San – Cambodia,** March, 2001

ADB, RETA 5771 (Phase II) – **Final Report: Project Progress, Achievements and Conclusions,** March, 2001

Commune Council Support Project (CCSP), **Promoting Pro-Poor Local Governance**, Two Year Project Proposal, July 2001 – June 2003,

Commune Council Support Project, **Decentralization, *A Review of Literature***, by David Ayres, Aug. 2001.

CRES, **Study Into Impact of Yali Falls Dam on Resettled and Downstream Communities**, Center for Natural Resources and Environmental Studies (CRES), Vietnam National University, Feb. 2001

DANIDA, **Project Document for National Capacity Development – Cambodia**, Jan. 2001

DANIDA, **Programme Document (2001-2005) for Natural Resource and Environment Programme – Cambodia**, March 2001

Electricity of Vietnam, **Hydrodynamic Modeling of Se San River: Tentative Terms of Reference**, May 2001

Gartner, Dr. Joseph A., ***Mandate of the Department of Agronomy and Agricultural Land Improvement***, Agricultural Productivity Improvement Project, April 2001

GTZ**, Review of the GTZ/MRC Sustainable Management of Resources in the Lower Mekong Basin Project (SMRP), Cambodia Report.**, Prepared by Danny Harvey, Khieu Borin and Ken Serey Rotha, Dec. 2001

GTZ, **Review of the GTZ/MRC Sustainable Management of Resources in the Lower Mekong Basin Project (SMRP**): Cambodia Report on the 2nd Phase: Nov. 1998 – Aug. 2001, Oct. 10, 2000, by Noelle O'Brien, Khieu Borin and Chin Chharom

Hasselskog, Malin et.al., **Addressing Anarchy: Decentralization and Natural Resources Management in Ratanakiri Province, Upland Cambodia**, June 2001

McKenney, Bruce, **Economic Valuation of Livelihood Income Losses and Other Tangible Downstream Impacts from the Yali Falls Dam to the Se San River Basin in Ratanakiri Province, Cambodia**, Jan. 2001

MRC, **Agriculture, Irrigation and Forestry Programme for 2001-2005, Sustainable Land and Water Use for Basin Health and People**, Dec 2000

MRC, **Watershed Directory** (on CD Rom),

MRC, **Project Document: Basin Development Plan**, May 2000

MRC, **Long-Term Environmental Programme 2001-2005, Main Document**, Oct. 1998

MRC, **Existing Institutional Legal and Policy Structure for Wetlands Management in Cambodia**, www.mekong.info, (no date)

MRC, **Strategic Plan 2001-2005 (Summary version),** April, 2001

MRC, **Strategy Study on the Development of the Watershed Management/Forestry Sector in the Lower Mekong Basin: Strategy and Action Plan**, Jan. 2000

Oxfam America, **The Voice of the Mekong: The southeast asia Regional program 1999-2004**, (Aug. 1999)

Oxfam America, **The Oxfam Mekong Initiative 2001-2003**, (no date)

RGC, **Action Program for Development of Agriculture in Cambodia 2001-2010**, MAFF, Dept. of Planning, Statistics and International Cooperation,

RGC, **Agriculture Development Plan 2001-2005**, MAFF, Dept. of Planning, Statistics and International Cooperation,

RGC, **A Poverty Profile of Cambodia 1999**, Min. of Planning,

RGC, **Cambodia National Environmental Action Plan 1998-2002**, Jan. 1998

RGC, **Community Forestry Guidelines**, ADB Sustainable Forestry Management Project TA-3152-CAM. June 2000

RGC, **Cambodia Poverty Assessment**, Min. of Planning, Dec. 1999

RGC, **Integration and Competitiveness Study – Part A: Overview** (DRAFT!) (A pilot study prepared under the Integrated Framework for Technical assistance Program of the world trade Organization, the International Monetary Fund, the International Trade Centre, United nations Development program, United Nations Conference for trade and development and the World Bank) – work in progress, 9, Oct. 2001

RGC, **Interim Poverty Reduction Strategy Paper**, Phnom Penh, Oct. 2000

RGC, **National Workshop – Formulation of the 2002 Seila Program Support Work Plan and Budget**, Council for the Development of Cambodia, Nov. 2001

RGC, **Poverty Monitoring and Assessment for Informed Dialogue and Decision Making in Cambodia – Principles, Diagnostic, and Recommendations**, Report prepared by IDEA International, Canada, and UNDP/Bureau for Development Policy, New York, April 2001

RGC, **Ratanakiri Seila Work Plan and Budget 2002**, by PRDC Ratanakiri, Jan. 2002

RGC, **Second Five Year Socioeconomic Development Plan 2001-2005**, Min. of Planning

RGC, **SEILA Program Document 2001-2005**, (SEILA Task Force), Dec. 2000

RGC, **SEILA Programme 2001-2005**, (SEILA Task Force), May 2000

RGC, **Seila Natural Resource and Environment Management Mainstreaming Strategy 2002-2005,** (Seila task Force), Nov. 2001

RGC, **The SEILA Programme of the Royal Government of Cambodia – Management Structure Roles and Responsibilities**, Dec. 1999

RGC, **Sub-Decrees, PRAKASs (Regulations) and Decisions of the SEILA Programme**, Aug. 2000

Romeo, Leonardo, ***The SEILA Program and Decentralized Planning in Cambodia***, March 2000

UNDP, **Project Document for CMB/01/007 – Partnership for Local Governance (UN Donor to Seila Programme),** July 2001 – 31 Dec. 2005

World Food Programme, (cooperation with Min. of Planning and PNDP) **Identifying Poor areas in Cambodia: Combining Census and Socio-Economic Survey Data to Trace the Spatial Dimensions of Poverty**, Feb. 2001

World Wide Fund for Nature, **Conservation Programme in Cambodia**, Oct 2000

World Wide Fund for Nature, **Virachey National Park, Ratanakiri and Stung Treng Provinces, Cambodia**, 2000

World Wide Fund for Nature (and Oxfam America and IDRC), **Project Profile of CBRNM Case Study and Networking Initiative**, July 2001

World Wide Fund for Nature (and Asia Foundation), **Resource Rights and Participatory Planning (RRaPP) Project,**

World Wide Fund for Nature, **The Forests of the Lower Mekong Ecoregion Complex**, Sept. 2001

Annex 4: International Laws, Treaties and Conventions

Cambodia is a signatory to a number of international laws, treaties and conventions. Many have only been recently signed. Those that relate to natural resources management and environmental protection include:

- Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin (MRC) (1995)
- Convention on Biological Diversity (CBD) (1995)
- International Tropical Timber Agreement (ITTA) (1995)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1977, first signed in 1973)
- Framework Convention on Climate Change (FCCC) (1996)
- The Convention on Wetlands of International Importance (Ramsar Convention) (1999)
- International Convention to Combat Desertification (CCD) (1994)
- Convention concerning the protection of the world cultural and natural heritage (1992)
- International Convention for the Prevention of Pollution by Dumping of Wastes and other Matter (MARPOL) (1994 and later additions)

Annex 5: Overview of Seila Programme

RGC, SEILA Programme 2001-2005, (SEILA Task Force), May 2000
RGC has reaffirmed SEILA's identity as a *Cambodian program for institutional strengthening of local authorities within the context of the decentralization and decentralisation strategies adopted by the Royal government of Cambodia.*

The Seila program is an approach to improved local governance as the key to achieving sustainable poverty alleviation in Cambodia. It is a collective undertaking by seven national ministries most directly concerned with local/rural development and the development of decentralisation policy (MOEF, MOP, MOI, MRD, MWVA, MAFF, AND MWRM). These ministries comprise a national 'Seila Task Force' (STF) which is supported by a Technical Secretariat in the Council for Development of Cambodia. The STF is responsibly to provide policy guidance and overall supervision of program implementation.

Seila is
- a local development program for poverty alleviation
- a program for institutional strengthening; and
- a decentralization and deconcentration policy experiment

The programs activities are grouped into program components: decentralized financing system, decentralized and participatory planning system, decentralized management supervision and support to commune authorities and a decentralized monitoring, evaluation and information system.

The outputs aimed for in this phase include locally managed infrastructure and services, improved institutions for public sector and community development management and related capacities at provincial and commune levels, and decentralisation policy lessons and statements.

RGC, The SEILA Programme of the Royal Government of Cambodia – Management Structure Roles and responsibilities, 10, Dec. 1999

From village-level to STF-level, roles and responsibilities

Romeo, Leonardo, The SEILA Program and Decentralized planning in Cambodia, March 2000

SEILA had to experiment at its beginning since Cambodia had no decentralization policy.

It treated CDCs as equivalents of Commune Councils and PRDCs as equivalents of Executive Committees.

Seila set up decentralized Financial, Planning, Management and Capacity Building, and Monitoring and Evaluation Systems

Seila has experimented with the institutions of sub-national planning including:
- the organizational set-up of the planning system;
- the instruments; and
- the process.

The Organizational Structure
The Seila programme has channeled resources and assigned overall development planning and management responsibilities at the provincial and commune levels. The Provincial Rural Development committee (PRDC) and the Commune Development

committee (CDC) act as both 'planning authorities' and consultative/participatory 'planning platforms'.

The PRDC is chaired by the Governor and includes representatives from all provincial departments, and from lower level District Development Committees (DDC). It is responsible for approving Provincial Development Plans (PDP) and Provincial Development Investment Programmes (PDIP), formulated through the provincial planning process led by the Provincial Department of Planning. Following approval of the PDIP, an Executive Committee (chaired by the Governor and including the Deputy Governor and the Provincial Department Directors of Rural Development, Finance, Women and Veteran's Affairs, Planning and Agriculture) is responsible for execution of the provincial investment programmes that are financed through decentralized resource transfers to the province. The task of providing planning, facilitation and technical support services from the Provinces to Communes is carried out by a unit of the Executive Committee: the "Local Capacity Building Unit" (LCBU). The LCBU includes both province and commune facilitation teams of local planners and community development workers and a technical support services group of rural engineering technicians.

The CDC is chaired, in most cases, by the Commune Chief and includes as members one man and one woman from each village in the Commune who are elected to the Village Development Committees (VDC) and serve as village representatives at commune level. The CDC allocates and manages SEILA resources through a development planning and implementation process that involves the VDC in data gathering and validation, project identification and priorities setting, and project implementation and monitoring.

The integration of the province and commune-level planning processes is effected through annual district-level workshops. These consultation and negotiation forums, facilitate the flow of information between commune authorities, provincial line departments and development NGOs active in the provinces. They allow them to interact and to adjust their respective programmes to better implement provincial development strategies and better respond to the demands emerging in the commune planning exercises.

The organizational set-up of the SEILA planning system may have to change or adjust, as an effect of the decentralization reforms. To the extent that decentralization advances in Cambodia, the "planning authority" role will have to shift from the PRDC and CDC to the Provincial Administrations and Commune Councils respectively. Nevertheless, PDRC and CDC (or similar with different names, if necessary for clarity of purposes) will have to maintain and strengthen their character of consultative/participatory platforms for sub-national planning. They should remain the instruments for broad-based preparation, and recommendation to the planning authorities, of local plans, programs and budgets. The process of resource allocation will need to be strengthened under the guidance of the Provincial Department of Planning (PDOP), consistent with its institutional mandate. Also, the central government will have to clarify to which extent and how it intends to assume responsibility for support and supervision of the emerging commune councils. This may then require that adjustments be made to the current arrangements, in order to secure an institutionally sustainable way of providing the planning facilitation and technical support services currently managed by the LCBU under supervision of the Provincial Director of Rural Development.

The instruments Seila uses are:
A five-year Provincial Development Plan
A 3-year Rolling Provincial Development Investment Programme
An annual SEILA Investment Programme
A 3-year Commune Development Plan
An annual Commune Investment Plan

The Provincial Planning Process
8 step process for 5-year PDP
National guidelines -> Provincial guidelines -> PRDC meeting and sector guidelines -> Sectoral planning workshops -> Draft PDP -> PDRC approval -> PDP dissemination -> PDP evaluation.
8 step process for 3-year rolling PDIP.
National guidelines -> Provincial guidelines -> PDRC meeting/sectoral guidelines ->Focal Points training and Sectoral Planning Workshops -> District integration workshops -> provincial Investment Resources allocation -> Draft PDIP -> PRDC approval

The Local (Commune-level) Planning Process (LPP)
LPP process
LPP orientation -> Identify village-level priorities -> Formulate commune development plan -> District integration workshops -> Formulation of the commune investment plan (CIP)
CIP Process
Review of CIP achievements -> Review of village-level priorities -> Review of commune-level priorities -> District integration workshop ->Annual CIP formulation

As the planning has developed, it has evolved to where the communes are main planning units and village plans are no longer prepared. Seila also dropped PRAs for quicker village-level surveys and participatory data analysis and validation (village data book) and links provincial and commune investment programs via district integration workshops.

The author's assessment:
- National government levels still quite centralized
- Decentralized financing needs to be added to make decentralized planning work
- Seila planning procedures were not conceived as "what provinces and communes should do" to access a specific source of funds and allocate its resources. Rather, they were designed and implemented to provide a unified framework for the investment of resources from a variety of governmental and non-governmental sources and to be institutionalized as local-level statutory planning procedures.
- there is not enough attention paid to helping provincial and district level administrations abandon the hierarchical controls of the past and learn how to provide the necessary support (facilitation and technical services) to the emerging local authorities.

The author recommends (1) incorporating Seila planning procedures into wider framework for public expenditures management and (2) their institutionalization as statutory procedures at the sub-national level.

Annex 6: Review of Previous Catchment Management Selection Activities

A number of catchments, both trans-boundary and within Cambodia, have been identified by MRC, RGC and two donors as potential sites for catchment management activities. What follows is a review of these selection principles and criteria.

A. MRC's "*Agriculture, Irrigation and Forestry Programme for 2001-2005*" (Dec. 2000) lists three tests, all of which need to be satisfied, for activities to be taken by MRC. All activities must have:

- Some significant *basin-wide implication* that is not being adequately covered under other bilateral/national programmes in the basin.
- *National Priority,* that is at least one country and an appropriate institution (public or private) must want the activity to be undertaken for a national purpose.
- *A relevance to the MRC mission.* MRC in this sense includes NMCs and staff of relevant line agencies.

With regard to Catchment Management in the AIFP, the objective is to institutionalize a process of catchment management planning in selected MRB cross-border areas and where resource use in one domain is creating stress to other users of a sub-basin. The AIFP goes on to identify all watersheds bordering the Tonle Sap lake and the three large trans-boundary watersheds in NE Cambodia (Se Kong, Se San and Sre Pok) as proposed sites for Catchment Management.

B. MRC's "*Strategy Study on the Development of the Watershed Management/ Forestry Sector in the Lower Mekong Basin*" (Jan. 2000) lists criteria for MRC forestry and watershed management interventions.

This document first states that forestry and watershed management activities should be in line with MRC's mandate and strategy, which is to "*promote and co-ordinate sustainable management of resources for the mutual benefit of people in the LMB*". The document goes on to state that the criteria for prioritizing projects and activities in the forestry/watershed management sector should be based on the following broad principles:

- activities should reinforce the MRC's mandate and strategic direction
- activities should have significance and mutual benefit to LMB countries
- activities which stimulate regional (cross-boundary) co-operation
- activities should, where feasible, incorporate cross-cutting themes – environment, people-centred development, poverty alleviation, livelihood generation, gender issues, etc.
- activities should strengthen capacity of regional institutions to resolve forestry and watershed management problems, as elaborated in the Mekong River Basin Diagnostic Study
- activities should identify, document and disseminate "best-practices" in watershed management through links to global, regional ad national watershed management initiatives

The document lists four main focal areas for activities:

1. security of land tenure and resource rights,
2. sustainable forest management,
3. ecosystem improvement and biodiversity conservation,
4. human resource and institutional capacity building,

and directs solutions to these issues and constraints to focus on:

- land tenure and forest resource security
- soil and water conservation

- forest protection and afforestation
- participation by upland farmers
- ecosystem improvement and biodiversity conservation
- public and private participation in programme development, priority setting and implementation
- cross-border cooperation
- institutional strengthening

The document goes on to give criteria for selection of individual critical watersheds. These criteria are:

- watersheds having more than 50%of Class I and II areas void of forests
- watersheds having more than 50% of the Class I and II areas void of forest, which have seen increase in population over the last five years by more than 10%
- watersheds with more than 50% comprised of Class I and II areas which discharge more than 1% of total LMB flow
- watersheds straddling two international boundaries, thereby presenting opportunities for regional collaboration
- critical watersheds (sub-basins) with a major part of their area located in gazetted protected areas, thereby presenting opportunities for supporting integrated conservation and development projects. (These projects would have the dual objective of enhancing biodiversity/reserve protection with community development in the buffer zones.)

It is felt that using the above approach would have the following advantages:

- meaningful comparative evaluations can be conducted to select priority areas; and
- appropriate combinations of bio-physical and socio-economic remedial actions can be designed to maximise positive impacts from investment of limited resources.

For one of ADB's regional projects (RETA 5771) – "*Poverty Reduction and Environmental Management in Remote Greater Mekong Sub-region Watersheds*", watershed selection criteria were developed in Phase I and further refined in Phase II. The criteria focused on seven parameters: (1) areas where poverty is endemic, (2) environmental fragility, (3) significance of biodiversity at a national and regional level, (4) have adequate infrastructure, particularly access by road or foot trail, existing or planned before project start-up, (5) have interest and consent of local population, (6) government commitment to provide adequate institutional support, and (7) security.

In addition to these general criteria, specific selection criteria focused on project sites with the following characteristics.

Criteria	**Comment**
Low population density	Within sub-basins with relatively low population density (,30p/sq.km)
Watershed Mismanagement	located in areas where watershed mismanagement has an actual or potential negative impact on infrastructure investments
Common hydrological system	definition based upon watersheds or contiguous groups of micro-watersheds linked through either a common hydrological system or common bio-geographical zone
Community based land use development	Located within communities that are willing to adopt a process of participatory land use planning with local officials, resource user groups and other stakeholders

Criteria	Comment
Development potential	The area must demonstrate a need for development, where "need" can be demonstrated by poverty, natural resource depletion, drug promotion or dependence, or disease incidence Areas where there are clearly defined opportunities for developing alternative livelihood projects that aim to increase household income levels well above the poverty line indicated for that specific region
Demand for development intervention	This can be demonstrated by local community willingness to participate, measured by local attempts to develop or improve
Resource use conflicts	Located in areas where community conflicts over resource use are not currently evident
Local absorption capacity	Local absorptive capacity must be adequate, both in respect of implementing agencies and target communities. There must be counterpart government agencies in the area that can service the communities and provide an adequate level of frequency and service.
Presence of other donors	If other donors are in the same area, there must be sufficient counterpart resources and capacity to accommodate a new project. Activities with a low level of other donor activity could be tolerated but no presence is obviously more desirable.
Non-government organizations	Located where NGOs or other social engineering infrastructure exists in order to spearhead community participation process.

The phase I report identified a list of three watersheds, selected and prioritized by the MOE for further study during Phase II. The ranked list was:

1. Stung Pursat, Pousat Province
2. Stung Sen, Preah Vihear Province
3. Se San, Ratanakiri Province

Although it did not match RGC's priority, during Phase II the choice was made to focus on the Se San watershed (or at least the Cambodian side of the Se San watershed). The main reasoning for this decision appeared to be a combination of extreme poverty, urgent need for development, remoteness and presence of a large numbers of ethnic minority people.

3. Danida was approached by the Seila Task Force (STF) with a proposal to mainstream natural resource management into the normal development and planning processes ("*Seila natural Resource and environment management mainstreaming Strategy 2002-2005"*). STF followed three basic considerations when selecting provinces and watersheds. The NRE Strategy watershed component would only be applied where

1. The province component (Seila system and mechanisms) was also being implemented.
2. Provinces were not new to the Seila system.
3. Where previously built capacities in land use planning and management and inter-communal cooperation could be used.

Following these considerations, a series of criteria were considered to compose a first selection list of provinces and watersheds.

- Numbers of provinces to be associated
- Province experience with Seila
- International border crossing watershed
- Number of communes to be covered
- Population concerned
- Watershed size
- Strategic development opportunities
- Environmental challenge and relevance with NEAP
- Past experiences with NRE
- Opportunities for partnerships

STF Secretariat has decided to start with the watersheds at Stung Pursat and Stung Mongkol Borey (mid-2002), and then expand to cover Stung Se San and Stung Sreng Late-2002/early-2003).

Annex 7: List of priority catchments in Cambodia

The **Se San Catchment** lays 40% within Cambodia (35% Ratanakiri and 5% Stueng Treung) and 60% within Vietnam (43% Kon Tum and 17% Gia Lai). It covers 18,888 km2 and is equivalent to 3.05% of the LMB. The catchment outlet is at 46 MaS and the highest point at 2397 MaS, with the majority between 100 and 800 MaS. The catchment has a high relief potential. More than two fifths of the slopes are steep and hilly, while about one fourth are flat. The catchment can be considered as not very critical concerning the risk of soil erosion at this time, since only 11% of the total area shows WSC classes 1 and 2 without forest cover. 12.4% of the catchment area is covered by Cambodian protected areas, and 18% by Vietnamese protected areas. Most of the land (75%) is covered in forests and shrubs and much of the rest (23%) is for agriculture or grassland. The total population for the Cambodian side of the catchment is 57,695, giving a population density of 3 people per km2, which is rather low.

The **Sre Pok Catchment** lays 41% within Cambodia (21% Mondulkiri, 16%Ratanakiri, 4% Steung Trueng, and 0% Kracheh), and 59% within Vietnam (Dac Lac 44%, Gia Lai 9% and Lam Dong 6%). It covers 30,942 km2 and is equivalent to 5% of the LMB. The catchment outlet is at 46 MaS and the highest point at 2145 MaS, with the majority between 100 and 500 MaS. The catchment possesses a high relief potential. Nevertheless, almost one half of the slopes are flat, with only a few steep and hilly slopes. The catchment can be considered as not critical concerning the risk of soil erosion, as only 3.2% of the total area shows classes 1 and 2 without forest cover. 9% of the catchment area is covered by Cambodian protected areas, and 11% by Vietnamese protected areas. Most of the land (78%) is covered in forests and shrubs and much of the rest (22%) is for agriculture or grassland. The total population on the Cambodian side of the catchment is 61,443 (146 villages), giving a population density of 2 people per km2, which is very low.

The **Se Kong Catchment** lays 78% within Laos, 19% within Cambodia (19% Steung Treung and 1% Ratanakiri), and 3% within Vietnam. It covers 28815 km2 and is equivalent to 4.66 % of the LMB. The catchment outlet is at 46 MaS and the highest point at 2174 MaS, with the elevation classes scattered quite evenly between 1 and 1300 MaS. The catchment possesses a high relief potential. Almost one third of the slopes are flat, and two fifths are steep and hilly. The catchment can be considered as not critical concerning the risk of soil erosion, as only 11% of the total area shows classes 1 and 2 without forest cover. 18% of the catchment area is covered by Lao NBCA, 3.8 % by Cambodian protected areas, and 1.5% by Vietnamese protected areas. Most of the land (91%) is covered in forests and shrubs and much of the rest (9%) is for agriculture or grassland. The total population for the catchment is 197,090 (600 villages), giving a population density of 7 people per km2, which is rather low.

The **Stung Pursat Catchment** lies wholly within Cambodia and covers 5965 Km2, which is equivalent to 0.96% of the LMB. The catchment outlet is at 5 MaS and the highest point is 1700 MaS, with the majority between 5 and 300 MaS. The catchment possesses a high relief potential. Almost half the slopes are flat and more than one forth are steep and hilly. The catchment can be considered as not critical concerning the risk of soil erosion, as less than 1% of the total area shows WSC classes 1 and 2 without forest cover. 26.28 % of the area is covered by Cambodian protected areas. Most of the land (82%) is covered in forests and shrubs and much of the rest (18%) is for agriculture and livestock. The total population in the catchment in 177,912 (260 villages), giving a population density of 30 people per Km2, which is within the upper middle range of all the LMB catchments.

The **Strung Mongkol Borey** lays 73% within Cambodia (Banteay Mean Chey 37%, Battambang 30%, Krong Palin 5%, and Otdar Mean Chey 1%) and 27% within Thailand. It covers 14966 km2 and is equivalent to 2.4 % of the LMB. The catchment outlet is at 10

MaS and the highest point at 510 MaS, and the majority between 100 and 200 MaS. The catchment possesses a low relief potential. Over four-fifths of the slopes are flat. The catchment can be considered as not critical concerning the risk of soil erosion, as only 0.6% of the total area shows classes 1 and 2 without forest cover. 18% of the catchment area is covered by various protected areas. Just less than half of the land (46%) is covered in forests and shrubs and most of the rest (54%) is for agriculture or grassland. The total population for the catchment is 903,846 (Cambodian side only)(80 communes), giving a population density of 80 people per km2, which is within the highest range of all the LMB catchments.

The **Stung Sreng Catchment** lays 99% within Cambodia (48% Otdar Mean Chey, 45% Siem Reap, 6% Banteay Mean Chey, and 1% Battambang) and 1% within Thailand. It covers 9986 km2 and is equivalent to 1.61 % of the LMB. The catchment outlet is at 5 MaS and the highest point at 671 MaS, with the vast majority between 5 and 100 MaS. The catchment possesses a low relief potential. Almost all of the slopes are flat. The catchment can be considered as not critical concerning the risk of soil erosion, as less than 1% of the total area shows classes 1 and 2 without forest cover. 11.7% of the catchment area is covered by Cambodian protected areas. Most of the land (71%) is covered in forests and shrubs and much of the rest (29%) is for agriculture or grassland. The total population for the catchment is 276,441 (450 villages), giving a population density of 28 people per km2, which is within the upper middle range of all the LMB catchments.

The **Stung Sen Catchment** lays 100% within Cambodia (63% Preah Vihear, 28% Kampong Thum, 6% Siem Reap, 2% Otdar Mean Chey, 1% Kampong Chhnang, and 0% Tonle Sap). It covers 16360 km2 and is equivalent to 2.64% of the LMB. The catchment outlet is at 5 MaS and the highest point at 802 MaS, with the vast majority between 5 and 100 MaS. The catchment possesses a low relief potential. Almost all of the slopes are flat. The catchment can be considered as not critical concerning the risk of soil erosion, as less than 1% of the total area shows classes 1 and 2 without forest cover. 27.9% of the catchment area is covered by Cambodian protected areas. Most of the land (85%) is covered in forests and shrubs and much of the rest (14%) is for agriculture or grassland. The total population for the catchment is 319,291 (457 villages), giving a population density of 20 people per km2, which is within the middle range of all the LMB catchments.

Annex 8: List of Legal Documents

Sub-decree on the Forest Concession Management –
Sub-decree on Environmental Impact Assessment Process - August 11, 1999
Draft Forestry Law (Submitted to the National Assembly, 20 July 2001)
Draft Sub-Decree on Community Forestry Management, 2001
The Land Law, October 18, 2001
Royal Decree on Watersheds, Dec 1998
Law on Environmental Protection and Natural Resource Management
Law on Administration of Communes

Sub-Decree on Organizing and Functioning of the Ministry of Land Management, Urban Planning and Construction, 1999
Sub-decree on the Organization and Functioning of the Ministry of Planning
Sub-Decree on Organizing and Functioning of the Ministry of Water Resources and Meteorology
Sub-Decree on Organization and Functioning of Ministry of Agriculture, Forestry and Fisheries

Annex 9: Schedule of Assessment

This schedule of the assessment covers the period from Jan. 1, 2002 until Feb. 4, 2002. It is broken into three phases. Part one covers 'Phase I', which focused on data and information collection. Part two covers the 'Cambodian country meetings'. Part three covers the activities of the Cambodian Country Team while the international consultants visited the other three LMB countries.

Part One:

Date	Person/Organization	**Reason**	**Team Member**
1 Jan 02	SMRP	Planning meeting	Limchhun/Ken
2 Jan 02	Mr. Sik Boreak/ WFP SMRP	Meeting Planning meeting	Limchhun/Ken Limchhun/Ken
3 Jan 02	Mr. Hans Helmrich/SMRP Watt Kosal/CNMC	Planning meeting Planning Meeting	Limchhun/Ken Limchhun/Ken
4 Jan 02	Mr. Hong Sokheang/UNDP Mr. Lay Khim/UNDP Mr. Tuon Sophal/MRD Mr. Meas Sophal/MOE Mr. Kol Vathana/MOE Mr.Theng Thara/MWRM/DDWRM	Meeting/documents Meeting/documents Meeting/documents Meeting/documents Meeting/documents Meeting/documents	Ken Ken Limchhun Limchhun Limchhun Limchhun
5 Jan 02	SMRP	Planning meeting	Limchhun/Ken
6 Jan 02		Planning meeting	Limchhun/Ken
7 Jan 02	Mr. Paul Im/ADB Mr. Toby Carson & Mr. Marc Goichot/ WWF Librarian/Seila Ms. Sous Sophal/MLMUPC/DUP Home	Meeting Meeting/documents Meeting/documents Report writing	Ken Ken Limchhun Limchhun
8 Jan 02	Mr. Puch Sothon/CIDSE Mr. Paul Im/ADB DANIDA Mr. Michael Gluck/SMRP Mr. Watt Bot Kosal/CNMC	Collect Documents Meeting Meeting Planning meeting Arrange appointments	Ken Ken Ken Limchhun/Ken Limchhun
9 Jan 02	Ms. Danny Harvey & Mr. Pel Piseth/Concern Mr. Leng Vy/MOI/DLA Mr. Sao Chivorn/MRD	Meeting Meeting/documents Meeting/documents	Ken Limchhun Limchhun
10 Jan 02	SMRP Mr. Sang Polrith, Mr. Nhem Sovanna & Mr. Ashish John/UNDP/UNOPS/Rat. Mr. Graham Brown, Mr. Gordon Patterson, Mr. Jerramy/Ratanakiri NGO Network Home	Planning meeting Meeting Meeting Report writing	Limchhun/Ken/ Chankosal Ken Ken Limchhun
11 Jan 02	Mr. Kham Khoen/First Governor of Ratanakiri Mr. Hor Hong, Mr. Yat Sokhan and others/Provincial Rural Development Meeting	Meeting Meeting	Ken Ken

	Mr. Pen Vuth	Fix appointment	Kosal
12 Jan 02			
13 Jan 02	SMRP	Planning meeting	Limchhun/Ken/ Chamkosal
14 Jan 02			

Jan 15/16 – TOR Workshop at MRCS – Limchhun/Ken/Chankosal

Part two:

International Consultant's Meeting Schedule: Jan 17-19, 2002

Mr. Fred Brandl, Mr. Kenneth Irwin and Mr. Min Bunnara	Mr. Florian Rock, Mr. Hour Limchhun and Mr. Tit Chankosal
17-01-2002	
8:30 Cambodia National Mekong Committee Secretariat Messrs Pich Dun, W.B Kosal, An Pichhada, H. Sophearith. and Ou Sophana 10:00 Ministry of the Interior Department of Local Administration Mr. Leng Vy Director	8:30 Cambodia National Mekong Committee Secretariat Messrs Pich Dun, W.B Kosal, An Pichhada, H. Sophearith. and Ou Sophana 10:00 Ministry of Agriculture, Forestry and Fisheries/ Deptartment of Forestry and Wildlife Mr. Ty Sokhun Director Mr. Tieng Sokhom GIS section
Lunch	Lunch
14:00 Ministry of Planning Department of Economic Planning Mr. Hoy Sythikun Deputy Director	14:00 Ministry of Agriculture, Forestry and Fisheries Department of Agronomy and Agricultural Land Improvement Mr. Mak Seoun Chief Technical Office 16:00 SEILA Programme Mr. Scott Lepair Program Manager Mr Joanne Morrison Operation Advisor Ms Julian Abrams Infrastructure Advisor
18-01-2002	

8:30 Ministry of Land Management, Urban Planning and Construction General Department of Land Management and Urban Planning Dr. Duch Wontito General Director Department of Research and Regulation Mr. Prak Angkeara Deputy Director Mr. Um Borith, 10:00 Ministry of Rural Development Department of Planning and Public Relation Mr. Pich Sam Ang Mr, Nhep Phan Deputy Director	8:30 Ministry of Water Resources and Meteorology/ Department of Water Resource Management and Conservation Mr. Am Norin Deputy Director 10:00 Ministry of Industry, Mines and Energy Hydro-electricity Department Dr. Bun Narith Director
Lunch	Lunch
14:00 DANIDA Mr. Lars Lund, NRE Programme Coordinator Mr. Loeung Kesaro Programme Officer 17:30 Oxfam America Mr. Michael Ounsted Regional Director Ms. Mia Hyun Senior Program Officer Mr. Michael Lerner Researcher/Lawyer Governance and Water Resources	14:00 Ministry of Environment Department of Nature Conservation and Protection Mr. Nouv Bunheou/Dep Dir Mr Meng Monirak Ms. Pum Vicheth 16:00 WWF Mr. Toby Carson, Advisor Mr. Marc Giochot, Advisor 17:30 Oxfam America Mr. Michael Ounsted Regional Director Ms. Mia Hyun Senior Program Officer Mr. Michael Lerner Researcher/Lawyer Governance and Water Resources
19-01-2002	
9:30 Concern Worldwide Ms. Danny Harway, Program Advisor Mr. Pel Piseth Program Manager	9:30 Concern Worldwide Ms. Danny Harway, Program Advisor Mr. Pel Piseth Program Manager

Part Three:

In the period from 20-01-02 until 4-02-02, the Cambodian team has continued to visit various ministries and people to collect documents and clarify information already collected. Documents were collected from and people visited at MAFF, MOE, MOP, and the Seila. Programme. The team also spent several days finalizing this report.

MRC - GTZ

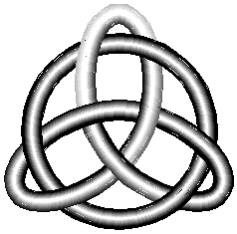
Sustainable Management of Resources in the Lower Mekong River Basin

Briefing Note

for the AIFP Appraisal

Workshop #1, 15-16th January 2002

Prepared by:



EARTH SYSTEMS LAO

January, 2002

1. GENERAL INTRODUCTION TO CATCHMENT MANAGEMENT IN LAO PDR

Watersheds of Lao PDR

64 watersheds have been identified in Lao PDR of which 53 drain into the Mekong River (*Danida 2001*)[1].

Significance to LMB

Lao PDR encompasses approximately 207,000 km^2 or 33% of the Lower Mekong Basin (MRCS, Watershed Classification Project).

Definition of Catchment Management

Rural Development with special emphasis on natural resource management in catchment areas (SMRP Briefing Material):

- decentralised planning / implementation
- local governance
- PLUP (Participatory Land Use Planning)
- multi-stakeholder involvement
- cooperation between GOs / NGOs / communities
- land allocation
- forest estate demarcation
- resource tenure

Generalised Objectives of Catchment Management

The objectives of Integrated Watershed Management as defined by Danida (2001) is a process that achieves one or more of the following development objectives:

- Increases the marginal productivity values;
- Poverty alleviation and improved standards of living;
- Improved conservation and protection;
- Improved conservation and management; and
- Improved water resource management.

2. IDENTIFICATION AND COMPILATION OF MAJOR CATCHMENT-RELEVANT NATIONAL POLICIES, SUB-DECREES AND LAWS

A list of documents relevant to the Regulative Framework for Catchment Management is provided in Table 1 Attachment 1. The list has been ordered accordingly:

- Land use planning
- Agriculture and Forestry

[1] Danida (2001) *Concept and Practice of Integrated Watershed Management in Lao PDR*.

- Decentralization
- Poverty alleviation
- Ethnic minority issues
- Investment
- Environment
- Infrastructure Development
- Water Resources

<Please note the presence of data gaps in Table 1 – these gaps have been highlighted.>

Of particular relevance to catchment management, the government of Lao PDR has prepared a number of action plans for sustainable natural resources management including:

- National Tropical Forestry Action Plan (*MAF 1991*)
- National Environment Action Plan (*STEA 2000*)

There are also several laws that are relevant to watershed / river basin management:

- Water and Water Resources Law
- Land Law
- Forest Law
- Environmental Protection Law
- Electricity Law
-

(Refer to the Danida Study (2001) for an outline of the relevant sections of these laws to catchment management.)

A copy of these plans and laws accompany this Briefing Note.

3. ORGANIZATIONS AND INSTITUTIONS RELEVANT TO CATCHMENT MANAGEMENT IN LAO PDR

(A contact list of key persons working in the field of catchment management is provided in Table 1 Attachment 2.)

3.1 Government Organisations

Central government is the level at which policy is decided. Provinces are defined as strategic units – the level at which development decisions are made and implemented. Districts as planning and budgetary units. Villages as implementing units. This recent move toward decentralization of power has given local officials greater authority in issues relating to environmental management (*Ecolao 2000*)[2].

[2] EcoLao (2000) *Lao Environmental, Institutional & Background Research Project – ADB 5783 Strategic Environmental Framework for the Greater Mekong Sub-region.*

The institutions involved in the development of watershed management can be divided into those mainly operating at the level of central government and those mainly operating at provincial and district levels.

Central Level Agencies

A List of Institutions/Organizations relevant to catchment management is provided in Table 2 Attachment 2 (*Danida 2001*).
An Organisational Chart for central government is shown in Figure 1 Attachment 2 (*Ecolao 2000*).
An Organisational Chart for Ministry of Agriculture and Forestry is shown in Figure 2 Attachment 2 .

Provincial Level Agencies
(Danida 1999)[3]

Lao PDR is broken down into 16 provinces plus the Saisombun Special Zone and Vientiane Prefecture.
The provinces are headed by a politically appointed governor, who has a large degree of autonomy over the use of economic and national resources including environmental issues.
The governors are assisted by line ministries, which have department level representation in the provinces and in most districts.
Development issues are coordinated and implemented by the Rural Development Committees (RDCs). The RDC has a senior administrative position within the provincial government and is situated directly below the Governor's Office. The RDC also has representatives at the district level.
Relevant institutions at the provincial and district level include: Provincial and District Agriculture and Forestry Offices; and the Planning Department.
An Organisational Chart for provincial and district level government is shown in Attachment 2, Figure 3 and 4 respectively (*Ecolao 2000*).

Village Level Agencies (*Danida 1999*)

At the village level the institutional point of entry is the Village Administration Committee consisting of 3 to 5 members and village headman. Specific development activities would have to be handled through a Village Development Committee.

Mass Organisations (*Danida 1999*)

There are three significant mass organizations in Lao PDR; Lao Women's Union; Lao People's Revolutionary Youth Organisation; and National Front for Reconstruction. These organizations receive support from and are controlled by the GOL. The Lao Women's Union and the Youth Organisation have well developed networks.

3.2 Non-Government Organisations

Cooperation with International NGOs has seen gradual growth and development however the extent to which NGOs contribute toward environmental management is relatively small. NGO activity within natural resource sector typically involves small-scale "on the ground" activities within the remote, rural communities (*Ecolao 1999*). The key NGOs involved in natural resource management include:

- IUCN (The World Conservation Union)

[3] Danida (1999) *Integrated Watershed Management in Xieng Khouang & Huaphan Provinces*.

- WWF (World Wide Fund for Nature)

3.3 Projects and Programmes

A list of projects and programmes in the area of natural resource management and development, that are relevant to catchment management are listed in Table 3 Attachment 2 (*Danida 2001*).

3.4 Research Organisations

Major research organisations are co-ordinated by the National Agriculture and Forestry Research Institute (NAFRI) which is a government research institute operating under the Ministry of Agriculture and Forestry. NAFRI is an umbrella organisation for 11 different centres including (SMRP Briefing Material):

- Coffee Research Center
- national Agriculture Research Center
- Horticulture and Vegetable REsearch Center
- Livestock Research Center
- Living Aquatic Resource Research Center
- Soil Survey and Land Classification Center
- Forest Research Center
- Forest Inventory and Planning Center
- Agro-climate Research Center
- Northern Agriculture and Forestry Research Venter
- Hydrology Research Center

<Provide detail on relevant activities of the Institute of Environmental Research operating under STEA.>

International research organisations include:

- Australian Center for International Agricultural Research (ACIAR)
- International Rice Research Institute (IRRI)
- IBSRAM
-

4. LIST AND INVENTORY OF SELECTED WATERSHEDS IN LAO PDR

A profile for the selected transboundary watersheds of Nam Ou, Se Bang Hieng and Se Kong are provided in Attachment 3 (MRC Watershed Classification Project).

The profile provides information on aspects including: land use, slope, size, and population.

<Further work is required to identify major organizations, major problems, and impact on downstream habitat.>

5. RECOMMENDATIONS FOR IMPLEMENTATION OF A CATCHMENT MANAGEMENT PROGRAMME

Some issues to be addressed in the development and implementation of a catchment management programme include (*Danida 2001*):

a. Continued capacity and awareness building in the area of catchment management at all levels of government.

b. Designation of watersheds as legal entities for planning purposes.

c. Clarification of mandate for watershed management among government agencies i.e. MAF and WRCC.

d. Consolidation of data into a National Watershed Management Information System.

e. Prioritization of the development needs within watersheds.

f. Coordination of donor assistance within the natural resources and environment sector.

g. Development of Regional standards for catchment management, particularly for trans-boundary watersheds.

Attachment 1 – Regulative Framework Relevant to Catchment Management

6

Land Use Planning

No.	Document Type	Document ID	Date	Document Name	Level	Implementing Agency	Sector
1	Decree	99/PM	1993	Management and Use of Land	National	MF	Land
2	Law	01/97/NA	1997	Land Law	National	MF/MAF	Land

Agriculture & Forestry

No.	Document Type	Document ID	Date	Document Name	Level	Implementing Agency	Sector
3	Decree	188/CCM	1989	Management and Protection of Aquatic Animals, Wildlife and on Hunting and Fishing	National	CCM	Biodiversity
4	Decree	117/CCM	1989	Management and Use of the Forest and Forested Land	National	CCM	Forestry
5	Strategy		1999	Strategic Vision for the Agricultural Sector Until 2010	National	MAF	Agriculture
6	Law		1998	Agriculture Law	National	MAF	Agriculture
7	Strategy			Agriculture and Forestry Sector Development Plan	National	MAF	Agriculture
8	Strategy			Environmental Action Plan for Sustainable Agriculture and Rural Development	National	MAF	Agriculture
9	Regulation	0542/AF	2001	The Management of the National Biodiversity Conservation Area (NBCA), Aquatic and Wild Animals	National	MAF	Biodiversity
10	Decree	164/PM	1994	National Biodiversity Conservation Areas	National	MAF	Biodiversity
11	Strategy		2000	Forestry Vision for 2020	National	MAF	Forestry
12	Regulation	0221/MAF.2000	2000	Management of Timber and Forest Products Exploitation	National	MAF	Forestry

13	Strategy		1997	Sustainable Forest Management and Conservation in Lao PDR Vision 2020	National	MAF	Forestry
14	Order	0054/MAF	1996	Customary Rights and the Use of Forest Resource	National	MAF	Forestry
15	Law	01-96/NA	1996	Forest Law	National	MAF	Forestry
16	Decree	186/PMO	1994	Allocation of Land and Forest Land for Tree Plantation and Forest Protection	National	MAF	Forestry
17	Decree	164/PM	1993	Establishment and use of Forest Reserves Throughtout the Country	National	MAF	Forestry
18	Decree	169/PM	1993	Management and use of Forests and Forest Lands	National	MAF	Forestry
19	Decree	89/PM	1993	Stating National Forestry Reservation Over the Country	National	MAF	Forestry
20	Decree	66/PM	1991	Adoption of the Tropical Forestry Program of Lao PDR	National	MAF	Forestry
21	Decree	67/PM	1991	National Logging Ban	National	MAF	Forestry
22	Decree	118/MAF	1999	Role, Functions, Rights and Organizational Structure of National Agriculture and Forestry Research Institute	National	MAF	Institutional
23	Decree	243/PM	1998	Organization and Activities of Ministry of Agriculture and Forestry	National	MAF	Institutional
24	Decree	89/PM	1998	Prime Ministerial Decree on implementation of the activities of MAF	National	MAF	Institutional
25	Decree	84/PM		The Organisation and Operation of the Ministry of Agriculture and Forestry	National	MAF	Institutional
26	Plan			National Biodiversity Action Plan	National	STEA / MAF	Biodiversity
27	Strategy			National Biodiversity Strategy	National	STEA / MAF	Biodiversity
28	Convention		1992	Biological Diversity	International	UN	Biodiversity
29	Convention			Protection of World Heritage and Natural Heritage	Internation	UN	Heritage

					al		
30	Policy	OP 4.36	1998	Forestry	International	WB	Forestry

Decentralisation

No.	Document Type	Document ID	Date	Document Name	Level	Implementing Agency	Sector
31	Instruction	01/PM	2000	Policy of building up the Provinces as strategic units, Districts as planning and budgeting units, Villages as implementing units.	National	CPC	Institutional

Poverty Alleviation

No.	Document Type	Document ID	Date	Document Name	Level	Implementing Agency	Sector
32	Strategy		2002	Poverty Reduction Strategy Paper, Draft	National	CPC	Social
33	Strategy			National Socio-Economic Development Plan	National	CPC	Social
34	Instruction	010/PM		Formulation of Poverty Eradication Program	National	PMO	Social

Environment

No.	Document Type	Document ID	Date	Document Name	Level	Implementing Agency	Sector
41	Agreement		1995	Agreement on the Sustainable Development of the Mekong River Commission	Regional	LNMC	Environment
42	Regulation	447/MIH	2001	Implementing Environmental Assessment for Electricity Projects, Draft	National	MIH-DoE	Environment
43	Regulation	1770/STEA	2001	Environmental Impact Assessment in Lao PDR	National	STEA	Environment

44	Strategy		2000	National Environment Action Plan	National	STEA	Environment
45	Law	02/99/NA	1999	Environmental Protection Law	National	STEA	Environment
46	Decree	68/PM	1999	Establishment of the Science, Technology and Environment Agency	National	STEA	Institutional
47	Regulation	1122/ STENO	1998	Control and Inspection of Wastewater Discharge	National	STENO	Environment
48	Convention			Wetlands of International Importance Especially as Waterfowl Habitat	International	UN	Environment
49			1998	Pollution Prevention and Abatement Handbook	International	WB	Environment
50	Agreement			Conservation of Nature and Natural Resources and ASEAN Agreements	Regional		Environment

Ethnic Minority Issues

No.	Document Type	Document ID	Date	Document Name	Level	Implementing Agency	Sector
35	Guidelines			Public Involvement Guidelines, Draft	National	STEA	Social
36			1998	Public Disclosure	International	WB	Social
37	Guidelines	Note F		Preparation of a Public Consultation and Disclosure Plan	International	WB	Social
38	Resolution		1981	Resolution Concerning Ethnic Minority Policy	National		Social

Investment

No.	Document Type	Document ID	Date	Document Name	Level	Implementing Agency	Sector
39	Law	1/94	1994	Law on the Promotion and Management of Foreign Investment	National	CPC	Investment
40	Lao			Law on Domestic Investment	National	CPC	Investment

Infrastructure Development

No.	Document Type	Document ID	Date	Document Name	Level	Implementing Agency	Sector
51	Regulation			Implementing Environmental Assessment for MCTPC Projects, Draft	National	MCTPC	Infrastructure
52	Law	04/99/NA	1999	Road Law	National	MCTPC	Road
53	Decree	05/PM	1995	Guidelines for Reducing Environmental Effects of Road Projects	National	MCTPC	Road
54	Regulation	180	1994	Industrial Waste Discharge Regulation	National	MIH	Industry
55	Law			Industrial Law	National	MIH	Industry
56	Law	04/97/NA	1997	Mining Law	National	MIH	Mining
57		585/MIH.DOE	2001	Environmental Impact Assessment for Electricity Projects	National	MIH.DOE	Electricity
58	Policy	581/MIH.DOE	2001	Power Sector Environmental Policy	National	MIH.DOE	Electricity
59	Strategy		2000	Hydropower Development Strategy, Draft	Regional	MIH-DOE	Electricity
60	Law	02/97/NA	1997	Electricity Law	National	MIH-DoE	Electricity
61	Law		1991	The Constitution	National	NA	
62	Policy	OP 7.50	1998	Projects on International Waterways	International	WB	Infrastructure

Water Resources

No.	Document Type	Document ID	Date	Document Name	Level	Implementing Agency	Sector
63	Decree			Fisheries	National	MAF	Fisheries
64	Policy		2000	Draft Policy on Water & Water Resources, Draft	National	PMO	Water
65	Strategy		2000	Management of Water Resources 2000 - 2005	National	PMO	Water
66	Law		1996	The Water and Water Resources Law	National	PMO	Water
67	Strategy			National Rural Water Supply Strategy	National		Water

ADB = Asia Development Bank
CCM = Council of Ministers
CPC = Central Planning Committee
DoE = Department of Electricity
LNMC = Lao National Mekong Committee
MAF = Ministry of Agriculture and Forestry
MIC = Ministry of Information and Culture
MCPTC = Ministry of Communication, Post, Transport and Construction
MIH = Ministry of Industry and Handicraft
MF = Ministry of Finance
NA = National Assembly
OP = Office of the President
PMO = Prime Minister's Office
STEA = Science, Technology and Environmental Agency
STENO = Science, Technology and Environmental Organisation
UNDP = United Nation Development Program
WB = World Bank

Attachment 2 – Organisations and Institutions Relevant to Catchment Management

Table 2 Attachment 2- Natural Resource Sector Agencies in Lao PDR (*Danida 2001*)

Organization	Responsibilities	Role
National Assembly	Has ultimate political authority over natural resource use. Approves National Socio-Economic Development Plan (NESDP).	Regulator
Committee for Planning and Cooperation (CPC)	Prepares National Socio-Economic Development Plan. Technical and executive functions related to approval of watershed/river basin management plans for incorporation into the NESDP. Support provincial, district and village organizations. Monitors the execution of programs and projects.	Regulator and Manager
➢ Dept. for the Promotion and Management of Domestic and Foreign Investment	Solicits and coordinates private sector investment initiatives in the water sector, particularly hydropower BOT investments. Ensures coordination among agencies involved in foreign investment bids and contracts	
➢ Dept. International Cooperation	Coordinates public sector donor support to Government water sector programs and initiatives.	
➢ Dept. for Monitoring and Evaluation	Monitors project implementation and reports to the PMO.	
Ministry of Foreign Affairs (MFA) ➢ Dept. of Law and Treaties	Provides advice on negotiation and signing and follows up implementation of agreements with foreign countries; gives legal advice to State agencies.	Regulator
Ministry of Justice (MJ)	Develops Government policy into law and promotes the law	Regulator
Prime Minister's Office (PMO)		Regulator and Manager
➢ Water Resource Coordinating Committee and Executing Secretariat (WRCC)	Apex agency for water resources planning and allocation. WRCC is still in formative state. WRCC has prepared Water Sector Profile and Water Sector Strategy	

Organization	Responsibilities	Role
	and Action Plan.	
➢ National Leading Committee for Rural Development	Lead agency to formulate and implement the National Rural Development Program.	
➢ National Land Use Planning and Allocation Committee	Lead agency to formulate the Government's land allocation program, a key element in watershed/river basin management.	
Ministry of Agriculture and Forestry (MAF)	Implements GOL policies, strategies and programs related to the development and management of irrigation, drainage, flood control, fisheries (and livestock).	Regulator, Manager, Operator and Service Provider
➢ Dept. of Forestry		
➢ Dept. of Irrigation	Collects, evaluates rainfall, evaporation, river height and flow information for the Lao hydro-meteorology network. Monitors and evaluates data and information related to all of the above.	
➢ Dept. Meteorology and Hydrology		
➢ Dept. Livestock and Fisheries		
➢ National Agriculture and Forestry Research Institute	Responsible for monitoring and management for the protection and conservation of watershed resources, protected forest areas, wetlands and wildlife.	
Ministry of Communications, Transport, Post and Construction (MCTPC)		Regulator, Manager, Operator and Service Provider
➢ Inland Waterway Division within Dept. of Communication	Manages the use of waterways for transport and ensures safe navigation via dredging and navigation aids. Responsible for river bank and urban flood protection. Collects hydrologic data on Mekong and main tributaries.	
➢ Dept. of Housing and Urban Planning	Responsible for urban development planning. Develops policies, regulations and plans for water supply and drainage, solid wastes and sewerage in urban areas.	
➢ Provincial Authorities Urban Water Supply	Supplies water to urban locations (greater than 2000 dwellings and density greater than 30 persons/ha); implements WHO guidelines for drinking water quality, manages sewerage in urban areas	
➢ Integrated Urban Development Project	Implements policies, plans and projects for urban areas, roads, sewerage systems, oxidation ponds and new settlements	Operator

Organization	Responsibilities	Role
	sewerage systems, oxidation ponds and new settlements.	
Ministry of Industry and Handicraft (MIH)		
➢ Dept. of Industry	Determines policies, plans, regulations and standards relating to industrial waste water.	Regulator, Operator, Service Provider
➢ Dept. of Geology and Mines	Explores mineral deposits, coordinates development and regulates mining operations.	Regulator, Operator, Service Provider
➢ Dept. of Energy	Determines policies, plans, laws and regulations for developing and controlling the production and distribution of electricity. Reviews and evaluates project proposals, contracts and agreements.	Regulator, Operator, Service Provider
➢ Electricte du Laos	Owns and operates main public sector generation, transmission and distribution assets. Undertakes project development and joint ventures.	Manager and Operator
Ministry of Health		Manager Operator and Service Provider
➢ National Institute of Hygiene Epidemiology and Rural Water Supply	Supplies water and sewerage services to non-urban locations.	
➢ Food and Drug Dept.	Sets and monitors standards for drinking water supplies.	
National Geographic Service	Provides mapping and other cartographic information.	Service Provider
Provincial Governor's Offices	Executing agency for provincial projects and provincial budgets. Main agency with links to district and village organizations. Empowered by PMO of all national resources.	Manager
National University of Laos	A working group under the Faculty of Agriculture and Forestry, the Faculty of Social Science and Humanities and the Faculty of Biology have established an Inter-disciplinary Working Group focusing on Environmental Education and Research	

Table 3 Attachment 3 – List of Projects and Programmes Relevant to Catchment Management

Project Name	Donor	Target Area	Output
ADB TA 3006 and TA 3205: Institutional Strengthening of the Water Resources Coordination Committee	**Asia Development Bank (ADB)**	**National**	**National Water Sector Strategy Action Plan** **National Water Sector Profile** **Draft Decree on WRCC Mandate**
ADB TA 3285: Strengthening the Capacity for Aid Coordination and Monitoring	**ADB**	**National**	**Multi-sectoral Donor Activity Database**
ADB TA 2734: Nam Ngum Watershed Management	**ADB**	**National**	
ADB TA 3374: Power Sector Strategy Study	**ADB**	**National**	**IPP Power Project Rankings and Assessments**
ADB TA 3403: Towards Implementing of the Agricultural Strategy	**ADB**	**National**	**Procedures, agencies, approaches and summary of donor activities.**
ADB Loan 1525: Secondary Towns Urban Development	**ADB**	**Selected Sites**	**Water sector infrastructure development**
ADB Loan 1558: Power Transmission and Distribution	**ADB**	**National**	**Water sector infrastructure development**

Project Name	Donor	Target Area	Output
ADB Loan 1710: Water Supply and Sanitation	**ADB**	**National**	**Water sector infrastructure development**
Nam Ngum Watershed Conservation Project (NAWACOP)	**German Technical Assistance (GTZ)**	**Paek and Pukoud Districts, Xieng Khouang Province**	**RRA and PRA land use appraisals and planning**
Nam Ngum Resources Management Project	**Integrated Rural Development Committee (IDRC)**	**National**	**Catchment wide socio-economic database.** **Participatory land use planning experience and approaches.**
Watershed Management Plan for Forest Conservation in Vang Vieng District	**JICA / JAFTA**	**Vang Vieng District**	**PRA / RRA approaches to resource and watershed management planning.**
Sekong, Sesan and Nam Theun River Basin Hydropower Development Strategy	**ADB**	**External river basins**	**National Policy for hydropower including related environmental issues and mitigation measures.**
ADB Loan Shifting Cultivation Stabilization Project	**ADB**	**Houaphanh Province**	**Development of sustainable agricultural systems.**
Poverty Reduction and Environmental Improvement in Remote Areas	**ADB**	**Mekong subregion**	**Holistic approach to integrated development and natural resource**

Project Name	Donor	Target Area	Output
Improvement in Remote Areas		**subregion**	**management policies.**
Watershed Classification Project	**MRC / CDE**	**National**	**Digital terrain maps for preparation of thematic maps.**
Assessment and Monitoring of the Mekong Basin Forest Cover	**MRC / GTZ**	**National**	**Digital forest cover maps.**
Lao-Swedish Forestry Cooperation Program	**SIDA**	**National**	**Vocational training.** **Participatory land use planning.** **Monitoring and Evaluation Systems.**
Lao-Danida Natural Resources and Environment Programme	**DANIDA**	**National**	**Concepts and Practice in Integrated Watershed Management.**
Forestry Management and Conservation Project (FOMOCOP)	**WB / GEF / Finland**	**Southern Provinces**	**Vocational training.** **Participatory land use planning.** **Monitoring and Evaluation Systems.**
Industrial Tree Plantation Project	**ADB**	**Paek and Pukoud Districts, Xieng Khouang Province**	**Tree production.**
Dong Dok Forestry College Project	**GTZ**	**National**	**Vocational training.**

Project Name	Donor	Target Area	Output
Management of Protected Areas	**IUCN**	**National**	**Policy for biodiversity, ecosystems and conservation.** **Capacity building for local institutions.**
Forest Conservation and Afforestation Project	**JICA**	**Vang Vieng District**	**Forest Conservation and Management.**
Sustainable Management of Resources in Lower Mekong Basin	**MRC / GTZ**	**Regional**	**Information dissemination, interactive conferencing on regional problems / strategies.** **Co-financing of local initiatives.**
Agricultural Strategy Study	**ADB**	**National**	**Strategy reform in the agricultural and forestry sector.**
ADB TA 1745 and TA 2333: Institutional Strengthening and Development of MAF	**ADB**	**National**	**Capacity building in irrigation, forestry, agriculture, livestock, fisheries, hydrology and meteorology sectors.**
ADB TA 2447: Small Scale Community Managed Irrigation	**ADB**	**5 provinces**	**Infrastructure development and water resource use and management capacity building.**

Project Name	Donor	Target Area	Output
ADB TA 3189: Irrigation Management Transfer	**ADB**	**5 provinces**	**Water resource management and development at the community level.**
Integrated Rural Development Program	**IFAD / UNDCP**	**Xieng Khouang Province**	**Integrated agro-forestry, community development and irrigation.**

Attachment 3 – Contact Institutions for WSM In Lao PDR

Organisation	Contact Name	Position	Phone
Ministry of Agriculture & Forestry	Thongphou Vongsipasom	Chief of Office, Vice Chairman of Water Resources Coordinating Committee	412340 413347
Dept. of Forestry, MAF	Phetsamay Vongkhammounty	Director	215000
Dept. of Forestry, MAF	Veunvang Boutthalath	Deputy Director	222563
Dept. of Forestry, MAF	Linthong Douangphachanh	Deputy Head of Forest Resources Division	222534
Dept. of Forestry, MAF	Savay Thammavongsa	Head of Water Resources Division	415540
Dept. of Irrigation, MAF	Pheng Phieangpanya	Deputy Director	215010 412341
Dept. of Meteorology and Hydrology, MAF	Vilavanh Phanoulath	Director	412349
Dept. of Agriculture, MAF	Thanousay Ounthouang	Deputy Director	
National Agriculture & Forestry Research Institute MAF	Dr. Ty Phommasack	Director	712047
STEA	Noulinh Sinhbandit	President, Chairman of WRCC	218738
STEA	Ms Keobang A Keola	Deputy Chief	020 519788
Dept. of Environmental Research, STEA	Phone Chalern Nonthaxay	Deputy Director	
PPTA Nam Ngum River Basin, WRCC, STEA	Hugh Milner	Team Leader	020 519035
Dept. of Electricity, MIH	Houmphone Bulyaphol	Director	413014
National Institute of Sanitation and Rural Water Supply, MPH	Dr.Nouanta Maniphousay	Director	413310 217204
Dept. General Planning, CPC	Sornthavixay Phetdaoheuang	Technician	216752 612081
Ethnic Minority Dept., National Front for Edification of Lao Nation	Ye Keu Ya	Technician	213764 251971
Gender Resource and Information Development Center, Lao Women's Union	Bounphèng	Librarian	412078
Danida - National Capacity Building Project	Peter Quist-Hoffmann	Technical Advisor	415364

MAF =	Ministry of Agriculture and Forestry
CPC =	Central Planning Committee
MPH =	Ministry for Public Health
MIH =	Ministry for Industry and Handicrafts
WRCC =	Water Resources Coordinating Committee
STEA =	Science Technology Environment Agency

Country – based Watershed Management Informational in Thailand

Udhai Thongmee

Watershed Management Division
Royal Forest Department
Bangkok, Thailand

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14 January 2002

CONTENTS

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1. Introduction to Watershed Management in Thailand

1.1 General Characteristic

1) Location

The kingdom of Thailand is located in the centre of the Indo-chinese Peninsula within the Southeast Asia; between latitudes 5^0 $40^/$ and 20^0 $30^/$ North and between longitudes $97^070^/$ and 105^0 $45^/$ East. It has a common border line with Myanmar in the west and northwest, Republic of Laos' People Democratic is situated on the northeast. Cambodia is on the east and Malaysia in the south. The South China Sea is on the east and the Andaman Sea on the West of the southern peninsula. The total area of the country is about 320 million rai (513,115 sq.km.) and total population is about 62 million. There are approximately 65% of the total population depend on agricultural activities.

2) Topography / Watershed Characteristics

The characteristics of watersheds in Thailand vary from place to place, due to differences in physiography. The National Hydrology Committee was classified the watershed area into 25 major watersheds for the whole country (Figure1). The total areas, upper watershed areas and average annual water volume of the major watershed are 512,066 sq.km., 127,731 sq.km. and 215,558 $km.^3$ respectively. The detail of each watershed is inlustrated in Table 1.

Northern region : The northern region where the Ping, Wang, Yom and Nan rivers originate, is the most important watershed area in the country. The river join together to form the Chao Phraya River, flowing through the central plain towards the Gult of Thailand. The others are Salawin, Kok, and Mekong watersheds. The northern region is mountainous with long ridges and steep narrow valleys in head watersheds. This is a general topographic of northern Thailand with about 75% comprising of highland. The altitude ranges from 100 meters to 2,685 meters above mean sea level. In the upland areas, there are almost a million population have been settled. Most of them are hilltribe minorities which have been practiced shifting cultivation.

Northeastern region : There are two main watersheds in the northeastern region. The Chi and Mun rivers flow eastward through the region and join the Mekong River. The other is Mekong watershed. It tributaries flow directly through the Mekong river such as Huai-Banghes, Huai Luang, Mae Nam Songkhram, etc. The topography of the watershed is the main characteristic of the Plateau, which gradually changes from undulation to rolling landforms in the lower portion to mountainous areas in the upper portion. The northeast is the most critical area where drought is prevalent during the dry season; floods and soil erosion in the rainy season. The soil is quite sandy, with low nutrient content and low water holding capacity.

Central region : The central region consists of the Chao Phraya, Sakae Krang, Pasak and Thachin watersheds

Eastern region : In the eastern region, consists of Prachin Buri, Bang Pakong, Tonlesap and East Coast Watersheds.

Western region : The western region consists of the Kwai-Yai and Kwai-Noi rivers which are the tributaries of the Mae-Klong watershed, flowing towards the Gulf of Thailand. The other watersheds in the southern part of this region are the Petchaburi and West-Coast watersheds.

Southern region : The southern region is a long slender peninsular which runs in a north-south direction. The watersheds can be physically distinguished between the east coast and the west coast. The eastern coast consistes of Peninsala East Coast watershed, Tapi Watershed, Tonle Sap Songkhla watershed and Pattani watershed. The western watershed is Peninsula West Cost watershed consists of small with short distance of river system such as Mae Nam Kraburi, Khlong La Un, Khlong Thom, Mae Nam Trang, etc.

3) Climate

The climate of Thailand is tropical and is mainly affected by the monsoons, resulting from the seasonal differences in temperature between the land mass and the oceanic body, alternately blow southwesternly and northeasternly over Thailand. However, the climatic condition of the country varies from region to region with an average annual rainfall from 1,100 millimeters to 4,000 millimeters . The major high rainfall zones are Peninsula Thailand and the southeast coast, which has an average annual rainfall of more than 2,000 millimeters to 4,000 millimeters in some areas. The low rainfall zone is found in the rain shadow in the central part of the northeast region where the average annual rainfall is about 1,100 millimeters. The rainy season with almost 80% of the total rainfall occurs in the period from May through October, resulting from southwest monsoon, with the exception of the southeast coast and east coast of Peninsula Thailand,the rainy season lasts through December. However the rainy season has been irrigular in the last 4 years.The northeast monsoon from November to February bring cool air to the northern and Northeastern region.The mean monthly temperature ranges from 20 ^{o}C to 32 ^{o}C

1.2 Watershed Problems / Degradation

The main cause of watershed problems or watershed degradation is the depletation of forest for the extraction of forest and the conversion of forest lands to agricultural lands incorperation with land use abuse. In the early 1900s, the forest has been depleted by the extraction of timber for national economic development. Another depletion of forest has also caused by conversion of forest lands to agricultural lands to provide subsistence food for rapidly increasing population as well as agronomic expansion for commercial crops. The other depletion of forest lands is for country development, such as road construction, water resources and others infrastructures development.

The watershed depletation has resulted on surface runoff, soil erosion and sedimentation in the rainy season. In conversion, it has effected to drought in dry season resulting on defficiency in water consumption, agricultural and industrial production etc. The flooded and drought have been increasing both in term of hazard and frequency.

The main cause of watershed degradation can be categoried as fallow.

1) Conversion of Forest lands to Agricultural lands

Over the last 3 decades, forest cover in Thailand has dramatically decreased from about 53% in 1961 to approximately 25 % in 1998 (Table 2). The depletion of forest areas has mainly been caused by conversion of forest lands to agricultural lands to provide subsistence food for the rapidly increasing population, as well as rapid agronomic expansion for commercial crops.

Most of Thai population have been converted forest lands in the low valleys and flat plain for paddy fields, and agronomic crops such as kenaf,cassava, maize and sugar cane in the flat or undulating areas. However, some of them have been encroached forest areas into the mountainous lands due to the areas in the lowlands are limitted effecting from rapidly increasing population.

In the upland, hilltribes have been settled in the mountainous areas particularly in the most important watersheds in northern region where the four main rivers, the Ping, Wang, Yom and Nan originate. The hilltribes have been practiced shifting cultivation (slash and burn practice) for their livelihood. It is a main cause of forest depletion on the mountainous areas. The hilltribes which living in the mountainous areas in Thailand are Karen, Hmong, Lahu, Lisu, Yao, Akha, H'tin Lua, khamu, and etc.

The population living in the highland mountainous areas in 1997 are almost a million people in 187,150 households of 4,841 grouping villages (glum ban) within 20 provinces mainly in the northern region. The distribution of the population and villages are shown in Table 3.

In the past, the cultivated lands in the upper watershed areas were mainly cultivated for subsistence food. However, in the last few decades, the cultivated lands have been converted to commercial crops which are rapidly caused forest destruction. The agricultural practices particularly the rapid expansion for commercial crops on the sloping watershed areas are major cause of watershed degradation. These are not caused only surplus runoff, soil erosion and sedimentation but also water contamination from insecticides and fertilizer applied to those crops.

2) Forest Fire

Forest fire is an important caused of watershed degradation in Thailand. Forest fire is caused by human activities mainly in form of slash and burn for agricultural purpose, collecting forest products, hunting and other causes. Forest fire is mainly occurrence in Dry Dipterocarp forest, Mixed Deciduous forest, Dry Evergreen forest, Pine forest, and abundant shifting cultivated areas. Forest fire is normally occured from January to May while the weather is getting warm and the forest areas is getting dry.

Forest fire is not only damage forest trees but also damage ground covers and surface soil. These will decrease water infiltration capacity, therefore resulting to surplus surface runoff and soil erosion. If the situation is going on year after year, the forest structure will be changed into the drier zone.

3) Logging Operation

In early 1900s forest policy emphasized on the extraction of timber for economic development. Nalampoon (1995) stated that; "Before the 1950's , Thailand had a thick forest cover of heterogeneous types. Timbers, particulary teak were the most important export commodity after rice. The timber harvesting done by most logging operation in the past, surpassed the sustainable level and caused deterioration to over logged forest."

Access roads for logging operation are also caused soil erosion and sedimentation. At the same time, local landless people penetrated deeper into the forests by using access roads and encroached forests for agricultural practices, and finally settledown in the forest areas. Due to the depletion of forest by logging operation incorporate with a hazard flood in southern Thailand in Nokhon Si Thammarat and Surat Thani provinces in late November 1988 which destroyed and buried 55,851 houses and 373 people (Sawintara and Thongmee, 1991). Logging operations both under the concession and illegal logging were blamed as an important cause of the hazard flood. Therefore, the government decided to ban logging over the country since January 1989.

4) Other Activities

Other activities cause watershed degradation are road construction, mining , over grazing, pesticides and fertilizer, and etc.

Road construction : Road construction particularly on the upper watershed sloping land is one of the major cause of soil erosion and sedimentation. Road construction on sloping land without well manage and unsuitable plan, soil from over cut will cause big

problem on sedimentation and water quality in the down streams. Land slide and/or soil erosion along the road sites have to be carefully prevented.

Mining : Mining is an important watershed degradation particularly in the upper watershed. Mining is cause soil erosion and sedimentation in down streams. Salvage water from mining process will cause water quanlities in down stream areas. Another important issue is a great effort to rehabilitate the areas after mining .

Over grazing : Over grazing is another cause of watershed degradation. In the mountainous areas, particularly in northern region where hilltribes are living. Most of the households raise animals such as cattle, horses, and ete. within the forest areas or swidden areas. In some places where over grazing occurrence, ground cover will be reduced at the same time, animals tramp will cause soil compaction. Water infiltration will be reduced which effecting surplus surface runoff and soil ersoion. Animals residual will also be contaminated water quality in the down streams.

Pesticides and Fertilizer Application : In the last few decades, the agricultural practices in the mountainous areas have been converted from subsistence food to commercial crops. Agricultural practices become more intensive incoporate with limitation of lands. Pesticides and fertilizer have been intensively applied for the commercial crops. Parlicularly for vegetable with rapidly expanded. Careless and over application of pesticides and fertilizerlead to water contamination causing big problems to water consumers down streams.

1.3 Evolution of Watershed Management

1.) Watershed Rehabilitation Stage :

Watershed Management programme in Thailand has been initiated since 1953 by setting up watershed rehabilitation field stations under the Royal Forest Department (RFD) which was focuses on headwatersheds rehabilitation by reforestation on abandoned shifting cultivated areas in the North. An approach used for watershed management at that time was just to regreen the head watershed areas by reforestation assuming that only the forest can produce optimal yield and distribution of water(Tangtham, 1987). This was the first effort in watershed management in Thailand.

In 1964, the Royal Thai Government (RTG) realized that it faced many problems resulting from watershed degradation in the upper watersheds areas. Hence, an interinstiutional watershed management programme was initiated. The Cabinet agreed to set up the Committee on Watershed Conservation and Development. Unfortunately, due to little support and inadequate cooperation among the concerned agencies, this committee did not function very well and disappeared in a few years (Thangtham, 1987). However, Land Development Department (LDD) set up Soil and Water Conservation and Management Division, and RFD established Watershed Research Sub-Division in 1965 (and eventually become a Watershed Management Division in 1975). Since then, foresters, agriculturists, soil and water conservationists, became part of watershed management teams. Watershed management and related activities such as soil and water conservation and agro-forestry etc. have been introduced. However, the main activity in watershed management still remained on reforestation of denuded watersheds and some soil and water conservation practices.

2.) Integrated Watershed Management Stage :

Since 1970, the RFD realized that, without taking the watershed inhabitants into consideration for rehabilitation works, it would be impossible to stop deforestation and land ues conflicts. The socio-economic development plan including permanent agricultural system have been introduced for replacing shifting cultivation practices on the mountainous watersheds. Therefore, in 1972 the RFD established the “Mae Sa Integrated Watershed and Forest Land-Use Project” with the assistance from FAO/UNDP. The main goal was to find out the best form of land use for rehabilitation of upland watershed areas in the northern

region. The project carried out watershed management, forest grazing and range management, horticulture, forest management, forest fire control, road construction, conservation farming, and extension etc. in order to replace the shifting cultivation practices and providing better living conditions to the watershed inhabitants. The project offered scholarships for staff training abroad in watershed management and related subjects. The project ended in 1981 and was completelytaken over by RFD. The project provided considerable on the job training and demonstrations on watershed management and related subject matters.

In October 1979, a Committee on Watershed Classification was officially set up. A major objective of watershed classification project is to formulate land use plans for the conservation of natural resources , and in particular water resources with a view to their sustainable use (Sriratana Tabucanon, 1998). Watershed classification is the macro Land-use planning for the sustainable development of water resources (Tangtham, 1996).

In 1980s an integrated watershed management approach, for people's participation and cooperation among concerned agencies, integrated watershed management concepts were introduced in watershed management programmes. There have been various watershed management project in cooperation with many international agencies, applying participatory approaches e.g. in the Mae Cheam Watershed Development Project (1980-1987) assisted by USAID in the north, and Integrated Development of the Phu Wiang Watershed Project (1984-1989) supported by FAO/UNDP in the north-east. The main objectives of these mentioned projects are to improve living condition and improved land use patterns for environmental conservation through participatory integrated rural watershed development.

3) Participatory Watershed Management Stage :

The Sam Mun Highland Development project (SM-HDP) received financial assistance from the United Nation Drug Control Program (UNDCP) . The project focused on improving the quality of life of the people in the project area and on reducing opium growing areas as well as opium addiction. The project was implemented between 1987-1994 and was divided into 2 phases. The SM-HDP was emphasized on people participation in forest and natural resources management, awareness on understanding of forest protection and conservation through participatory land use planning, 3-D model techniques, and self-sufficiency agicultures. In addition, the project also provided basic informations appropriate technology and knowledge to local people through formal and informal discussion, meeting, training, and study tour. The programme has been extended to Accelerated Watershed Rehabilitation Programme, and Watershed Management Units under Watershed Management Division , RFD.

The Thai-German Highland Development Program (TG-HDP) was implemented during 1981-1998. Based on the achievement of the programme, the TG-HDP found that inter village networking were an effective way to improve community based land use planning and local watershed management.

The Upper Nan Watershed Management Project has been carried out since 1996. The DANCED funded project is planned to continue until year 2003. Village revolving funds are being used for more sustainable land use and generating off-farm income. The strengthening of the village watershed networks has been shown to assist in improving community forest fire management. In 1999 an important activity of the project is improved natural resource management through the sub-district administrations (TAO).

Figure 1 : 25 Major Watershed of Thailand

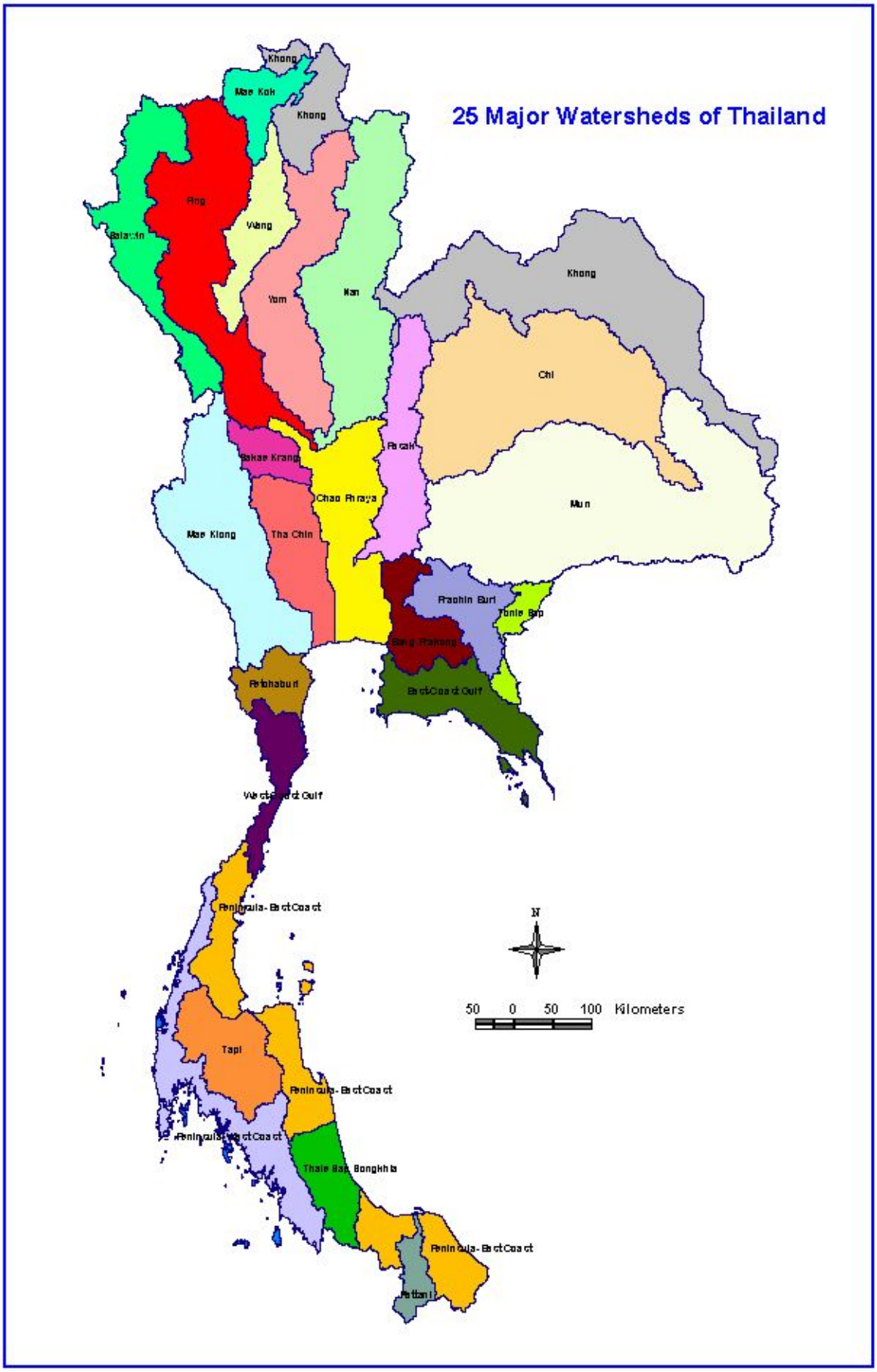


Table 1 Area and Water Volume of Major Watershed in Thailand

No.	Region	River Basin	Total area (km^2)	Upper Watershed area (km^2)	Average Annual Water Volume (km^3)
01	N	SALAWEEN	17,920	14,873	8,156
02	N	MEKONG	57,422	10,514	15,800
03	N	KOK	7,895	4,452	5,119
04	N-E	CHI	49,477	6,531	8,035
05	N-E	MUN	69,700	2,300	21,767
06	N	PING	33,898	17,762	8,116
07	N	WANG	10,791	39	1,429
08	N	YOM	23,616	7,557	1,430
09	N	NAN	34,330	13,354	9,581
10	C	CHO PRAYA	20,125	403	4,925
11	C	SAKAE KRANG	5,191	841	519
12	C	PA SAK	16,292	3,486	2,708
13	C	THA CHIN	13,682	944	2,815
14	W	MAE KLONG	30,837	16,405	12,943
15	E	PRACHINBURI	10,481	1,362	4,502
16	E	BANG PARONG	7,978	631	4,900
17	E	TONELESAP	4,150	228	1,193
18	E	EASTERN COAST	13,830	2,060	25,960
19	W	PETCHABURI	5,603	2,740	1,410
20	W	WESTERN COAST	6,745	803	1,013
21	S	S-E COAST	26,353	5,007	35,614
22	S	TAPEE	12,225	2,543	17,380
23	S	SONGKLA LAKE	8,495	2,013	7,301
24	S	PATTANI	3,858	826	3,024
25	S	S-W COAST	21,172	10,057	9,918
TOTAL			512,066	127,731	215,558

Source : Sriratana Tabucanon M. 1998

Table 2 Remaining Forest area in Thailand

Year of total area	sq.km.Of forest area	% of total area
1961	273,628	53.33
1973	221,207	43.11
1976	198,417	38.67
1978	175,224	34.15
1982	156,600	30.52
1985	150,866	29.4
1988	143,807	28.03
1989	143,417	27.95
1990	141,110	27.5
1991	136,698	26.64
1993	135,521	26.02
1995	131,485	25.62
1998	129,722	25.28

Source : RFD Annual Reports

Table 3 Highland Community within 20 Provinces of Thailand in 1997

Tribe	Village	Households	Population
Karen	2,130	70,892	353,574
Kmong	266	15,704	126,300
Yao	195	9,501	48,357
Akha	276	9,740	56,616
Musur	446	15,388	85,845
Lisu	161	5,652	33,365
Lua	71	3,322	17,637
H'tin	151	7,058	38,823
Khamu	47	2,516	13,674
Malabri	3	24	125
Palong	4	290	1,626
Tongchu	4	53	257
Chinese	71	3,456	21,579
Thai Yai	72	4,547	20,068
Thai Lue	17	1,344	6,472
Low land Thai	879	36,031	157,718
Others	48	1,632	9,086
Total	4,841	187,150	991,122

Source : Public Welfare Department, 1997

2. Policy on Forestry and Land Use Planning relevant to Watershed Management

2.1 National Policy

National Economic and Social Development Plan (NESDP) is a national framework for policy and planning. There are also provided guidance for natural resources and environment management which are related to watershed management.

The first six NESDP (1961 – 1991) focused on stimulation economic growth. The 7th NESDP (1992 - 1996) introduced the concept of sustainable development and natural resource management.

Northern watershed Management project (1996) stated that "the primary focus of the first seven plans focus on economic development which proved highly successful with an impressive average annual growth rate of about seven percent. However, economic growth was unbalanced, with income disparity levels continually widening which created new social stresses and weakened traditional cultural values. The growth was fuelled, largely by resource exploitation rather than investment, particularly in regard to the Country 's resource base and environment which is now seriously degraded as a result.

The 8th NESDP (1997 – 2001) focus not only on the factors that could constrain growth, but also stresses the need to improve household and regional income distribution and manage natural resources in a sustain manner. The plan is emphasized on "**human development**" as the key concept of development. Its ideas emphasize on an increase in efficient natural resource management through an appropriate system including strengthening the capability of people and their communities to deal with problems, to protect and rehabilitate natural resources through a participatory approach (Liwgasemsan, 1996).

In order to have effective administration and management of National Resource and Environment; the programs should be management of water resource by watershed area, support the existing land use relevant to land capability and watershed classification. In its implementation strategy the 8th Plan emphasized on an integrated approach which all agencies are urged to cooperate in the design, implementation and evaluation of programmes together with full stakeholder participation (Northern Watershed Management project, 1996)

Gilmore (1999) expressed that the 8th NESDP had emphasized on three categories. The most important thing is the focus on the protection of remaining natural forests. The second emphasis given in the plan is the rehabilitation of forest and promotion of reforestation. The third emphasis is on people participation in the process of forest management in various forms.

Sukawong (1999) concluded that:

- the 1st – 2nd NESDP encouraged the exploitation of forest resources in order to bring foreign currency.
- the 4th NESDP realized the loss of forests, therefore, their conservation was initiated and their destruction banned until the 6th NESDP.
- during the 7th NESDP, forest cover continued to reduced by about 1 million rai (160,000 ha.) per year.
- the 8th NESDP encouraged the people to participate in the process, initiated community organizations, strengthened the community, campaigned for the understanding of government officials towards the community roles and promoted people's participation.
- the 9th NESDP states more clearly that provinces will be aimed at local planning.

The current 9th NESDP (2002 – 2006) aims at poverty alleviation and raise standard of living of the major population in order to sustain development and happiness of Thai people under the "**sufficient economy philosophy**". The plan is emphasized on human development (as stated on the 8th plan), strengthening communities, administrative and management natural resource and environment including development of science and technology in appropriate with Thai society. The target on natural resource is to conserve and rehabilitate Protected Forest area not less than 30% of the total country's area and

mangrove forest not less than 1.25 million rai; promote economic forest plantation 5% and private forest 5% of the total country's area. The strategic plan related to watershed management and natured resources are

1) decentralize the responsibility to local administrative organization.

2) restructuring rural and city development by encouraging economic at grass root with effecting economic growth and poverty reduction; strengthening communities, development group productions and area productions in order to make efficiency economic bases under the area approach participatory management.

3) restructuring mechanism and process of administration and management of natural resource and environment effectively by participation of local communities and the whole stakeholder in the society for sustainable used.

4) poverty reduction by making opportunity for poor people accessing the government services and be able to equally use of natural resources.

2.2 Forest Policy

Early forest policy (1900s) was emphasized on the extraction of timber for national economic development. Though forest policy was included in the First Five - Year NDP in 1962, but the implementation was not emphasized. The only significant policy statement in forestry was the establishment of the minimum permanent area to be kept under forest cover. The target in the Plan was 50 percent of the land area to be under forest cover, with a provision that, as population reached 30 million, the figure should be reduced to 40 percent (FAO, 1993). Due to over logging operation incorporate with encroachment for agricultural lands (particularly during the cash - crop boom in 1960s) have effected the rapid depletion of natural resources causing many of the serious environmental problems.

In order to unity the forest policy, the RFD established a committee to draft a national Forest Policy in 1982. The committee was mainly a government body consisting of various ministers, advisers and government secretaries. There was only one representative from the private sector the President of the Forest Industry Association of Thailand. The aim was to coordinate and consolidate the efforts of all concerned toward protection and utilization of the national forest resource.

The committee had the following terms of reference (FAO, 1993) :

- Assigning no less than 40 percent of the area of the country as forest area: 15 percent for Protected Forest area with appropriate measures under the National Park Act, Wildlife Protection and conservation Act and the cabinet resolutions on forest conservation; and 25 percent for Economic Forest area with measures under the Forest Reservation Act and Forest Act and any other laws or cabinet resolutions concerning economic forest development;
- Developing a guideline and target for long-term forest management, forestdevelopment and forest resource conservation according to the proposedNational Forestry Policy;
- Specifying measures for the conservation of forest environment, soil, water,
  rare flora and fauna and measures for prevention of natural calamity from flood and landslide and assigning the responsibility to various agencies for implementation;
- Supervising and expediting the operation of law - enforcement officials to deal with offenders and specifying procedures to follow in prosecution;
- Providing recommendations to the cabinet on policy and measures on forest management, forest development and forest resource conservation

such a increasing the use of modern technology to increase farm productivity, reduce farm area expansion, and provide a clear forest boundary to prevent forest encroachment, etc;

- Improving the forest administration system;
- Assigning all lands with slope of more than 35 percent as forest land and no land deed or title for such land may be issued under the Land Codes;
- Specifying policy and measures to promote private tree farming; and
- Undertaking any other activities assigned by the cabinet.

The specific terms of reference limited the scope for deliberations of the committee. The policy formulation process was detailed, with extensive readings and public hearings for academics, the public, politicians, and village leaders. Cabinet approved the policy in 1985.

The original ratio of protected to productive forest of 15 percent to 25 percent has already been changed to 20 percent in 1990 and back again by Ministerial decree. At the same time, the Seventh NESDP (1992 – 1996) was submitted for approval where a ratio was specified as 25 to 15 percent. The Cabinet approved the Plan. Also logging has been banned from all forests, so production forest is effectively zero. (FAO, 1993)

2.3 Policy and Prospective Plan for Enhancement and Conservation of National Environmental Quality, (1997 - 2016)

This section is summarized from Office of Environmental Policy and Planning, 1999. Preparation of the Policy and Prospective Plan for Enhancement and conservation of National Environment Quality Act of 1992, as stipulated in Section 13(1): The National Environment Board has the authority and obligation to propose the Cabinet for agreement, to be used as guidelines and a framework for administration and promotion and conservation of the nation's environmental quality. The document has been considered finally by the National Environment Board, and on 26 November 1996, the Cabinet passed a resolution accepting the Policy and Prospective Plan for Enhancement and Conservation of National Environmental Quality, 1997-2016.

2.3.1 The Policy and Prospective for Plan Environment and Conservation of National Environment Quality for the period 1997 - 2016, consists of six main policy as areas on Natural Resources, Pollution Prevention and Eradication, Natural and Cultural Environments, Community Environment, Environmental Education and promotion, Environmental Technology.

2.3.2 The vision for managing environmental quality includes:

(1) Natural resources are the resource base for sustainable development. Utilization of these resources for economic development purposes is based on conservation and social justice.

(2) Administration and management of environmental quality overall are decentralized to be effective, with power being transferred from central offices to local institutions. Thus, all government agencies, the private sector, NGOs and local level institutions can participate in formulation of policy and planning, and a monitoring program.

(3) People have awareness and are willing to work together to protect, and rehabilitate environmental quality.

2.3.3 The objectives for managing environmental quality includes:

(1) Protect and rehabilitate environmental quality for enhancement of quality of life and better health of human beings.

(2) Conserve natural resources to be the resource base for sustainable development, by rehabilitating degraded natural resources for future development, by preserving and sustainable using non-renewable resources.

(3) Boost institutional capacities to administrate and manage environmental quality, in addition to decentralizing power to provincial and local authorities.

2.3.4 The Policy and prospective Plan for Enhancement and Conservation of National Environment Quality for the period 1997 - 2016 on Natural Resources are:

(1) Increase efficiency in the use of natural resources; coordinate any utilization of natural resources and reduce conflicts; and, accelerate rehabilitation of degraded natural resources to be the basic inputs for sustainable development.

(2) Enhance administration and management of natural resources by systematic decentralization of power and authority from central offices to regional offices, in addition to strengthening relationships among government agencies, the private sector, NGOs, and local people.

(3) Support the application of resource economics for effective management of natural resources and establishment of social justice.

(4) Amend the legal and regulatory framework enabling support for more effective administration and management of natural resources, and recognition of rights and responsibilities of local people to demonstrate ownership of resources.

(5) Support the study, research, and establishment of a standardized database net work for natural resource.

(6) Increase conservation awareness of senior government officers, politicians at all levels, the private sector, and the general public, in order to integrate concepts for natural resources development and conservation, ensuring their movement in the same direction.

2.3.5 The goal to protect remaining natural resources, and rehabilitate degraded resources as the resource base for sustainable development over the long-term includes:

(1) Soil and Land Use

- Effectively use land resources for various activities on their capacity and conforming to environmental conditions, taking into consideration the impact on the country as a whole.
- Conserve, rehabilitate and improve degraded soil and land as the resource base for sustainable development, by accelerating rehabilitation of abandoned areas and solving the problem of soil erosion, that covers 59.5% and 41.7% of the countries area, respectively.
- Conserve areas containing unique ecosystems and geology based on the natural balance.

(2) Forest Resources

- Protect 50% of the country as forest cover; of this at least 30% is designated as conservation forest, and the remaining 20% is designated as economic forest.
- Utilize forest resources based on maintaining balanced ecosystems and environmental quality.
- Conserve biodiversity sustainability.

(3) Water Resources

Develop, conserve and rehabilitate surface and ground water resources in all basins, to ensure sufficient quantity and good quality on a long-term basis.

(4) Coastal Resources

- Preserve at least 1 million rai (160,000 hectare) of mangrove forest.
- Conserve and rehabilitate all types of coastal resources in order to maintain the natural balance of this ecosystem.

2.3.6 Policy on Forest Resource Management

(1) Increase forest cover to 50% of the country. At least 30% is to be designated as conservation forest, and 20% as economic forest, to ensure that demands of economic and social development are met, and to maintain the environmental balance.

(2) Utilization of forests must be in accordance with natural resource conservation practices.

(3) Protect remaining natural forest areas from encroachment.

(4) Reduce conflict over utilization of forest resources and other resource in forest areas.

2.4 Watershed Classification

In order to protect natural resources, land areas have been allocated for various uses such as areas to be permanently protected forests as watershed cover, commercial forests, and areas open for utilization all resources or conversion to agronomic uses. The watershed classification has been recognized in Thailand for many years. Several methods had been proposed but had not been widely accepted by the government resources management agencies. Finally, a Watershed Classification Project was established by the Cabinet under the National Environment Board. A new committee was formed for the Watershed Classification Project in October 1979. The National Economic and Social Development Board provided funds to Kasetsart University through the National Environment Board for conducting the project. The National Environment Board retained a technical panel of experts (the Watershed Classification Committee : WCC) for advice of technical aspects of the project. While the project was mainly funded by the Government of Thailand, technical assistance and support had been provided by the Government of Sweden through the International Union for Conservation of Nature and Natural Resources (IUCN)

A major objective of watershed classification is to formulate land use plans for the conservation of natural resources, and in particular water resources with a view to their sustainable use (Sriratana Tabucanon, 1998). In addition, watershed classification is the macro Land-use planning for the sustainable development of water resources (Tangtham, 1996).

Watershed classification initiated by the WCC is defined as the identification of inherent capacity of landscape unit to be managed and produced, either plants or animals. The terms “WSC” used by the WCC is synonymous with land use planning for watershed areas. It is an effort to make man’s uses of land as compatible as possible with the features of the environment and to mitigate on-site and off-site effect of use. All WCC members were asked to propose the parameters which are thought to be meaningful in characterizing watershed classes and must be available or can be made available in short period. Also constraints required for mapping large area of country (40 million ha) with limited time and computer system (PC) were informed to WCC members. It was agreed that parameters used in deriving prediction models must be stable in space and time and equally good data and must be numerically scaled to establish a mathematical relationship with WSC and for efficient production of WSC maps. Five variables were selected from more than 20 parameters initially proposed by concerned agencies. They are SLOPE, ELEVATION, LANDFORM, GEOLOGY and SOIL. Values for the five variables were read either from 1:50,000 topographic maps, or soil and geologic maps for each of 1x1 sq.km grid. A multi-variable analysis was employed to develop the mathematical relationships of variables with assigned WSC values for each region and/or basin. Detailed information on prediction equation derivation, field test and mapping procedures was described by Tangtham (1992).

The watershed classification and its land-use practices resolution have been implemented since 1985 for the Ping-Wang watershed in the northern region and implementation in all of the watershed regions of the country in 1995. The watershed classification and recommended land-use are shown in Table 4.

According to the watershed classification promulgation under cabinet resolution, there are about 58 million rai (9.3 million ha.) or 17.86 percent of the country area was classified as WSC1, about 26.7 million rai (4.28 million ha.) or 8.3 percent was classified as WSC 2. Therefore, about 26 percent of the country area was classified as head watershed areas. The rest of about 235.79 million rai (37.7 million ha.) or about 73.7 percent was classified as WSC 3-5.

After Cabinet approval, all government agencies concerned must follow the resolutions whereby measures and recommendations of land utilization applicable to each watershed class.

According to the cabinet resolution, watershed class 1 is protected or conservation forest which must be strictly permanent forest as head water sources. All land use are prohibited. Those communities located in the watershed class 1A must be relocated. Immediate reforestation program must be undertaken by RTG on the abandon shifting area. However the LANDSAT imagery survey in 1993 found that, over 2.76 million rai (0.44 million ha.) on the WSC I have been encroached (Thongmee,1999). Highland Community Development and Narcotics Control Master plan No.2 (1997 - 2001) illustrated that the population living in the highland mountainous areas in 1995 are over 853,000 people in 154,821 households of 4,297 grouping village (glum ban) within 20 provinces mainly in the northern region (the population who are settle on watershed class 1, have not yet classified). The population have been increased up to 991,122 people in 1997 (data from Public welfare Department).

Table 4 Watershed Classification and Recommended Land use, Thailand

WS CLASS	CHARACTERISTICS AND MAJORLAND USE RECOMMENDED	WATERSHEDS APPROVED BY CABINET
WSC 1A	Protection forest and headwater source area at higher elevations and steep slopes. Primary headwater areas should remain under permanent forest cover.	PING-WANG : 28 May 1985 YOM - NAN : 21 October 1986 MUN - CHI : 12 July 1988 SOUTHERN: 07 November 1989 EASTERN: 19 November 1991 WESTERN-CENTRAL-PASAK NORTHERN AND NORTHEASTERN BORDER : 21 February 1995
WSC 1B	Similar to WSC 1A but some areas cleared for agricultural use or occupied by villages. Primary headwater areas require special SWC measures, replanted to forest or maintained in permanent agro-forestry.	
WSC 2	Protection and/or commercial forest at higher elevations with steep slopes. Landforms less erosive than WSC 1A or WSC 1B. Secondary headwater areas may by use for grazing or certain crops with SWC measures.	
WSC 3	Unplands with steep slopes and less erosive landforms. Areas may be used for commercial forests, mining, grazing, fruit trees or certain agricultural crops with SWC measures.	
WSC 4	Gently slopping lands suitable for row crops, fruit trees and grazing with moderate need for SWC measures.	
WSC 5	Gentle to flat areas used for paddy fields of other agricultural used with few restrictions.	

Source : Office of the National Environment Board (n.d.) and OEPP (1996a)

3. Laws and Regulations Relevant to Watershed Management

Wongbandit (1976) concluded that "no law in Thailand is issues to specifically deal with the management of watershed resources as an integrated whole, but each law in general usually addresses each specific kind of resource and at the same time the law give some power to the officials concerned to create some conditions or requirements necessary for the protections and management of resources under their responsibility. However there are many levels of legal framework relevant to watershed management. These include Thai Constitution, 1997, laws as well as cabinet resolutions.

3.1 Thai constitution, 1997

According to Thai Constitution, 1997, the local people and organization should be involved in managing their natural resources. The constitution has further enshrine people's participation in forest management (Pragtong, 2000 sited from Poffenberger, 1999). Under the Constitution, local governments at the sub-district level, Tambon Coucils and Tambon Administration organization (TAO) have an important role in natural resource administration within their jurisdiction (Pragtong, 2000). TAO has clear responsibilities, as specified by the TAO Law in Clause 67, in which the TAO shall protect, maintain and preserve natural resources and environment within its responsible areas (Sukawong; 1999). There are some sections under the Constitution which are relevant to Watershed management as well as decentralization. These are:

Section 46 Person so assembling as to be a traditional community shall have the right to conserve or restore their customs, local knowledge, arts or good culture of their community and of the nation and participate in the management, maintenance, preservation and exploitation of natural resources and the environment in a balanced fashion and persistently as provided by law.

Section 56 The right of a person to give to the State and communities participation in the preservation and exploitation of natural resources and biological diversity and in the protection, promotion and preservation of the quality of the environment for usual and consistent survival in the environment which is not hazardous to his or her health and sanitary condition, welfare of quality of life, shall be protected, as provided by law.

Section 78 The State shall decentralize of power to localities for the purpose of independence and self-determination of local affairs, develop local economics, public utilities and facilities systems and information infrastructure in the locality thoroughly and equally throughout the country as well as develop into a large – sized local government organization a province ready for such purpose, having regard to the will of the people in that province.

Section 79 The State shall promote an encourage public participation in the preservation, maintenance and balanced exploitation of natural resources and biological diversity and in the promotion, maintenance and protection of the quality of the environment in accordance with the persistent development principle as well as the control and elimination of pollution affecting public health, sanitary conditions, welfare and quality of life.

Section 89 For the purpose of the implementation of this Chapter, the State shall establish the National Economic and Social Council to be charged with the duty to give advice and recommendations to the Council of Ministers on economic and social problems.

Section 290 For the purpose of promoting and maintaining the quality of the environment, a local government organization has powers and duties as provided by law.

The law under paragraph one shall at least contain the following matters as its substance :

(1) the management, preservation and exploitation of the natural resources and environment in the area of the locality;

(2) the participation in the preservation of natural resources and environment outside the area of the locality only in the case where the living of the inhabitants in the area may be affected;

(3) the participation in considering the initiation of any project of activity outside the area of the locality which may affect the quality of the environment, health or sanitary conditions of the inhabitant in the area.

3.2 Laws concerning forest and wildlife

(1) The Protection and reservation of Forest Act, B.E. 2481 (A.D.1938) which amended in 1953 and 1954. The Protection and Reservation of the Forest Acts was revise and become the National Forest Reserve Act, B.E. 2507 (A.D. 1964)

(2) The National Park Act, B.E. 2504 (A.D. 1961)

(3) The Conservation and Protection of Wildlife Act,B.E. 2535 (A.D. 1992)

The National Forest Reserve Act, 1964, the National Park Act, 1961, and the Conservation and Protection of wildlife act, 1992, are primarily intended to protect forest and wildlife, which authorize the government to designate certain areas as forest reserves, national parks and wildlife sanctuaries respectively. Entry into such areas is controlled by the government officials but in practice only the national parks and wildlife sanctuaries are under the strict control of the government.

3.3 Laws concerning land and soil

Agricultural Land Consolidation Act, 1974, and Agricultural Land Reform Act, 1975. These acts prohibit the use of land for purposes other than agriculture, the scope of their application is quite limited and they do not go far enough to specify what part of land should be used for what kind of agriculture or crops. Nor do they require landowners to carry out soil conservation. In fact the issue of soil conservation is addressed by the Land Development Act, 1983, but the Land Development Committee and its Secretariat established by the Act have no power to force landowners to comply with good practice of soil conservation. What has been mentioned seems to imply that land use control and soil conservation are not easily carried out by relying only on the powers of the official concerned under such acts (Wongbandit, 1996).

3.4 Laws concerning water resources

Laws concerning water resources will be discussed only on water in watercourse which are summarized from Wongbandit, 1996 as fallow:

1) Water in watercourses in general

Water in watercourses in general is free to all persons in Thailand due to the perception that running water was difficult to own, water was indispensable for maintaining life and water in Thailand was still abundant when the Section 1304 of the Civil and Commercial code states was promulgated. However, a kind of limitation or water use is imposed upon riparian landowners as Section 1355 of the Civil and Commercial Code states that "a riparian landowner has no right to withdraw water in the amount exceeding his reasonable need to the prejudice of other land abutting the same water way". So, all persons seem to have almost unlimited right to use water in watercourses in general, which is not good for the development, management and conservation of water resources and country as a whole since it is impossible to identify the scope of water right of each person.

However, there recently have some conflict on water user group between people on the upper watershed and downstream areas; for example in cases of Chom-Tong district, Chiang-Mai Province and in Pua district, Nan Province.

2) Water in watercourse in irrigated areas

The use of water in watercourses in areas irrigated by government projects, especially those under the responsibility of the Royal Irrigation Department (RID) is regulated

by the Royal Irrigation Act, 1942. In regulating water use, RID usually develops an irrigation system for conveying water to a particular area which is called an “irrigated area”. Watercourses, either natural or man-made, used for an irrigation purpose also are designated by the Minister of Agriculture and Cooperatives as “irrigation canals”. Once a watercourse is designated as an irrigation canal, the official concerned may according to Section 35 of the Act prohibit anyone from withdrawing or using water from the watercourse if such withdrawal or use would cause injury to another person. The gate of irrigation canal according to Section 25 can be closed or opened only by the official concerned. This indicates that the use of water in irrigation canals is actually under the control of RID.

3.5 Laws concerning environmental protection

Wongbandit (1996) stated that "the issues of environmental protection in Thailand is addressed by a large number of laws but the one considered as a framework legislation is the Enhancement and Conservation of National Environmental Quality Act, 1992 (ECNEQA). This Act addresses several interesting issues such as the creation of National Environmental Board, Pollution Control Committee and Environmental Fund, issuance of environmental quality standards, requirement of environmental impact assessment report for some projects, designation of pollution control areas and environmentally protected areas, imposition of strict liability upon the owners or possessors of pollution sources, and promotion measures for environmental protection".

Section 7 in order to encourage people participated on Environment protection and conservation, NGO as non-profit group or non-political party, can register to be a protected and preserved organization by the Ministry of Science, Technology and Environment according to the rules and regulations of the ministry.

Section 8 Legalized NGO as section 7, may get support or assistance from the state as follows:

1.) Provision of volunteers working the government officials regarding to this bill or relation, environment protection and promotion Law

2) Public relation, dissemination of information and knowledge to the people in order to create public awareness about environment conservation.

3) Support the local community to implement the project on environment conservation.

4) Research on environment conservation and propose to the government or concerned agencies.

5) Law assistance to the people endangered by discharge of dissemination of pollution and also being as representative of the suffered to claim for compensation and damage in the court.

3.6 Cabinet Resolutions concerning natural resources related to watershed management.

1) Cabinet Resolution concerning Watershed Classification

The detail of watershed classification have already mentioned in section 2.4. However, it have to be mentioned here that, according to the cabinet resolution, watershed class 1 is protected or conservation forest which must be strictly kept permanently as head water sources. All land use are prohibited. Those communities located in the watershed class 1A must be relocated. Immediate reforestation program must be undertaken by RTG on the abandon shifting area.

2) Cabinet Resolution on 30 June 1998

Cabinet resolution on 30 June 1998 states that those who are living and farming in areas of strict protection, National Parks, Wildlife Sanctuaries, and watershed class 1A and 1B:

- Communities settled before the date of establishment as a protected area shall be allowed to remain.

- Exceptions are those communities settled in ecologically sensitive zones and these community settled, which, when possible shall be resettled. An ecologically sensitive zone or critical area is an area which located surrounded or close to good forest cover or abundant biodiversities. It such these areas are disturbed there will be ecologically fragile or on the areas with susceptible to soil erosion, etc.

- To ensure that the implementation will be fair and ecologically appropriate the designation of sensitive areas in each site will be done with the full involvement of all local communities concerned, in conjunction with academics and forestry officials.

Procedures for 30 June 1998 resolution on forest protection areas

1) Confirmation the government policy on forest protection areas, not to allocate the forest lands to the office of Agricultural Land Reform.

2) Surving and registering the occupied forest areas.

3) RFD and agencies concerned have to proof the occupied lands by using aerial photographs taken before the declaration of forest reserve areas together with the other evidences.

4) The farmers cultivate the lands before the declaration, RFD should provide basic needs for the people and survey the farmland boundary. In the critical areas, RFD should find the other suitable areas for the farmers provided with infrastructures, on-farm and off-farm agriculture and land issuance. RFD will reforest those destroyed areas.

5) If the farmers cultivate the lands after the declaration, RFD should carry on the following activities:

- Removing farmers from protected areas and planting trees for watershed rehabilitation. Before starting the relocation, RFD has to provide arable lands, public works, on-farm and off-farm agriculture and land legislation for the farmers.

- If RFD can not move farmers immediately, the occupied forest lands must be controlled and the land allocation programs and basic needs should be provided.

6) Sustainable agriculture has to be implemented on the occupied areas to minimize the impacts on natural resources and environment.

7) Basic needs for self reliance are supported by the highland development agencies such as RFD, LDD, Agricultural Extension Department, Public Welfare Department, Highland Community Development and Narcotics Control Program, etc.

4. Organizations Relevant to Watershed Management

Northern Watershed Management Project (1996) summarized that " 38 Government departments are active in watershed management related activities, not one has sole responsibility for watershed management. As a consequence, activities tend to be somewhat uncoordinated and disjoined. The four main Government programs which fund activities include the National Rural Development Program, the regular programs of Ministry of Agriculture and Cooperatives (MOAC) line agencies, the Highland Community Development and Narcotics Control Program and the Government's first attempt at bottom-up planning whereas MOAC activities tend to be more centrally oriented. The Departments of Forest, Land Development, Irrigation, Livestock Development, Agricultural Extension and the Agricultural Land Reform Office are the main MOAC agencies active in watershed management. Whilst their plans are funded along agency lines, they often cooperate jointly in development projects with varying degrees of success. In spite of the majority of activities being funded under MOAC agency programs, the responsibility for National Watershed Policy Development lies with the Ministry of Science Technology and the Environment.

In planing and implementing any project / program. all government agencies have to comply with policies issued by several coordinating committees responsible for natural resources utilization, developments, management and conservation. Such coordinating bodies includes, among other things, the National Economic and social Development Board (NESDB), National Environment Board (NEB), National Water Resources Council (UWRC), National Forestry Policy Board, Committee for Solving National Security Problems Concerning Hill Tribe Population and Narcotic Plants, and Local and Regional Prosperity Distribution Committee (Wongbandit, 1996).

Though, many government departments and coordinating bodies are responsible for planing implementing in natural resources utilization, development, management and conservation for watershed management. However, the RFD plays an important role on implementing watershed management particularly on the head watershed areas, due to most of those areas are under forest reserves, National Parks and Wildlife sanctuaries which are the main responsibility of RFD.

In addition, under the Tambon Administration Act 1992 and the new Thai Constitution 1997, Tambon Administration Organization (TAO) will play a greater vole in forest management and involved in managing natural resources with in their boundaries.

Main organizations relevant to watershed management are as fellow:

4.1 Office of Environmental Policy and Planning

The Office of Environmental Policy and Planning (OEPP) was established after the government passed a new Enhancement and Conservation of National Environmental Quality Act 1992 as a unit of the Ministry of Science, Technology and Environment (MOSTE). The OEPP has the responsibility for establishing environmental policies and plans of the country in accordance with the Enhancement and Conservation of National Environmental Quality Act of 1992.

The OEPP is divided into 8 division and 12 regional offices. The detail of responsibility, roles and implementation, and organization of OEPP are in Annex 1 However, watershed management issue is the domain of Natural Resources and Environment Management Division. The division is responsible for :

- coordinating the management of natural resources to ensure the integration of the Environmental Quality Management Plan into the National Economic and Social Development plan;
- coordinating the designation of environmental Protected Areas and issuing ministerial Regulations prescribing any necessary protection measures;

- formulating specific plans related to natural resource management such as conservation of biodiversity, watershed classification, coastal and marine resources, water and mineral resources and energy, land and use.

Under the OEPP, a Watershed Resources Sub-Division of the National Resources and Environment Management Division has responsibility for coordinating on natural resources and environment management policy in the watershed areas particularly on the watershed class 1 and class 2.

Although, the OEPP has responsibility for watershed policy not an implementing agency. The OEPP is coordinating and monitoring three pilot watershed management project in different regions of the county, including Mae Taeng in the north, Nam Churn in the northeast, and Khlong Yan in the south. These pilot projects are aimed at coordinating the activities of various line agencies involved in watershed management in an integrated manner. On of the major lessons learned from these projects if that funding through the central line agencies makes the integration of activities at the field level very difficult (Northern Watershed Management Project 1996).

4.2 Royal Forest Department

The Royal Forest Department (RFD) was Founded by the King Rama the Fifth on 18 September 1896. The RFD was initially under the Ministry of Interior for 25 year, then it was transfered two to there ministries before it eventually become a unit of the Ministry of Agriculture (Ministry of Agriculture and Cooperatives) in 1935. The RFD has responsibility for all forest related activities including management, protection, conservation and rehabilitation, law enforcement, services and reseach.

The RFD is now organized into five Offices seven Administrative Divisions, 21 Regional Forest Offices, 75 Provincial Forest Office and District Forest Officers. The organization Chart is illustrated on Figure 2. The most important Office under RFD in regard to watershed management is Office of Natural Resources Conservation (ONRC). The main divisions related to watershed management under ONRC and National Park Divisions, Wildlife Conservation Division and Watershed Management Division. Watershed Research Sub-Division under the Office of Forest Research play an important role or research activities related to watershed management.

National Park Division : National Parks have represent special conservation areas controlled by specific laws and regulations which vary from governing forest reserve. Establishment of National Parks have been carried out under the legal framework of the National Park Act of 1964 for gazetting park areas and boundaries including the provisions for their management and use. Under the Act, the entry of visitors to the parks is encouraged and appropriate forms of eco-tourism are promoted along with the use of parks for educational purposes or scientific research. The law also allows any activities necessary for park maintenance, development and protection of natural resource. Under the law, a number of activities are specifically excluded including land ownership, clearing and burning, cattle raising and the removal of any flora and fauna.

Till 1998, National Park Division has gazettied a total of 19 National Parks covering a total areas of 11,041.99 sq.km. rai (11.04 million ha.).

Wildlife Conservation Division : wildlife Sanctuaries and Non-hunting Areas are under the responsibility of Wildlife Conservation Division. Those areas are also represent the conservation or protected areas which are strictly reserve forest which are good for watershed protection. The Wildlife Sanctuaries are governed by the Wildlife Preservation and Protection Act of 1960 and amended in 1992. The Act contains similar provisions of national parks with some additional restrictions as to their use. Till 1998, the RFD has Set up a total of 8 sanctuaries cover a total areas of 4,324.6 sq.km. rai (432,400 ha.).

Watershed Management Division : Watershed Management Division (WMD) is directly concern to watershed management implementation activities. The WMD is

responsible for conserving the area under forest cover in the country's watershed areas with particularly on the head watershed areas and for attending to provide sufficient needs of communities which utilize this resource for farming and livelihood activities. However, some of watershed areas have overlab with National Parks and Wildlife Sanctuaries. The objectives of the WMD are as follows:

- To manage watershed areas with pay attention to head watershed areas to provide sufficient and continuous supply of good water quality water through out the year.
- To prevent/alleviation soil erosion within the watershed areas and sedimentation to downstream areas.
- To improve the socio-economic status of the villagers living in the watershed areas through the efficient use of natural resources based on sound soil and water conservation principles.

Watershed management was initiated by the RFD in 1953. Since then, the RFD has played an important role on watershed management implementation, with particularly on head watershed areas. In 1965, the RFD was set up a Watershed Research Section under the Silvicuture Division, and eventually become a Watershed Management Division in 1975.

At the present, the WMD is under the Office of Natural Resources Conservation of the RFD. The WMD has divided its organization into six sub-divisions, and has established 19 Watershed Management Centers with 189 Watershed Management Units through out the country which concentrate in the northern region. The organization chart is shown in Figure 3. Further more, the WMD has been working in collaboration with other related organization such as Royal Project, Queen initiated Project etc. There are 274 officers which mainly Forest Officers graduated from Forestry School in Phrae Province and Kasetsart University, with 200 Permanent employee, and many of temporary employment.

The main activities have been carried out by WMD are as fallow:

1) Reforestation Program :

Reforestation have been carried out on the denuded areas by shifting cultivation from 1965 to 1996 cover an area of about 1.3 million rai (0.2 million ha.). The reforestation for watershed rehabilitation are mainly in the northern region 960,145 rai (153,632 ha.) particularly on The Ping Watershed about 577,730 rai (92,439 ha.).

Reforestation for watershed rehabililation in each region are as follows.

- Northern region	963,495	rai
- Central including West and East region	114,377	rai
- Northeast region	231,583	rai
- Sounthern region	15,940	rai
Total	**1,325,395**	**rai**

Since 1996, the watershed management has a policy on watershed rehabilitation through natural regeneration incorporate with enrichment planting. The main activities are fire prevention, area protection from encroachment, planting local tree specis 25 trees per rai and tending of planting trees. Total areas of 377,740 rai (60,438.4 ha.) was carried out from 1996 to 2001.

2) Vetiver grass for soil and water conservation :

Vetiver grass has been introduced for soil and water conservation since 1993. Vetiver grass has been enconraged to plant on highland agriculture, roads site, on eroded soils and dam site. About 40 million vetiver grasses were introduced for those purposes between 1993 and 2001.

3) Check dam :

Check dam is another activity for watershed rehabilitation. Series of check dams have been constructed to retain water flow in the stream, trap sedimentation, increase moisture, and enhancing vegetative growth. Integrated check dam or temporary check dam is constructed from local matherial such as stone, wooden branches, sack of sand or soil etc. It should be constructed on the upper part of the stream. Where the streams are wide and deep, semi-permanent check dam and permarent check dam should be introduced. These dams are also be able to collect water for consumption and small scale agricultural purpose.

Till 2001 amount of 42,366 integrated check dams, 1,009 semi-permanent check dams, and 600 permanent check dams have been constructed.

4) Community arrangement/ development :

As mentioned earlier, there are about a million people in 4,841 villages (glum ban) living in the head watershed areas, which are difficulty to move them out of those areas at the circumstant. They should stay in harmony with natural resources, make them stay co-exit in the forest areas with less impact. Therefore participatory approach has been introduced to cope those problems. In order to encourage local people participated on watershed activities, 3 tools consist of a) participatory land use planning (PLP) , b) Watershed network organization, and c) people forum have been employed by forest officers, community coordination officers and local communities.

a) Participatory Land Use Planning (PLP) : Participatory Land Use Planning by using 3-D model has been developed as a method of negotiation competing claims to resources and helping upland villagers to develop sustainable land management, especially through community forestry schemes. Through such negotiation, agencies and villages have agined access to knowledge and better mutual understanding so that conflict can be resolved. PLP has achieved a good degree of success and life in upland communities made more secure.

b) Watershed Network Organization : On the Watershed land , there are many tribal groups living for a long time and praticing different types of agricultural systems. Each village has specific problem concerned with forest and natural resources and had established a village committee. By using 3-D model for land use planning, each village issues regulation for their own and selects a representative to be watershed network committee. The roles of the watershed committee are:

1) To consider the problems and solution in the watershed,
2) To develop and issue regulation on forest and natural resources utilization,
3) To enforce the watershed regulations by punishment,
4) To coordinate with the government and concerned agencies.
5) To collaborate with the project staff and lacal communities.

c) People Forum : Strenghtening local people on dicision making about watershed management, the people forum will be held at community center or any available appropriate places, aiming to provide a chance for villagers to exchange their experiences and to resolve conflicts among local communities. Informations and documentations concerned with the government policy, forestry plan, marketing and agricultural technologies will be provided by the RFD in order to create common undershtandings among local people and to resolve conflict with the government offcials.

Till the year 2001, the watershed management units have carried out community development through participatory approach in 1284 villages.

Watershed Research Sub-Division : Watershed Research Sub-Division of Forester Environment Research and Development Division is an Unit under the Forest Research Office. The main responsibilities of the Watershed Research Sub-Division are research and monitoring activates cover the field of Forest Hydrology, Climatology, Ecology and Environment, Soil erosion and sedimentation and Secio-enonomice aspect. Up to date

there are 16 field watershed research stations have been established scattering in all main river basin through out the country.

Upper Nan Watershed Management Project : Upper Nan Watershed Management Project is a collaboration project between Royal Forest Department, Watershed Management Division and DANCED. The project area is on upper nan (right bank), Nan Province. The mandate of the project are:

- **Development Objective :** Sustainable management of the natural resource

in the upper right catchment of the Nan River is greatly improved by year 2010 through enhanced capabilities of local communities and government agencies.

- **Immediate Objectives :** A sustainable organizational framework and financial basis for continued forest protection and soil and water conservation efforts beyond the project period established in project villages and at the local government agencies. The area and quality of forest cover in the project area is increased considerably by the year 2003 through land use planning, improved cultivation practices and better fire control. Holistic land use systems aimed at sustainable and environmentally sound production and improved quality of life development by the involved parties and applied by a majority of land users.

The implementation capacity consists of

1) Royal Forest Department Staff
   * Project Coordinator, Watershed Management Division, Bangkok
   * Project Director, Center 12, Nan
   * Deputy Project Director
   * RFD Watershed Management Unit Chiefs (6)
2) Local Hire Staff
   * 6 Specialist staff
   * 15 Community Coordinators
   * 8 drivers
3) RAMBOLL Consulting Company, Denmark
   * Project Director, RAMBOLL
   * Project Coordinator
   * CDE Consultant

4.3 Land Development Department

Land Development Department was established on 23 May 1963 under Ministry of National Development, which was later abolished. Some years after their establishment, the government agencies were restructured, and as from 29 September 1972 Land Development Department was transferred to be under Ministry of Agriculture and Cooperatives. Land Development Department is responsible for soil survey and classification, soil analysis, land use planning, conduct experiments and carry various assorts of land development, assist farmers in soil and water conservation practices and soil improvement, seed production for cover crops and soil improvement materials, transfer technology from its research of soil development and soil science for multiple purpose use.

Other duties and responsibilities which stand in an Act of Land Legislation are…

1) To conduct soil survey and produce soil resource maps, including survey to obtain census of the land data concerning land economics.
2) To conduct landuse planning for the sustainable of land resources.
3) To conduct research and experiments in relation to soil, land improvement, soil and water conservation, watershed conservation, and other relevant issues pertaining to land development and farmer's requirements.

4) To disseminate land development technologies to relevant government personnel, farmers, and interest people.

4.4 Hilltribe Welfare Division, Department of Public Welfare

The Hilltribe Welfare Division (HWD) of the Public Welfare Department comes under the jurisdiction of Ministry of Labor and Social Welfare. The HWD has been working in the highland areas with highland people for more than 30 years. Its policy, as stated in its 7th Development plan, is "to assist hilltribe people in their development process to become self-sufficient and qualified Thai citizens through a participatory development process and a permanent settlement strategy." The HWD's policy focuses on three key areas (Northern Watershed Management Project, 1996 Quoted from Hilltribe Wellborn Division 1995) :

1) Political and Administrative : To provide village stability and sedentary land-use in accordance with the law; encouraging hilltribe people to become part of Thai society from neighboring countries.

2) Economic and social Development : To provide equal access to government services; improving living conditions and standards and promote self reliance in hilltribe people, provide job and occupation and reduce the number of addicts.

3) Natural Resources Management and Conservation : To enhance permanent settlement in accordance with natural resources conservation; introduce appreciate conservation forming practices; and maintain the balance of nature and the environment.

The HWD has responsibility for the welfare and development of Thailand's hilltribe people. The type and extent of services provided by the HWD varies according to the level of integration of each hilltribe community into the government system.

Because of security issues in many of the remote boder areas occupied by hilltribe people, their migratory life-styles, and the production and use of narcotic crops by some groups, a number of HWD's programmes are coordinated by a National Security Council committee and are implement under the National Security Programme, often in conjunction with the Thai military. In addition, the communities within Watershed Class 1A or other protected areas, has prompted a survey of highland villages currently conducted by LDD.

Figure 2 : Organizational chart of Royal Forest Department

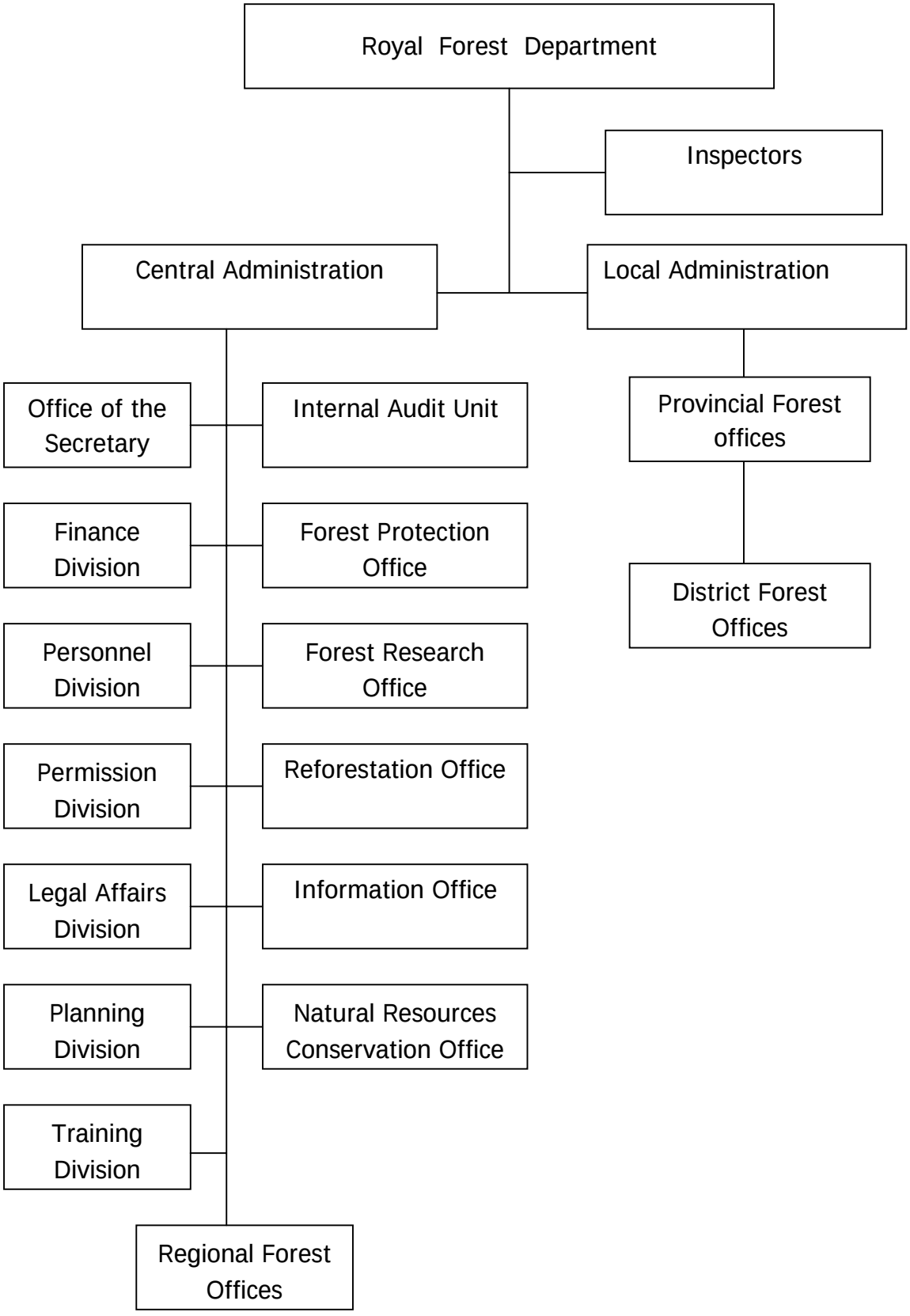
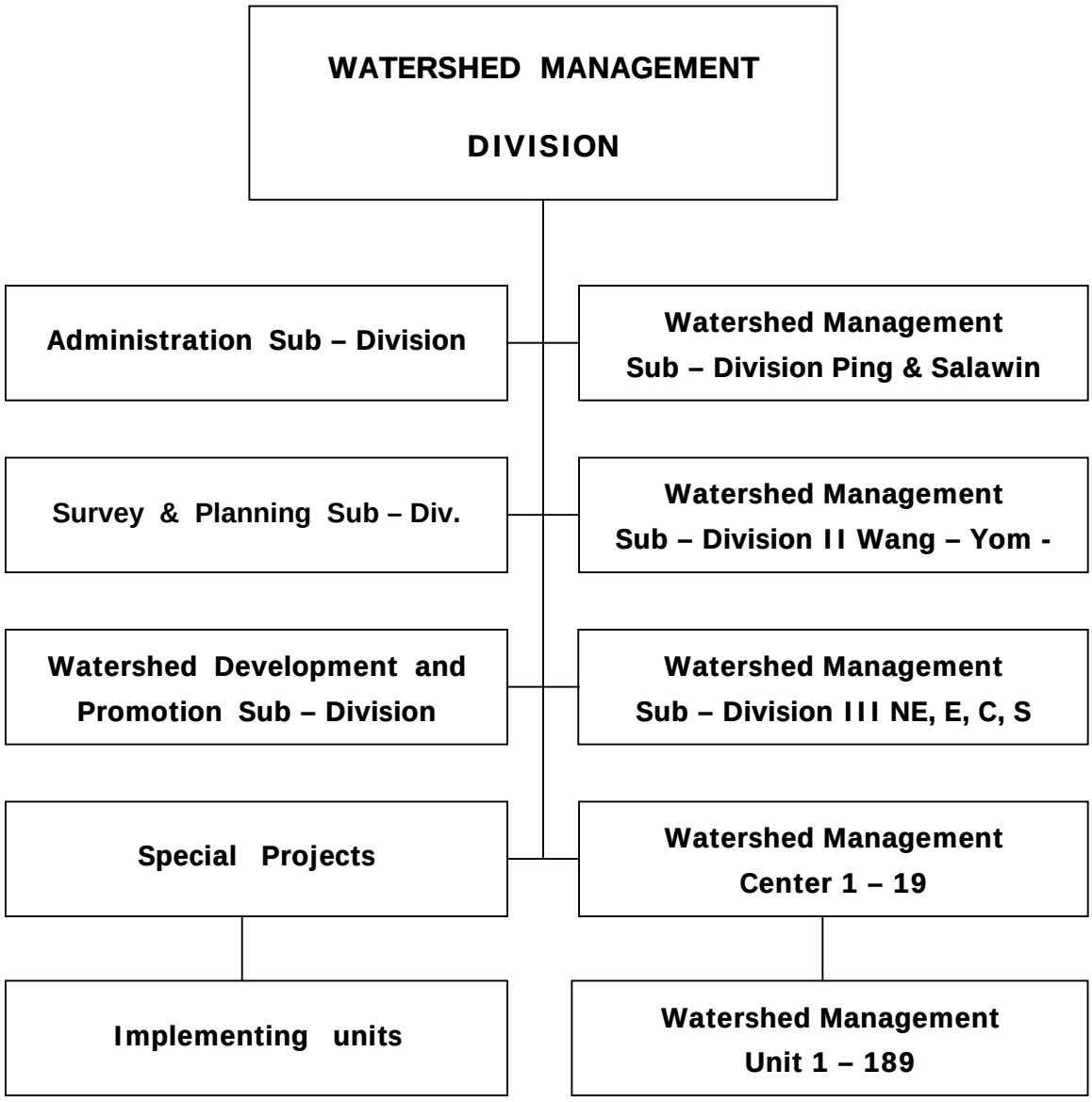


Figure 3 : Organization chart of Watershed Management Division



5. Watershed Area in the Lower Mekong Basin (LMB) in Thailand

5.1 Mekong River Basin

The Mekong River is one of the largest rivers in the world rises in the Tibetan Plateau at an elevation of 5,000 m. and flow in a generally southeast direction through southern China, northeast Myarmar, north and northeast Thailand, Laos PDR and Combodia before discharging to the South China Sea in southern Vietnam. The Mekong River Basin cover an area of 795,000 sq.km with a total length of 4,800 km, and a mean annual runoff of 475,000 $Mm.^3$ (Mekong River Commission, and Office of Environmental Policy and planning, 1999).

5.2 The Tributary Basins in LMB within Thailand

The main tributaries of the Mekong River Basin within Thailand consist of the Kok River Basin and tributaries of the Mekong River Basin in the north (Mekong N); while tributaries in the northeast consist of the Mun and Chi River Basins, and tributaries of the Mekong River Basin in the northeast (Mekong NE). The total catchment area within Thailand is about 184,495 sq.km (or about 23.2% of the 795,000 sq.km of the entire Mekong River Basin).

5.2.1 Kok River Basin

The Kok River Basin is a sub-basin of the Mekong River located in the northern region of Thailand and eastern Myanma. It has total catchment area of 10,560 sq.km; with a catchment area of 7,895 sq.km in Thailand.

According to watershed classification, there are 56 percent are classified as head watershed (watershed class 1 and 2), with the remaining of 44 percent belong to watershed class (WSC) 3 to 5 (Table 5). The figures show that most of the areas are on the head watershed which would be mountainous sloping land. This is a general topographic of northern Thailand with about 75% comprising of highland. In addition, there are 4 percent of the total area or about 315.8 sq.km were classified as WSC 1B. In the other word, forest areas on the WSC 1 have been converted into agricultural land or inhabitant, which might cause watershed degradation.

Corresponding to the decline in forest area, agricultural land has been expanding at a rate of around 2.5 percent annually. Around 20 percent of the arable land in the uplands is dominated by slash and burn cultivation where a variety of crops is grown MRC/OEPP (1999).

The sedimentation of the Kok River Basin was comparatively high with 116 ton/sq.km, while the sedimentation of the Mekong (N), Mekong (NE), Chi and Mun Basins were 77, 42, 29 and 27 ton/sq.km respectively (Table 5). Therefore, Kok river Basin is one of the most critical watershed area in the LMB.

In accordance with national hydrology committee, Kok Basin is divided into 4 sub-catchments namely Nam Mae Fang, Nam Mae Lao, Nam Mae Suai and Lower Nam Mae Kok cover area of 1,948 sq.km, 2,635 sq.km, 539 sq.km, 2,773 sq.km respectively. These four sub watershed should be more investigation.

5.2.2 Chi River Basin

Chi river basin is one of the tributary of the Mekong river basin in the northeast region of Thailand covering an area of 49,477 sq.km. The forest cover constitutes about 14 percent of the total basin in 1988 (Tangtham, 1992). Ongsomwang (1999) studied forest cover in 1995 was 13.8 percent of the total basin. The head watershed area accounts to 13.3 percent of the total basin which 10 percent belong to WSC 1A, others 0.7 percent in WSC 1B and 2.6 percent in WSC 2. The lower part of the basin cover an area of 86.7 percent of the total basin mainly are in WSC 4 and WSC 5, with only 3 percent of the total basin belong to WSC 3 (Table 5). In the other word, there are about 87 percent of the total

basin are located on plat to undulating suitable to agricultural and other uses. About 13 percent of the total basin is mountainous sloping land with should be kept for head watershed areas. According to the Lower Mekong Basin Forest and Land Cover 1997 map of the Forest Cover Monitoring Project showed that most of the forest cover in Chi basin belong to the head watershed of Lam Nam Choen (code 04.13), Nam Prom (code 04.12), Upper part of Nam Phong (code 04.09), and Upper part of Nam Chi (code 04.02) watersheds. Name of sub-basins, code, and areas of each sub-basin are illustrated in table 11. The sedimentation in Chi basin was 29 ton/sq.km with comparatively low due to most of the watershed area (87 percent) are in the plat to undulating lands. However, the 4 sub-basins mentioned earlier which are the most important head watershed of the Chi basin should be taken into consideration and should be more investigated.

Total population in the Chi basin in 1992 was 5,531,116 people in 1,147,967 household with population density of 112 person per sq.km. About 80 percent of the population earn their living on agricultural practices, with mainly paddy field. Upland crops are mainly cassava; the others are sugarcane, maize, beans etc. (ONESDB, 1994b).

5.2.3 Mun River Basin

Mun river basin is the largest river basin in Thailand covering an area of 69,701 sq.km in northeast region of Thailand. The mean annual rainfall varies from 1,000 mm. to 2,000 mm. over the watershed. The head watershed area accounts to only 3.4 percent of the total basin area. These areas are belong to WSC class 1A 2.0 percent WSC 1B 0.5 percent another 0.9 percent WSC 2 (Table 5). The remainder an area of 96.6 percent covers the lower part of the basin, which most of the areas (94.6 percent) are under WSC 4 and WSC 5. Most of the watershed areas are plat to slightly undulating. The remainder small portions of the watershed are mountainous area on Phanomdongrak Range in Nakornratchasima and along border line between Burirum, Surin,Sisaket and Ubonratchathani provinces and Combodia. In accordance with national hydrology Committee the Mun basin is divided into 32 sub-basins (Table 7). The forest cover constitutes about 10 percent of the total basin in 1988 (Tangtham, 1992). About 6,000 sq.km of forest area has been converted to other uses in the last 15 years period (1981 – 1995 / 1996) in the study area (Eiumnoh et al; 1996). The majority of forest land conversion is for agricultural purposes due to increasing population and food demand. The 10 percent or about 6,900 sq.km of the remaining forest cover at the present are mainly on the Phanomdongrak range. Though, forest cover in the Mun river basin is less than the other river basins comparing with the Mekong, Kok and Chi. However, the sedimentation was only 27 ton/sq.km comparing with 77,42,116 and 29 ton/sq.km of the Mekong (N), Mekong (NE), Kok and Chi basins respectively. The low sedimentation on the Mun basin due to most of the watershed area (96 percent) are in the WSC 3 – 5 with mainly plat to undulating lands.

5.2.4 Mekong River Basin

Mekong river basin (code No 02) in Thailand has been divided into there main unconnected sub-basins. They are namely Mae Chan and Mae Ing sub-basin in the north and Sakon-Loei sub-basin in the northeast with total area of 57,422 sq.km (ONESDB, 1994c). In accordance with national hydrology committee; the Mekong river basin (code No 02) has divided into 38 sub-basins as shown in Table 8. Mekong (N) or sub-basins in the north cover area of 9,920 sq.km or 17.3 percent of the Mekong river basin (code No.02) in Thailand. The remainder Mekong (NE) or sub-basins in the northeast cover an area of 47,502 sq.km or 82.3 percent of the Mekong river basin (code No.02) in Thailand.

1) Mekong (N)

Topographical features of the Mekong river basin in the northern part is characterized by mountainous topography, which consists of a series of parallel and longitudinal folded mountains. The folding in this part has resulted in small, long and narrow river valleys divided by steeply rising uplands with a considerable variation in elevation. A series of small tributaries drain into Ing river, the main tributary of Mekong basin in this region which flows down northwards into the Mekong at Pak Ing. Some other small tributaries such as Mae Chan, Nam ma etc. flow down eastward directly into the Mekong river (ONESDB, 1994c).

According to watershed classification, the head watershed of Mekong (N) consists of 35.8 percent of the total basin with 18.2 percent belong to WSC 1A, 4.6 percent in WSC 1B and 13 percent in WSC 2 ; while the lower part of the basin (WSC 3 – 5) covers an area of 64.2 percent (table 5). These figures have come along with the topographical features as summaries by ONESDB (1994c). In addition, there are 4.6 percent or about 456 sq.km belong to WSC 1 B. In other words, forest area on the head watershed was replaced by shifting cultivation or inhabitant. The forest cover in Mekong (N) was 37 percent in 1988 (Table 5). The most important sub watersheds should be investigated are Upper Part of Nam Mae Ing, Middle Part of Nam Mae Ing, Mae Nam Pung, and Mae Lao.

The problems in these sub-watershed include the forest areas on the head watershed have been replaced for shifting cultivation by ethnic minority groups. It results on soil erosion, sedimentation on down-stream areas, and also socio-economic problem of the watershed inhabitant.

2) Mekong (NE)

The general topographic feature of the Mekong river basin in the northeastern region is mainly plat to undulating with is separated from Mun-Chi river basins by the Phu Phan mountain range extending from Loei to Nakhon Phanom provinces forming the part of the Mekong river basin which is bordered by hill to the west and south and by the Mekong river to the north and east. It is an area of low relief sloping to the east draining a number of tributaries in to the Mekong river. The main tributaries in the northeast region are Mae Nam Loei, Huai Nam Som, Nam Mong, Huai Luang, Mae Nam Songkhram, Huai Nam Un, Huai Nam Kam, Huai Bangi, etc. and some small tributaries flow down eastward directly to the Mekong.

In the Mekong (NE) basin, head watershed covers area only 15.9 percent with 8.5 percent belong to WSC 1A , 2.2 percent in WSC 1B, and 4.4 percent in WSC 2; while the lower part of the basin cover an area of 84.1 percent which mainly are in the WSC 4 and WSC 5 of 22.8 percent and 54.8 percent respectively. It shows that most of the areas are in the plat to undulating low lands with small portion of mountainous sloping land on the Loei sub-basin in Loei province and head watershed of Huai Nam Kam and Huai Bang Sai sub-basins in Sakon Nakhon and Mukdahan provinces. The forest cover in Mekong (NE) basin was 20 percent in 1988 (Table 5). The existing forest cover are mainly on the mountainous areas.

Table 5 Watershed areas and classification and estimated sedimentation .

Code and main watershed	Total area (km^2)	Watershed classes (percent)						Forest cover in 1988	Sedimen -tation (t/km^2)
		1A	1B	2	3	4	5		
02 Mekong	57,422							22.9	
Mekong N	9,920	18	5	13	14	12	38	37	77
Mekong NE	47,502	9	3	5	7	23	55	20	42
03 Kok	7,895	36	4	16	12	11	20	38	116
04 Chi	49,477	10	0.7	3	3	24	60	14	29
05 Mun	69,701	2	0.5	0.9	2	20	75	10	27
Total	**184,495**								

Source : Modify from Tangtham (1992)

Table 6 Chi basin (04)

CODE	SUB-BASIN NAME	Area (SQ.KM)
0401	Mae Nam Chi (main river)	49,476.50
0402	Upper Part of Lam Nam Chi	2,488.92
0403	Lam Saphung	758.49
0404	Lam Krachuan	886.54
0405	Lam Khan Chu	1,634.82
0406	Second Part of Lam Nam Chi	3,807.64
0407	Huai Sam Mo	729.04
0408	Third Part of Lam Nam Chi	3,244.48
0409	Upper Part of Lam Nam Phong	4,424.34
0410	Huai Phuai	915.77
0411	Lam Phaniang	1,912.14
0412	Nam Phrom	2,320.40
0413	Lam Nam Choen	2,921.70
0414	Lower Part of Lam Nam Phong	2,385.72
0415	Huai Sai Bat	741.01
0416	Fourth Part of Lam Nam Chi	5,409.90
0417	Upper Part of Lam Pao	3,281.89
0418	Lam Phan Chart	657.25
0419	Lower Part of Lam Pao	4,263.79
0420	Lam Nam Yang	4,144.78
0421	Lower Part of Lam Nam Chi	2,547.88

Source : National Hydrology Committee, 1993

Table 7 Mun basin (05)

CODE	SUB-BASIN NAME	Area (SQ.KM)
0501	Mae Nam Mun (main river)	69,700.44
0502	Upper Part of Lam Nam Mun	2,997.46
0503	Lam Sae	1,173.62
0504	Lam Phraphlong	2,210.93
0505	Lam Takhong	3,517.68
0506	Lam Choengkrai	2,622.41
0507	Lam Chakkarat	1,613.87
0508	Lam Nang Rong	1,325.76
0509	Lam Pathai	622.92
0510	Lam Plai Mat	3,990.89
0511	Second Part of Lam Nam Mun	4,189.18
0512	Huai Aek	1,083.20
0513	Lam Sa Thaet	2,589.16
0514	Lam Phang Su	1,231.44
0515	Huai Ta Khong	1,151.58
0516	Lam Chi	4,590.59
0517	Lam Phlapphla	1,112.51
0518	Lam Tao	846.56
0519	Lam Sieo Noi	697.94
0520	Lam Sieo Yai	2,790.16
0521	Huai Thap Than	3,571.44
0522	Third Part of Lam Nam Mun	2,780.24
0523	Huai Samran	3,502.21
0524	Huai Tha	1,572.27
0525	Huai Khayung	1,774.58
0526	Huai Phong	787.70
0527	Lam Sa Bai	2,969.37
0528	Lam Sa	3,518.37
0529	Lam Dom Yai	4,846.24
0530	Lower Part of Lam Nam Mun	1,013.01
0531	Huai Tung Lung	843.38
0532	Lam Dom Noi	2,163.77

Source : National Hydrology Committee, 1993

Table 8 Mekong basin (02)

CODE	SUB-BASIN NAME	Area (SQ.KM)
0201	Mae Nam Khong (main river)	57,422.07
0202	Upper Part of Mae Nam Khong	766.48
0203	Nam Mae Chan	1,847.57
0204	Upper Part of Mae Nam Ing	1,087.52
0205	Middle Part of Mae Nam Ing	1,759.29
0206	Mae Nam Phung	1,049.25
0207	Mae Lao	1,176.87
0208	Lower Part of Mae Nam Ing	2,769.09
0209	Second Part of Mae Nam Khong	507.92
0210	Third Part of Mae Nam Khong	674.10
0211	Nam Man	622.30
0212	Nam San	876.41
0213	Fourth Part of Mae Nam Khong	807.70
0214	Huai Nam Puan	658.17
0215	Lower Part of Mae Nam Loei	2,902.04
0216	Fifth Part of Mae Nam Khong	1,822.75
0217	Huai Nam Som	1,056.28
0218	Nam Mong	2,717.83
0219	Sixth Part of Mae Nam Khong	540.39
0220	Nam Suai	1,309.75
0221	Huai Luang	3,424.63
0222	Huai Dan	680.85
0223	Seventh Part of Mae Nam Khong	2,407.18
0224	Upper Part of Mae Nam Songkhram	3,308.16
0225	Lower Part of Mae Nam Songkhram	3,029.90
0226	Huai Khong	629.82
0227	Huai Hi	714.72
0228	Huai Nam Yam	1,733.29
0229	Huai Nam Un	3,468.61
0230	Huai Thuai	787.56
0231	Eight Part of Mae Nam Khong	1,185.65
0232	Nam Phung	970.97
0233	Huai Nam Kam	2,537.15
0234	Nineth Part of Mae Nam Khong	643.79
0235	Huai Bang Sai	1,365.72
0236	Huai Muk	551.58
0237	Huai Bang I	1,589.79
0238	Lower Part of Mae Nam Khong	3,387.08

Source : National Hydrology Committee , 1993

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INFORMATION ON CATCHMENT MANAGEMENT IN VIETNAM

Nguyen Tu Siem [1)] & Phung Tuu Boi [2)]

1. GENERAL INTRODUCTION TO CATCHMENT MANAGEMENT IN VIETNAM

1.1. Main features of Vietnam's territory

Vietnam covers a total area of around 330 000 sq.km with a total population of 78 m. habitants. Three quarters of the country are covered by mountains and uplands, the remaining parts belong to plains of two major river basins: Red River (RR) in the North and Mekong River (MR) in the South.
Vietnam's territory can be divided into 7 ecological zones, i.e.: Mountains and Midlands of the North; Red River Delta; Central Coast; Central Highland; South Central Coast; Eastern Midland and Mekong Delta.

The topography of the uplands is complicated and dissected with a dense network of rivers. Most of big rivers are short and steep and pour directly to the sea, forming a great number of catchments and watersheds, which are commonly narrow and scattered.

About 80% of the total population (50.6 m. habitants) reside in the rural area. The average population density is 192 person/sq.km; however, majority of people crowd in the plains while in the highlands the population density is quite low (50-150 persons per sq.km). The annual growth rate is around 2% with much higher rate among the highlanders (up to 3% and higher). The mountain and highland areas is livelihood of about 20 m. habitants belonging to 50 ethnic minorities of the total 54 ethnic groups of the country. In the mountain region of the North there are 37 minority groups accounting for 58.2% of the area population.

Three main landforms can be found popular in the catchment areas: forested land, bare land and narrow wetland valleys along the water lines. Natural forest cover was reduced from 43% in 1943 to 29% in 1983 and 31% by 2000.

1.2. Catchments

The most critical catchments and watersheds of the country are located in three zones: the Mountains and Midlands of the North; Central Coast and Central Highland. Land in these areas is slope and cultivable land is extremely rare, especially in the steep and rocky limestone mountains. For example, in Song Da catchment of the North, approximately 70% area have slope more than 35o. Soils are generally shallow and poor, except certain plateaus derived from basaltic parent rocks of the Central Highland.
Lack of cultivable land is common for every catchments in Vietnam. Three above-mentioned zones account for 80% of total territory, but the area suitable for cultivation presents only about 45% of national agricultural land. As flatland is rare (589,000 ha or 6.35% of unused land), the potential for agricultural land expansion is very limited.

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2 CATCHMENT-RELEVANT NATIONAL POLICIES

There are at least four laws guiding the catchment management, viz.:
-Land Law (LL, 1993/1998)
-Law on Forest Protection & Development (FL, 1991)
-Law on Water resource Use and Management (WL, 2000)
-Law on Agricultural Cooperatives (1997)
A series of policies most important for land, water and forest protection, development and sustainable management have been promulgated (see Annexes).

Previously, in the centrally-planned economy, agriculture and forestry were based on state farms and cooperatives, thus the role of farm households were not properly recognized. Since 1988, farm household has been considered an independent and self-directed economic unit that has the right to use land, perform its own production and business and enjoy its results.

Since 1988, especially after the Land Law of 1993, land has been allocated to farmers on a long-term stable basis. Tax on land use has been reduced and fixed for long-term. The State has adopted a benign policy on rural credit for farm households. A new mechanism of agro-products distribution was adopted allowing free circulation of supplies and products at the best price for farmers.
The State used a national reserve fund as an instrument to regulate demand-supply relations in the market and a pricing stabilization fund to subsidize some essential agro-products and input materials in favor to farmers.

2.1. Policies on Land Use Planning

Of the total area of 33 million ha, about 55% (18 million ha) is now under “productive” use, of which 40% (7.35 million ha) is under agriculture.

Current land use of Vietnam

Agriculture land:	10.156 m.ha
Forestry land:	13.504 m.ha
Other lands	9.558 m.ha
Total	33.218 m.ha

The cultivated acreage in rainfed areas can be listed as follows:

North mountain and midland area:	1.3 m.ha
Western highland area:	0.6 m ha
East south area:	0.9 m ha
North central coast area:	0.7 m ha
South central coast area:	0.5 m ha
Total:	4.0 m ha

Land Law (LL, 1993, revised 1998)

The terms of the LL the most relevant to catchment management can be briefed as follows:

- Land ownership is people’s ownership.
- Land is under State management.
- Land is allocated to organizations, households and individuals (“owners”) to use for long-term (20 years for short term crops and 50 years for long term crops). This term will be automatically extended if the user doesn’t violate the regulations.
- Maximal area to be allocated for each household is limited in accordance to land resource availability of each locality.

- General limitation of forestry land to be allocated to each household is 30 ha.
- Five rights on land use include: transfer, exchange, inherit, lease and use as collateral. These rights are recorded in Land Use Certificate (LUC) given to users
- Land and forest of less protective importance and scattered protection areas are allocated to households and individuals for protection, reforestation and management.
- Land and forest of large block having important protection function are allocated to the Management Boards of Watershed Forest Protection Zones. Forest State Enterprises (SFEs) are also allocated certain areas of this type of land.
- The Management Boards and SFEs must re-allocate forest and forestry land to their worker households or individual workers to protect, tending, regenerating and new planting forest. This allocation is practiced in form of long term contracts (up to 50 years).

2.2. Forestry

The promulgation of Forest Protection and Development Law (FL) has been promulgated in 1991. After that the Government has issued about 150 under-law documents to form a legal framework for forest management.
These policies state that:

- State unanimously manages forest and forestry land
- Tree forest categories are defined
- Forest and forest land is allocated to organizations and individuals ("owners") to protect, develop and use for long term in accordance with the State projection and plans.
- Each forest watershed zone has a management board
- Benefit sharing from forest production is defined.

In accordance with the general land use projection, there are about 16 m. ha of forestry land which include protection forest; special-use forest and production forest. Protection forest amounts 6 m. ha (or 37.5%) of which:

Watershed forest:	5,715,000 ha (95.2%)
Windbreak forest:	130,000 ha
Coastal forest and Mangroves:	155,000 ha

(Source: Forestry Development Strategy 2001-2010; Draft of Sep. 2001)

Forest categories

Based on main use purposes, since 1986 present forest areas are divided into 3 categories (FIPI):

Total	9 302 200	100%
of which:		
special-use	898 300	9%
protection	487 700	37%
production	4 925 200	54%

Protection forests

Watershed forest is regrouped into the category of protection forests.
There are 41 zones of protection forest of which 4 are of national importance and placed under the the central management: Da River, Thach Nham, Tri An and Dau Tieng. Each zone has Forest Management Board. The remaining are managed by the SFEs or provincial Department for Agriculture and Rural Development (DARD).

Watersheds of 4 these projects are located in 12 provinces. Forest cover is poor (Song Da 9.8%; Thach Nham 10.4%; Tri An 14%; Dau Tieng 8%). From 1991-94 about USD 4.0 m. has been invested for forestation. About

20 000 ha forest have been planted increasing forest cover in these 4 catchments by 4-6%. Most important watershed is Song Da (Son La, Lai Chau, Hoa Binh, Lao Cai and Yen Bai) requires an establishment of 0.8 M ha of forest. 1991-94: about 30 M VND. Da basin has a total natural land area oof 2,568,000 ha of which 0.8 m ha is protection forests.

Special-use forests:

Special-use encompass natural reservations, national parks and cultural and historical forests. Each special-use forest zone has a Management Body and a Forest Team. In 1999 there were 103 special-use forests (including 10 national parks) on an area of 952,882 ha.

Production forest:

There are 413 state forest enterprises (SFE) which have two types: exploitation and establishment of forest. Most of them are now under the provincial management. At present, only 105 SFEs are still allowed to continue logging about 300 000 m3 of sawn timber per year.

Changes in Forest Cover:

Between 1943 and 1990 there was a steady and rapid decline in natural forest coverage from 43% (14.3 M ha) to 27.8% (9.175 M ha). Evergreen forest is being reduced the fastest. After that, the forest cover has been gradually increasing reaching 31% in 2000.

Forest benefit sharing:

In general, policies on benefit sharing is not clear and systematical. There are different regulations for forest benefit sharing depending on different forest categories.
For natural protection forest: forest owners are allowed to collect undesirable trees; non-timber products; thinning products. Thinning ought to be less than 20% to ensure a cover of minimum 80%.
For planted protection forest invested by the Government, owners are allowed to exploit supportive species; thinning products (no more than 20% to ensure a canopy of >0.6); selective logging of standard timber (less than 20%). Total logging must be less than 1 ha in important protection areas and less than 0.5 ha in very important protection areas. Annual logging area must not excess 10% of total mature forest.
For protection forest planted with the owners' capital, the owners can exploit maximum 10% of planted area. Total or selective logging can be applied, but the logged area must be < 2 ha in important protection areas and < 1 ha in extremely important protection areas. For production forest planted in the barren land with the owners' capital, the owners benefit 100% forest products.

2.3. Agriculture

Vietnam is predominantly an agricultural economy, based of paddy rice production. The sector accounts for 28.7% of the country's GDP, employs about 62% of the national labor force, accounts for 16.5% of state investments and originates 35% of total exports.

Agriculture provides livelihood for some 23.4 million laborers. Of these, 70.8% (16.3 million) are engaged in crop production; 14.4 % (3.32 million) in full time livestock rising. Agriculture employs about 3 million laborers, absorbing a greater proportion of the labor force than necessary (i.e. farm sizes are too small to provide full employment even at peak seasons). In per capita terms, Vietnam's cultivated land resource base is among the lowest in the world. The cultivated area per capita averages slightly over 0.1 ha and cropping intensities

(sow area divided by cultivated area) exceeds 140%. Approximately one-third of the cultivated area receives irrigation (mainly for rice).

Crop cultivation accounts for about three-quarters of the gross value of agricultural products. Food grain amounted to 33 m. tons in 2000 of which paddy rice was 30 m tons. Rice continues to dominate Vietnam's agrarian economy. Rice production increased from 27.7. million tons in 1997 to 28.4 million tons in 1998 and more than 30 million tons at present. Rice exports expanded to 3.5 million tons in 1997 and 4.6 million tons in 1999, making Vietnam the second largest world exporter of rice after Thailand. As in the past, the bulk of rice production came from the Red River and Mekong Delta, which account for most of Vietnam's exportable surplus. Production of other commercial crops such as coffee, rubber, sugar-cane were more heavily affected by market availability.
Coffee area expanded rapidly from 120 000 ha in 1990 to 300 000 ha in 1998. The 1997-98 harvest resulted in 391 000 tons of coffee beans for export and generated a revenue of USD 594 million, however, the 1998-99 crop was as much as one fourth lower as the coffee price was sharply decreased.
Although the rural economy benefited considerably from the early liberation which shifted production away from dominated collectives to private households and granted more secure land tenure arrangement, state intervention continues in a number of areas. There is a need to continue on the path of reform (e.g. to further liberalize agricultural trade, diversify from rice to other commodities, ...), provide rural infrastructure and credit and support agro-processing and rural industrialization.

2.4. Decentralization and devolution (local government)

The decentralization and devolution is taking place intensively, reflecting in the following aspects:

- Local authorities decide their development and financial plans by themselves;
- Provincial and district authorities are more empowered in land use planning and land allocation.
    - District People Committees are assigned to allocate land instead of Provincial Land Administration;
    - Quota on export and import has been moved;
    - State enterprises/farms are under equitation and private companies are in full position in their business;
    - Local authorities are assigned to establish relation and cooperation with foreign agencies; including with the border localities of neighboring countries;

2.5. Poverty alleviation

Since the implementation of a market economy, the rich-poor polarization has increased in certain places. In that context, the State has carried out a policy of hunger eradication and poverty alleviation and wealth formation for everyone. This policy is considered the most important at the national level. A number of decisive policies, solutions and activities have been implemented for poor regions and poor households to reduce their problems. The policy is based on the community's participation in helping the poor gain access to land, capital and training for better livelihood performance.

The State has also budgeted a considerable sum to help the poor regions and poor people, especially those in the mountainous and remote areas, including the ethnic minorities who receive top priorities. An employment-generating fund was set up to create more jobs for farmers in their native villages and to move people to new settlement areas if the old places became unacceptable. A number of projects have been conducted to ensure farmers with food, clean water, education, health care, transport and information.

2.6. Ethnic minority issues

Vietnam has 54 ethnic groups of which Kinh ethnic group is majority. Of the total population of 76 m persons the ethnic minority groups account for only 10% of the total population and mostly live in the mountainous regions. The population density in the rural area is 194 persons per sq.km. However, it differs from locality to locality. In the RRD delta the density is 839-1,092 person/sq.km. In the Western Highland and the northern mountainous regions, there are only 100 persons/sq.km. In these sparsely populated areas the local rural population shares high ratio, due to the fact that most of them are ethnic minorities.
On commercial development for Mountain Areas, subsidize price and transport cost were provided.
For remote areas (Zone II & III), loan interest is reduced by 15 and 30%, respectively.

2.7. Investment through main Target Programs:

- *Program 327 (1993-98):*

To invest in average USD 30 m. per year for implementing 427 projects on protection and establishment of forests in the catchment areas. The Project Management Board had a supportive role to assist farmers households who were main actor in implementation. A set of policies had been issued: allocate land to households and organizations; subsidize forest protection and plantation of protection forest; disburse loan with no interest for home gardens establishment; livestock, crop and forestry extension; loan and subsidy for commune road; etc.
During 6 years the Project has invested USD 200 m. and protected 1.6 m. ha natural forests, regenerated 0.7 m. ha, and newly planted 0.64 m. ha.

- *5 M ha reforestation:* (1998-2010)

  - Invest about USD 315 m for reforestation of 5 million ha to increase cover to 40%;
  - Protect existing forest;
  - Plant 2 m. ha protection and special use forests (including regeneration of 1 m. ha and new plantation of 1 m. ha);
  - Plant 3 m. ha production forest (including 1 m. ha industrial crops).

- *Program 133*: Hunger Eradication and Poverty Alleviation (started in 1998)

  - Fund for job generation;
  - Credit with no/low interest (Bank for the Poor);
  - Subsidies for crop, livestock and aqua-culture extension;
  - Partly subsidies for health care, education, etc.
  -

- *Program 135*: Socio-economic Development Program for particularly difficult communes in the remote areas (started in 1998). The most difficult communes selected to involve to the Program accounted 1,715 in 1998; 1, 870 in 2000 and 2,200 in 2001. Each commune received about USD 2,700 per year. The fund is used mainly to improve the infrastructure.

- *Resettlement Projects*: Started from 1968.

  - Up to now about 500 projects has been conducted.

  In 26 provinces, it has resettled 1.9 M persons with 800 sq.m land for food production (compared 300 sq.m in 1968).

- The Projects has supported 132 000 households of 0.8 m persons stabilizing in new sites.
- Up to 2000 there still has 280 000 households of 1.5 M persons nomad and shifting life.

- *Project of supporting extremely difficult ethnic minorities*: Started from 1992.

- *Drug control Program*: Focus on 524 communes growing poppy (1992).

- *Program of joint-commune centers*: Establish 500 centers for groups of remote communes (hospital, school, market, post office, etc.).

3. ORGANIZATIONS AND INSTITUTIONS RELEVANT TO CATCHMENT MANAGEMENT

3.1 Legislative level

Ethnic Council of the National Assembly: Monitoring of implementing the laws including those relating the ethnic issues. Periodically this Council organizes its monitoring missions. The last mission took place in 1998 Monitoring implementation of Laws. Forest Law has a number of terms not fit to market economy and innovation policies. Now the Law is being revised by the MARD.

3.2 Executive level *(see Annexes)**:***

Government organizations:

1. Ministry of Agriculture and Rural Development (MARD)
- *Forest Protection Department*
- *Forest Development Department*
- *Department for Water and Irrigation Constructions*
- *Five million ha of Reforestation Project*
- *Forest Inventory and Projection Institute (FIPI)*
- *Forest Science Institute of Vietnam (FSIV)*
- *National Institute for Agriculture Planning and Projection (NIAPP)*
- *Institute for Water Planning and Projection (IWPP)*

2. Committee for Ethnic Minority and Mountain Areas (CEMMA):

3. Ministry of Science, Technology and Environment (MOSTE)

4. Ministry of Planning and Investment (MPI)

5. Ministry of Labor, Invalid and Social Affairs (MOLISA)

6. General Department for Land Administration

7. General Department for Meteology and Hydrology

8. Mekong Committee (VNMC)

9. People's Committees of the provinces

3.3 Research and education *(see Annexes)*

1. Forest Inventory and Planning Institute (FIPI)
2. Forest Science Institute of Vietnam (FSIV)
3. Institute for Water Resources Research (IWRR)
4. Institute for Water Projection and Planning (IWPP)
5. National Institute for Agricultural Projection and Planning (NIAPP)
6. Southern Institute for Water Resources Research (SIWRR)
7. Forestry College (FC)

3.4 Donors/NGOs *(see Annexes)*

1. Danida - Water Sector Program Support (WSPS, MARD)
2. HELVETAS - Social Forestry Development Support (MARD)
3. FAO-BELGIUM - Participatory Watershed Management in Hoanh Bo district
4. GTZ- Social Forestry Project (MARD).
5. IUCN
6. CRES
7. WWF
8. CIDSE
9. CARE

4. OUTLINES OF THE SELECTED WATERSHEDS IN VIETNAM

Four watersheds are proposely selected and their main features are list below:

Table 1. Main features of the selected watersheds

Watersheds	Se Bang Hien	Sesan	Serepok	Nam Rom*
Location : Province District	16°20-16°40N 106°30-107°0E Quang Tri Huong Hoa, Khe Sanh, Lao Bao	13°45-15°14 N 107°10-108°24 E Kon Tum- & Gia Lai 8 districts + Pleiku city	11°53-13°55 N 107°,30-108°45 E Gia Lai , Dac Lac, Lam Dong 18 districts + Pleiku city	20° 50-21°35 N 102°50-103°10 E Lai Chau Dien Bien
Area (km^2)	818	11 450	17 300	1 699
Landscape Altitude Slope	Mountains and hills 250m - 600m > 20°	Mountains, hills, high plateaus 800 - 2 598m 10 - > 25°	Mountains, hills, high plateaus 700 - 2 400m 10 - > 25°	Mountains, hills 400 - 1 500m 20 - > 25°
River		Poko, Dakbla, Sa Thay	Krong No Krong Ana Ia Drang	Nam Khau Hu, Nam Phan, Nam Luong,...
Mekong	Ban Kong Don (Laos)	Stung Treng (Cambodia)	Stung Treng (Cambodia)	Luang Prabang (Laos)
Forest (ha)	29 116	730 000	1 110 597	27 221
Agric. Land (ha)	10 702	143 294	367 241	13 309
Population (person)	45 948	453 000	1 608 527	121 724
Living standard and mode	Very poor Shifting cultivation	Very poor Shifting cultivation Migrated from North	Very poor Shifting cultivation Migrated from North	Very poor Shifting cultivation Migrated
Ethnic minorities	Pa Co, Van Kieu, Kinh	Jarai, Bana, Sedang, Gie Trieng, Kinh, Brau,	Jarai, Bana, Sedang, Gie Trieng, Kinh	Thai , H'mong, Kho Mu, Laotien, Kinh
Road No Airport	No 14; No 9	No 14; No 24; No 40; No 661 Airport	No 14; No 26; No 27 Airport	No 279; No 42; No 12 Airport
Calamity	Draught & Flooding	Draught & Flooding	Draught & Flooding	Draught & Flooding
Others	Reservoir	Reservoir Yaly; Sesan 3, Sesan 4,... Protected area: Chu mom Ray	Reservoir National park: Yordon	Reservoir

Note: Vietnamese name Nam Rom is Nam Ou in Lao language.

Two provinces with potential watershed sites, namely Lai Chau and Quang Tri, have following features:
*(Source : Govement Decree No 286TTg **).***

Lai Chau province: Total area : 1,691,923 ha. DARD has 14 technical staff. Dien Bien forest enterprise has 22 technical staff managing 4,664 ha .
Quang Tri province has a total area of 465,134 ha.

Table 2. Land use and population of Dien Bien district, Lai Chau province

Communes	**Population**					**No. of House-holds**	**Land area in hectare**				
	Total	Thai	H'Mong	Kho Mu	Kinh		Total	Forest land	Natural Forest	Plantation Forest	Bare forest land
Muong Pon	3307	2161	765	369	12	562	12340	2557	2447	110	9283
Na Thau	8043	6385	1249	0	325	1242	12572	3166	2748	418	9466
Than Nua	7757	4813	816	291	1314	1435	8536	997	652	346	7538
Muong Phang	7205	5016	794	1227	162	1163	7868	1598	1212	386	6210
Thanh Minh								0			
Thanh Luong	7260	3159	7	43	3761	1810	2767	530	304	227	2237
Thanh Xuong								0			
Thanh Hung	5209	2155			3021	1149	1401	367	359	9	1039
ThanhChan	4264	2313	2	6	1663	924	1636	459	459		1177
Thang An	5821	3552	91		2192	1203	1021	812	48	764	209
Than Yen	6762	3248	2	3136	1465	1465	803	181	151	30	621
Pu Nhi											
Muong Thanh	5532	1488	87		3646		116	97		97	20
Pa Them	872	18		143		156	8670	1785	1785		6825
Noong Luong	4939	2906			2276	1000	1899	187	152	35	1212
Nong Het	7248	2848		8	4377	1557	591	351	1	350	240
Na U	1107	14	1076		15	176	6268	1427	1427		4841
Sam Mun	9184	5227			3876	1881	2848	1009	439	569	1837
Nua Ngam	4706	2176	659	694	447	848	6715	3138	3104	34	3577
Muong Nha	5602	2351	2260	371	23	858	16953	8649	8649		
Muong Loi	2995	530	229	1148	5	482	19924	2444	2444		17480
(New) Dien Bien District	**163967**	**57001**	**8035**	**4607**	**33047**	**20626**	**101478**	**26075**	**19965**	**3822**	**75404**

Source Personnel communication from the GTZ project.

Table 3. Land use and population of Huong Hoa district, Quang Tri province

Commune	Population			Land use (ha)			
	No of household	Total habitants	Of which Kinh people*	Total area	Agric.land	Forest.land	Unused land**
Huong Lap	287	1 970	15	22 057	571	8 131	13 313
Huong Phung	766	2 861	1 236	12 479	8	922	10 311
Huong Tan	426	2 358	997	2 462	715	19	1 676
Huc	432	2 538	162	6 488	619	393	5 450
Ta Tang	374	2 169	26	6 092	428	599	5 047
Thuan	385	1 975	269	2 108	275	20	1 790
Thabh	407	2 162	23	2 215	540	171	1 472
Huong Loc	311	1 621	81	4 979	291	582	4 090
A Xinh	262	1 440	28	1 615	337	144	1 116
A Tuc	290	1 563	32	1 223	421	42	713
A Doi	231	1 241	21	2 984	346	278	2 343
Xy	239	1 229	16	2 118	368	125	1 609
Khe Sanh	1 835	9 088	7 908	1 326	590	232	275
Lao Bao	1372	7 302	6 396	1 700	312	184	957
Tan Thanh	454	2 357	1 986	4 574	474	730	3 325
Tan Long	543	2 836	2 625	1 974	720	173	1 040
Tan Lap	609	3 084	2 413	1 927	798	61	986
Tan Len	646	3 281	2 999	1 294	637	36	573
Total	**9 869**	**51 075**	**27 233**	**79 622**	**8 450**	**12 844**	**56 093**

*Note: * Remaining is Van Kieu and Pa Co ethnic groups. **Remaining is water surface, road and housing quarter.*

5. INSTITUTIONAL AND POLICY ISSUES MOST RELEVANT TO CATCHMENT MANAGEMENT

5.1. Relevant policies, decrees and laws

Table 2. Prioritized Policies & Organizations

Policies	Guiding	Relevant	Within framework
Land Law	Land tenure Land allocation Land use rights		
Law on Forest Protection & Development	Forest classification Forest/land alloca-tion & contract		
Law on Water Resources Use and Management	Water resources protection, use & management		
Law on Agricultural Cooperatives		Principles & rules of coop. Establishment	
5M ha Reforestation Program (5MR), (1998-2010)		Formation of forest management system Investment for Forestry Development Land use planning Benefit sharing	
Water Sector Support Program			Building capacity on water delivery & management Building provincial capacity on basin management Clean water provision
Decree No 525 TTg (1993) on Mountain Area Development		Policies for socio-economic develop't of mountain areas	
Decision No 02 CP on Land Allocation			Guidelines for forest land allocation
Decision No 245			Responsibilities of authorities on forest/land mangn't
Decision No 163 on Forest land allocation		Recognition of community forest	
Decision No 170 CP on private sector		Policy on promotion of private sector	
Decision No 264 CP on credit for forest planting			Guidelines for special credit for forest planting

Policies	Guiding	Relevant	Within framework
Decision No 135 CP on Difficult Communes			Classification of difficult communes Support 2,200 remote communes
Decree No 09 LCTTN		Organization & operation of Disaster Control activities	
Decision 08 CP on Management of 3 forest categories			Regulations on managing special-use, protection and production forests

5.2. Comments on Policies and Implementation of Previous Projects

Principal changes of the policies to adapt to market economy:

- Ecological protection is now considered the most important function;
- A strategic shift from state forestry towards people's forestry;
- A renovation in roles of state forest enterprises with two separate functions: public service and business;
- A conceptual change: single plantation towards plantation combined with natural rehabilitation;
- A transfer of less important protection forest into a category where the production purposes dominate;
- Transition from direct intervention by State to indirect intervention through incentives;
- Decentralization strengthening local authorities.

Projects shortcomings:

A number of shortcomings have been found both in design and implementation of the Projects, i.e.:

- Too large subsidies while direct investment to households was low;
- Cost-effective principle was not followed;
- Top-down approach was dominant;
- Benefit sharing was mot clear;
- Technical guidelines were not appropriate; and so on.

Learning from the previous programs:

- Experience show that if the State covers the entire cost, sustainability will not be secured as the fund is not available and the long-term benefits are not seen by local people.
- Local population in the watershed should be in the center of the watershed management cause. It needs to promote them to engage to land use planning, forest management,
- Management activities should go parallel with improving the local livelihood.

Problems to be addressed:

- Identification of forest categories, and demarcation on the field is not completed;
- A significant area of forest and barren land is neither classified and identified on the field nor allocated to users by the competent authorities.
- A precondition for establishing local projects is to review and revise the overall land use plan in order to identify the forest land and classify it into 3 categories (special-use, protection and production).

- Before, the sustainability standard for forest owners simply included: no reduction in forest area; and stability of the logged volume. But in fact over the second half of the last century forest area steadly shrunken and degraded; up to 60% of natural forest became poor with volume reducing to under 100 m3/ha.
- How to certify sustainability in managing three forest categories is quite new
- Criteria and Indicators (C&I) for sustainable forest management have not been developed.

6. POTENTIAL PARTNERS/ORGANIZATIONS

Table 3. Potential partners

No	Organizations	Priority*
1	*Ministry of Agriculture and Rural Development (MARD)*	**1**
2	• *Forest Protection Department (FPD)*	**1**
3	• *Forest Development Department FDD)*	**1**
4	• *Five million ha of Reforestation Project (5MR)*	**1**
5	• *Forest Inventory and Planning Institute (FIPI)*	**1**
6	• *Forest Science Institute of Vietnam (FSIV)*	**2**
7	• *National Institute for Agriculture Planning and Projection (NIAPP)*	**2**
8	• *Institute for Water Planning and Projection (IWPP)*	**2**
9	♦*Mekong Committee (VNMC)*	**1**
10	♦*National Water Resources Council (NWRC)*	**1**
11	♦*Committee for Ethnic Minority and Mountain Areas (CEMMA):*	**2**
12	♦*Ministry of Labor, Invalid and Social Affairs (MOLISA)*	**3**
13	♦*Ministry of Science, Technology and Environment (MOSTE)*	**3**
14	♦*General Department for Land Administration (GDLA)*	**2**
15	♦*General Department for Meteodology and Hydrology (GDMH)*	**3**
16	♦ *Provincial Authorities of Lai Chau and Quang Tri*	**2**

**Notes: (1): essential (2): wanted (3): observed.*

7. CONCLUDING REMARKS:

• The catchment area in Vietnam, and selected watersheds in particular, are vital important in terms of socio-economic and environmental development as well as natural resources protection. They are livelihood of all ethnic minorities - the most prioritized target groups of a number development projects of Vietnam at present and in future.

• Major constraints for catchment development include, *inter-alias*, remoteness; poor infrastructure; degraded forest, water and land resources; threatened bio-diversity.

• Emerging issues include poor-rich polarization; food insecurity; low local investment capacity; low level of knowledge; traditional gender imbalance.

• A set of policies have been issued creating sound legislative background for development. State and local people are determined to work together pursuing a sustainable development and in fact have made a considerable step in catchment development (land tenure, reforestation, poverty alleviation, food security, water supply, etc.). However, the policies are still fragment with a numerous elements of a top-down approach. Development activities are widely subsidy-based, weak in cost-effectiveness and linkage and in certain cases low local participation..

• In catchment management, the following issues should be taken into account:

- decentralization and devolution is uncompleted;

- responsibility sharing is not clear between central and local levels;
- uncertainty of benefit sharing between the State and forest owners;
- land allocation should be speeded up;
- human resources and farmers' participation should be improved.

Hanoi, 17 February 2002

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25. IIED, 1998: Sustainable livelihoods in the uplands of Vietnam: Land allocation and beyond

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Annexes

Annex 1. List of Organisations/Institutions relevant to catchment management in Vietnam

	Name	Contacts	Mandate	Implementation capacity
1	Ministry of Agriculture & Rural Development (MARD)	2, Ngoc Ha, Hanoi Dr Le Van Minh, Director, ICD Tel: 8448 437520. Fax: 8447 330752	-Rural development; -Agriculture, forestry and irrigation; -Manage WSM projects	No
2	MARD-Department Forest Protection (DFP)	2, Ngoc Ha, Hanoi Dr Nguyen Ba Thu, Director Tel: 8447 335680. Fax: 8448 252695	-Protection and inspection of forests; -Inspection and protection of wildlives; -Manage Natural reserves.	-DFP local branches take part in accordance with their function
3	MARD-Department Forest Development (DFD)	2, Ngoc Ha, Hanoi Dr Nguyen Hong Quan, Deputy Director Tel: 8448 438 803. Fax: 8448 438793 E-mail: duan661@hn.vnn.vn	-Planning of forest development; -Manage protection and production forests; -Technical guidelines for exploitation and wood processing	-DFD and its local branches take part in implementation
4	MARD-Department for Water & Irrigation Constructions Management	2, Ngoc Ha, Hanoi Director: Pham Xuan Su Tel: 8447 335708 . Fax: 8447 335702 E-mail; phamxuansu@fpt.vn	-Planning water resources; -Water use management; -Management of irrigation construction	This department its local branches take part in implementation
5	MARD-Five Million ha Reforestation Project Board	A9 Building, No 2, Ngoc Ha, Hanoi.Dr Nguyen Ngoc Binh, Director of DFD Tel: 8448 438801. Fax: 8448 438793 E-mail: 5mhpart@hn.vnn.vn	-Assist Steering Committee (SC) and MARD in afforestation planning; -Assist SC & MARD in distributing plans and funds; -Direct, guide and supervise the implementation of 5m ha of forests; -Reviewing and reporting.	-Provide guidelines and co-operate in implementing reforestation in the grass-root level.

	Name	Contacts	Mandate	Implementation capacity
6	Committee for Ethnic Minorities and Mountain Areas (CEMMA)	80, Phan Dinh Phung street, Hanoi Mr Trinh Cong Khanh, D'ty Director Tel: 8448 437615. Fax: 8448 230235	-Standing agency of the Government -Assist in taking care of the minority and mountain issues; -Preparation of policies relevant mountain areas and ethnic minorities; -Implement main projects on ethnic minority and mountain area development.	-Provide policy guidelines on the issues relevant to ethnic minorities and mountain areas; -Assist in the poverty alleviation policies.
7	General Department for Land Administration (GDLA)	73 Nguyen Chi Thanh street, Hanoi. Mr Do Duc Doi Dep't for Land Registration Tel: 8448 343921 Fax:: 8448 352191	-Compile land law and under-law; -Manage land use planning; -Land inventory & registration; -Land certification; -Cadastral measurement.	-Provide policies and guidelines on land use plan; -Its branches co-operate in land mapping and allocation
8	Vietnam's Mekong Committee (VNMC)	23, Hang Tre, Hanoi Dr Nguyen Hong Toan Tel: 8448 255 596. Fax: 8448 256 929 E-mail:	-Governmental agency with MARD as standing body; -Cooperate sustainable development, utilization, conservation and management of Mekong basin in Vietnam.	-Co-ordinate all activities on the project design and implementation; -International cooperation
9	MOSTE-Department of Environment Management	67, Nguyen Du, Hanoi D'ty Director Truong Manh Tien Tel: 8448 223196. Fax: 8448 223189 E-mail: tmtien@nea.gov.vn	-Manage natural resources; -Supervise environment; -Technical guidelines on environment protection;	-Provide guidelines regarding the environmental issues; -Advise on natural resources management; -Environment impact evaluation
10	Management Board of Forest Projects	1A, Nguyen Cong Tru, Hanoi Director: Doan Diem Tel: 8449 712 542 Fax: 8449 712 542 E-mail: pmu@fpt.vn	-Manage and implement projects of reforestation.	-Provide experience in implementing reforestation projects

	Name	Contacts	Mandate	Implementation capacity
11	Department of Agriculture & Rural Development (DARD) of Lai Chau province	101, Muong Thanh, Lai Chau Tel: 023 826 184 Fax: 023 826 008 Director: Nguyen Van Cat	-In charge of agriculture, forestry and water use in the province; -Implementation projects on rural development; -State management on the relevant issues.	-Implementation planning; -Project management; -Partly involve in implementation; -Integrating the existing projects in the locality
12	Department of Agriculture & Rural Development (DARD) of Quang Tri province	256, Le Duan, Dong Ha Tel; 053 852 573 Fax:053 855 013 D'ty Director: Truong Khanh	-In charge of agriculture, forestry and water use in the province; -Implementation projects on rural development; -State management on the relevant issues.	-Implementation planning; -Project management; -Partly involve in implementation; -Integrating the existing projects in the locality
13	National Water Resources Council Chairman: Vice Prime-minister Nguyen Cong Tan. Standing member: Minister Le Huy Ngo	2, Ngoc Ha, Hanoi Secetary Dr Pham Xuan Su Tel: 8447 335708 . Fax: 8447 335702 E-mail; phamxuansu@fpt.vn	-Strategy & policy on national WRM; -Planning for inter-basin diversions; -Projecting water use and flood control; -Involve in international water sources management and settling disputes; -Resolution of any conflicts relating water resources.	-Guiding function

Annex 2. Donors and NGOs relevant to catchment management in Vietnam

	Name of NGOs	Contact	Mandate/Activity	Implementation capacity
1	DANIDA Project "Water Sector Program Support"	MARD. 2, Ngoc Ha street, Hanoi Mr Las Skov Andersen Tel: 8447 337 696 Fax: 8447 337 697 E-mail: watersps@fpt.vn	-Support water sector program; -Assist in capacity building and implementing national program; -Rural and urban water supply and sanitation.	Cooperator
2	GTZ - Social Forestry Development Project	1A, Nguyen Cong Tru, Hanoi Ms Elke Forster Tel: 8448 214768 Fax: 8448 214765 E-mail: gtzsfdp@netnam.org.vn	-Social forestry development; -Participatory planning; -Land use; -Poverty alleviation;	Cooperator
3	IUCN	13A, Tran Hung Dao street, Hanoi Dr Nguyen Minh Thong Tel: 8449 330012 Fax: 8448 258794 E-mail: office@iucn.org.vn	-Advise on strategic issues of natural resources; -Develop projects on natural resources management.	Cooperator
4	CRES	19 Le Thanh Tong street, Hanoi Dr Truong Quang Hoc, Director Tel: 844 825 3506. Fax: 8448 262932 E-.mail: cres@hn.vnn.vn	-Research on natural resources conservation; -Study and consultation on environmental protection; -Education and training staff in the relevant areas.	Cooperator
5	WWF	53, Tran Phu street, Hanoi Mr Hoang Thanh & Mike Baltzer Tel: 8447 338387. Fax: 844 733 8388 E-mal: erbc@wwfvn.org.vn	-Survey and inventory of wildlives; -Planning wildlife protection and development; -Execute the projects on wildlife	Cooperator
6	CIDSE	Road No 4, Quarter A-5 , Thanh Cong, Dong Da, Hanoi. Mr Laroche Marc Tel 8448 359939. Fax: 8448 359928 E-mail: reception@cidse.org.vn	-Small scale projects on rural development; -Poverty alleviation;	Cooperator

	Name of NGOs	**Contact**	**Mandate/Activity**	**Implementation capacity**
7	CARE	Floor 11, Fortuna Tower, No 6B, Lang Ha street, Ba Dinh, Hanoi. Mr Doolan Brian Tel: 8448 314155. Fax: 8448 314160 E-mal: carevn@care.org.vn	-Small scale projects on rural development; -Poverty alleviation;	Cooperator
8	HELVETAS	Lathanh Hotel, Doi Can street, Hanoi. Ms Sylvaine Rieg Tel: 8448 431750. Fax: 8448 431744 E-mal: helvetas@hn.vnn.vn	-Social Forestry Development Project; -Natural Resources in Ba Be watershed -Poverty alleviation.	Cooperator
9	FAO-BELGIUM	FAO Quarter, Room 202- B1, Van Phuc village, Hanoi. Mr Kumar Upadhuyay Tel: 8448 464268. Fax: 8448 464268 E-mal: faobel@fpt.vn	-Participatory Watershed Management Project; -Poverty alleviation;	Cooperator

Annex 3. Research & Education institutions relevant to catchment management in Vietnam

	Name	Contacts	Mandate	Implementation capacity
1	Forest Inventory & Planning Institute (FIPI)	Thanh Tri, Hanoi D'ty Director: Dr Nguyen Huy Phon Tel. 8448 615511 Fax: 8448 612 881 E-mail: phonfipi@fpt.vn	Survey of natural resources; Prepare development plan Monitor forest resources Research on forest inventory & planning	Cooperator -Forest inventory -Forest classification -Mapping, GIS
2	Forest Science Institute of Vietnam (FSIV)	Tu Liem, Hanoi Tel: 8448 389 031 Fax: 8448 389 722 E-mail: vkhln@vista.gov.vn Director: Prof. Do Dinh Sam	Research on sylvi-culture, forest economy, forest management Consultation on forest investment Post-graduate education on forestry	Cooperator
3	Institute of Water Resources Planning (IWPP)	Hoan Kiem, Hanoi Tel: 8448 254 091 Fax: 8448 252 807 E-mail: iwrp.hanoi@hn.vnn.vn Dr Dr To Trung Nghia	-Inventory of water sources -Planning water use -Water resources management methods	Cooperator
4	National Institute for Agricultural Planning and Projection (NIAPP)	61, Hang Chuoi, Hanoi Tel: 8449 716 408 Fax: 8448 214 163 E-mail: htqt-niapp@bdvn.vnmail.vnd.net Director: Vu Nang Dung	-Land survey -Land use planning -Land projection	Cooperator
5	Vietnam Institute for Water Resources Research (IWRR)	171, Tay Son, Hanoi Tel: 8448 522 086 Fax: 8445 632 827 Director: Nguyen Tuan Anh	-Studies on water resources management methods; -Method of water supplies; -Water sanitation	Cooperator
6	Southern Institute of Water Resource Research	Quan5, Ho Chi Minh City Tel: 8488 352 320 Fax: 8488 355 028 E-mail: siwrr2@hcm.vnn.vn Director: Dr Le Sam	Special for the South -Studies on water resources management methods; -Method of water supplies; -Water sanitation	Cooperator

	Name	Contacts	Mandate	Implementation capacity
7	Forestry College	Xuan Mai, Ha Tay, Vietnam Tel: 034 840 233 Fax: 034 840 540 Rector: Nguyen Dinh Tu	-Education of forest technicians at university level	Cooperator -Training in social forestry
8	Water Management University	299, Tay Son, Hanoi Tel: 8448 522 201 Fax: 8448 633 351 Rector: Le Kim Truyen	-Education of water management at university level	Cooperator
9	Northwest University	Dien Bien Phu town Lai Chau province	Recently established (2000) -Education for minority students	Cooperator In training