

WATER RESOURCES AND ENVIRONMENT
ADMINISTRATION LAO PDR

Strengthening Environmental Management Phase II - SEM II

*Draft final Case Work
Guideline 2007*

Integrated Spatial Planning for
Sustainable Development

WATER RESOURCES AND ENVIRONMENT ADMINISTRATION

Case Work Guideline for Training in Integrated Spatial Planning

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Foreword

This “**Case Work Guideline for Training in Integrated Spatial Planning for Sustainable Development**” has been prepared as part of the comprehensive capacity development project titled **Strengthening Environmental Management Phase II, SEM II**, undertaken by the **Water Resources and Environment Administration**, Lao PDR and funded by the **Swedish International Development Cooperation Agency**, Sida.

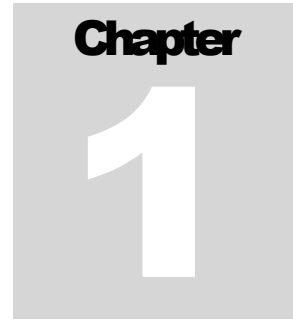
The Guideline is prepared to support training of government officials in the development and use of spatial planning as an instrument towards sustainable development and better integration of environment and economy. This edition of the Guideline is particularly developed to train members of the Secretariats of the National Environment Committee and the Provincial Environment Committees of Lao PDR.

The Guideline is the result of teamwork in the Training Team established under the SEM II Project by the Dept of Environment, WREA in April 2006. The Training Team comprised WREA officials, Local Consultants, Regional Experts from Khon Kaen University and International Experts from Grontmij | Carl Bro International:

- Mrs Bounkham Vorachit, Deputy Director General, Dept of Environment, WREA and Head of the Training Team;
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This training course, which this Guideline has been prepared for, is built on the principle that learning comes from practice, and therefore, during this training programme, the trainees will have the opportunity to use maps and spatial data and develop their own integrated spatial plan for a province in Laos – based on actual data and information.

Vientiane, September 2007



Introduction to Spatial Planning

To understand spatial planning we should look at three important aspects:

1. The planning process;
2. The plan itself; and
3. The use of the plan;

What is Spatial Planning

Integrated Spatial Planning is about planning for sustainable utilization of our surroundings or space and involves establishing a framework for land use, protection and enhancement of nature and environment, location of future residential and industrial areas and location and type of large investment projects.

It is the experience from all around the World that to have good environmental management, you need integrated planning. Integrated Spatial Planning is a prerequisite for good and sound environmental management.

What is a Spatial Plan

An Integrated Spatial Plan is based on a vision for the area in question and the plan puts the development vision of the area on a map and assigns specific measures and regulations to each particular area or zone.

An Integrated spatial plan is a set of maps that shows and indicates what kind of land use, activities, operations and constructions are preferred/not preferred or allowed/not allowed in certain areas. The plan guides investments and government policies from all sectors and interests in one shared desired direction. A spatial plan is not an action plan as we normally know it. A spatial plan is a regulatory instrument to integrate and balance competing or conflicting interests. The measures determined in the plan are designed specifically to promote the desired development or to avoid and move away from undesired development.

Box 1.1 shows some of the main planning issues often managed by spatial planning.

Sustainable Development

Spatial planning can be a valuable tool to support sustainable development by basing the plans, measures and interventions on key sustainability principles.

Box 1.2 lists some examples of how spatial planning can support and contribute to sustainable development. The list presents overall sustainability principles and general planning measures divided into three main categories:

- i) Environmental principles;
- ii) Social principles; and
- iii) Economic principles.

Spatial Planning

General planning issues

- THE PHYSICAL LAYOUT AND MAIN STRUCTURE
- PLAN FOR THE USE AND PROTECTION OF LAND, NATURE, FORESTS, WATER, AND MINERALS



- Agricultural land interests.
- Wetlands, Nature preservation areas.
- Preservation of cultural heritage etc.
- Recreational areas.
- Areas for protection of water resources.
- Areas for exploitation of mineral resources.

- Urban zones
- Major transport facilities
- Large technical facilities
- Large public institutions
- Location of Industries
- Structure of retail trade



Box 1.1

Sustainable Development and Spatial Planning

Examples of how spatial planning can support sustainable development

Sustainability principles	Spatial planning
<p>Environmental Principles</p> <ul style="list-style-type: none"> • Maintaining or enhancing the natural resources; • Minimizing consumption of resources; • Improving the environmental quality; 	<p>Planning Measures</p> <ul style="list-style-type: none"> • Land use zoning to locate development away from critical or sensitive nature and environment; • Reserve and protect forests; wetlands; groundwater and cultural heritage; • Reserve good soil for agriculture; • Promote and encourage cleaner production in agriculture and industry; • Promote or impose good standards of operation in agriculture and industry to prevent pollution of soil, water and air; • Locate new developments in close relation to existing settlements; • Regulate exploitation of resources based on resource classification and permission system
<p>Economic Principles</p> <ul style="list-style-type: none"> • Self – Sufficient economy • Poverty alleviation 	<p>Planning Measures</p> <ul style="list-style-type: none"> • Plan for the use of local resources for local production; • Ensure sufficient land for local agricultural production; • Organize partnerships for solving problems and developing potentials; • Identify areas with valuable or degraded resources and find suitable practices based on local knowledge and research for protection, rehabilitation and utilization; • Utilize local knowledge to develop measures/services that support a diversified agriculture and industrial production
<p>Social Principles</p> <ul style="list-style-type: none"> • Develop social capital • Access to services and amenities • Equity, transparency, democracy 	<p>Planning Measures</p> <ul style="list-style-type: none"> • Plan for green areas; • Plan residential areas for good access people/work/school; • Involve NGOs, mass organizations etc in the planning process; • Integrate local knowledge in the plan-making; • Locate services to give easy access for people (public transport, education, health, etc)

Box 1.2

Planning Process

The development of a spatial plan runs through three main work processes:

1. Baseline Data Analysis of the existing situation and problems and potentials;
2. Outlining objectives and strategies; and
3. Integration across sectors and synthesis of all aspects into a coherent balanced spatial framework

It is worth noticing that in real life the processes are **not** separate entities that can be dealt with in isolation from the others. It is an iterative process that runs through several loops before finalization.

Box 1.3 outlines the content and tasks in each of the main planning phases.

The Planning Process in Three Main Phases

PLANNING PHASES			
	Baseline Data Analysis	Objectives & Strategies	Integration and Synthesis
Technical Tasks	<ul style="list-style-type: none"> • Data Collection and reviewing • Establishing GIS and web-mapping • Analysis of data and checking validity • Analysis of problems and Potentials 	<ul style="list-style-type: none"> • Prioritize problems & potentials • Outline strategy including objectives and principles 	<ul style="list-style-type: none"> • Define criteria for planning maps • Transform data • Draft planning maps and measures • Balance competing or conflicting interests • Identify implementer s/ responsible partners
Participatory Methods	<ul style="list-style-type: none"> • Consultations among Planners, Professionals and People with knowledge about local issues. • Public Forums • Opinion Poll 	<ul style="list-style-type: none"> • Stakeholder workshops • Round table discussions, • Technical working group meetings • Collaboration Planning & Management Team meeting 	<ul style="list-style-type: none"> • Technical working group meetings • Public information • Round table discussions • Partnership initiatives • Public Forums • Collaboration Planning & Management team meeting
Results	<ul style="list-style-type: none"> • GIS and web-mapping with baseline data and maps 	<ul style="list-style-type: none"> • Vision for the area and Strategy setting the direction of 	<ul style="list-style-type: none"> • Planning Maps & Measures • Stakeholder agreement

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	<ul style="list-style-type: none">• Description and mapping of current problems and potentials• Listing and location of main problems	the plan <ul style="list-style-type: none">• Decision on planning issues	on plans and measures
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Box 1.3

Integration

Integration is a key concept in spatial planning. Ensuring integration can be done in several ways; there is technical integration, organizational integration, management integration, and integration of understanding and more:

Integration of data and terminology

Data integration is about ensuring that all agencies and organizations involved in planning have and use the same data set. If they don't use the same data they may reach different conclusions and will have difficulties agreeing. It also refers to ensuring that the same set of technical standards is used for data analysis, making maps, etc.

Integration through organization

Organizational integration refers to including all relevant partners in planning committees, working groups etc.

Integration through procedures

Integration can also be facilitated through management and procedures and processes. This involves participatory planning methods such as public forums, public awareness raising, consulting stakeholders, problem tree analysis, participatory mapping, etc. Likewise, this also concerns management procedures for the whole planning process e.g. defining roles and responsibilities of the agencies and organizations concerned, and procedures for giving information and responding to draft plans.

An important aspect of integration is creating a common understanding of planning concepts, goals and strategies. A central part of this is about having the same understanding of the terminology used during meetings, negotiations and in documents.

Integration of solutions

Finally, integration of solutions shall ensure that solutions proposed in the plan support both environmental, social and economic sustainability principles or as a minimum do not get in the way of solving other problems or have negative impact on other issues or areas.

Implementation and use of the Spatial Plan

When the Spatial Plan has been completed and approved it is ready for use. As mentioned earlier the Plan shall help ensure that development goes in the desired direction and that nature and environment are protected, rehabilitated and utilized in a sustainable manner in accordance with relevant policies, laws and national or provincial strategies.

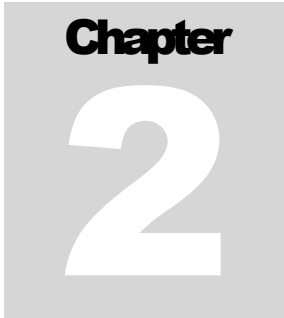
Thus the main functions of the plan are:

- ☐ Direct public investments to geographic areas and types of activities/projects stated in the plan and in accordance with the National and Provincial Socio-Economic Development Plan;
- ☐ Provide a common coherent framework for administration in concerned The Provincial Administration and Provincial Departments; this includes administrative issues such as: i) permits for high polluting activities; ii)

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permission to extract natural resources; and iii) location of new residential areas or industrial zones;

- ☞ Serve as a framework for environmental impact assessment (EIA) of proposed development projects and for strategic environmental assessment (SEA) of proposed programs and plans.
- ☞ Attract private investments through promotion activities, research, and incentives directed towards geographic areas and project types stated in the plan in accordance with the National and Provincial Socio-Economic Development Plan;
- ☞ Ensure protection of valuable or sensitive environment, nature; and cultural heritage;
- ☞ Help private investors find suitable locations for their investment projects;
- ☞ Present to the public the preferred development in the province using plain non-technical language and maps that are simple and easy to understand;
- ☞ Enhance coordination between central & Local






Baseline Data Analysis

The Baseline Data Analysis shall provide an overview of the economic, social and environmental conditions in the province with an emphasis on trends, relations and impacts.

The preparation of a Baseline Data Analysis is the first step in the planning process and the intention is that the analysis shall provide an overview of the present situation as well as an estimated best guess of how the future might look if present trends continue. This shall include identification and assessment of significant impacts on environment, economy and social conditions. Another important outcome of this activity is a list of available data and evaluation of their usefulness.

For the purpose of this Case Work, the Baseline Analysis will concentrate on the following three components:

-  Nature and Environment
-  Business and Production
-  People and Living

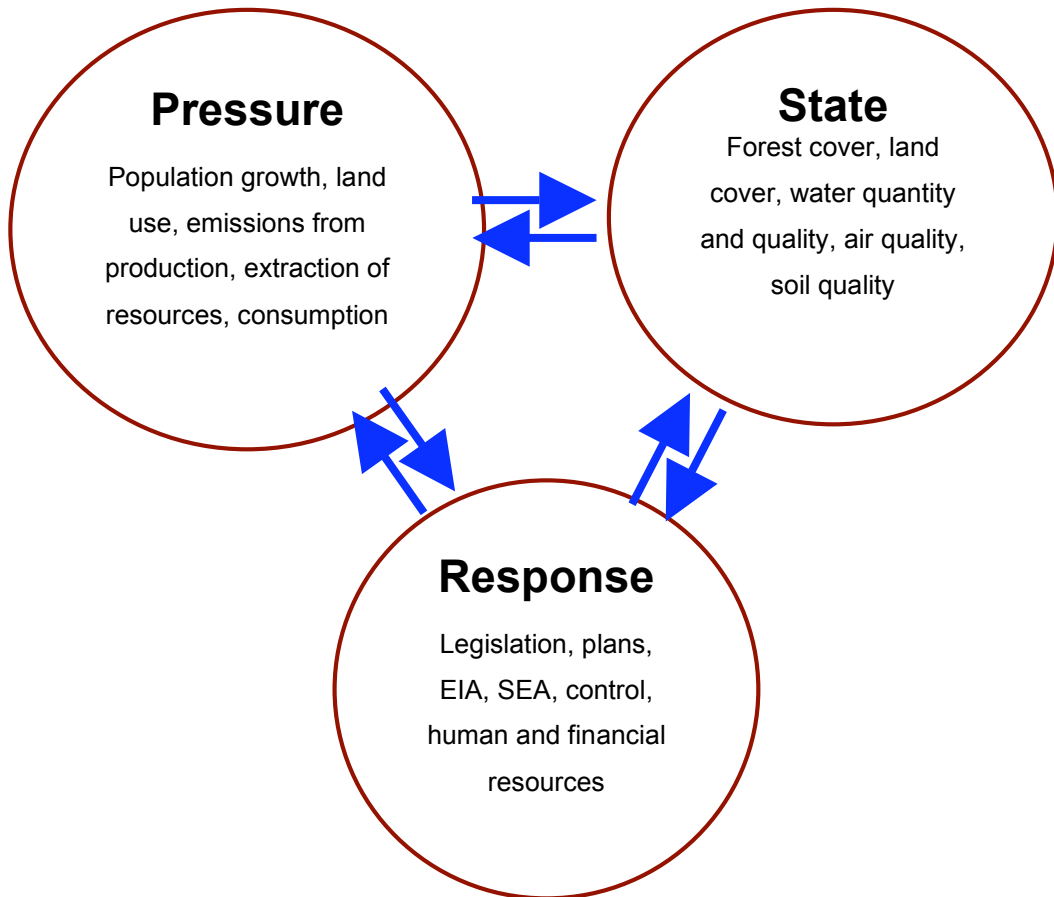
Data and Information System

In the course of the data analysis phase a data and information system should be established. It is recommended to build the system on GIS and web-mapping.

Analytical Framework

The analytical framework for understanding the provincial planning process can be shown as the interaction between three processes; pressure created by human population and activity, state of nature and environment and the "response" by stakeholders to the situation. This relationship is shown in the following diagram:

Analytical Framework



Indicators

It is advised to select a set of simple indicators that are easy to understand, and to present these indicators graphically, in tables and on maps.

In general indicators can be divided into three groups (related to the analytical framework): 1) Indicators of conditions or state; 2) Indicators of impacts or pressures; and 3) Indicators of performance (response). In the case of natural resources and environment indicators usually concern conditions or impacts (group 1 and 2).

In selecting indicators, there are two main considerations: On the one hand, the indicator should be easy to understand for all partners and the public; and on the other hand the indicator should also show and represent the real situation or trend as accurately as possible. These two criteria do not always come together, because

while a simple indicator may conform to the first criterion, a more sophisticated, advanced and technically correct indicator may be needed to serve the second criterion.

It is worth bearing in mind that for the purpose of giving information to the public and creating public participation simple indicators (the first type) are very useful. Technical or complex indicators - on the other hand - are useful for professionals when conducting technical assessments.

Other relevant considerations for selecting indicators are listed below.

The indicator should be:

- related to sustainable development principles and existing National or Provincial strategies/targets;
- based on reliable data that are regularly collected and updated;
- leading to the setting of targets;
- significant and relevant to the problem or issue in question;
- relevant and meaningful to the planning partners and the public.

Nature and Environment



Nature and environment is an inseparable element in quality of life as it forms the basis for both production and living

Data Collection

Nature and environment are traditionally divided into the following categories:

- ☐ Soil, Land, Topography, Landscape, Land use;
- ☐ Minerals; Oil and Gas;
- ☐ Forest, Wetlands, Flora and Fauna;
- ☐ Inland Surface Water Bodies;
- ☐ Groundwater;
- ☐ Marine Water Bodies;
- ☐ Air, Climate;
- ☐ Cultural Heritage;
- ☐ Administrative boundaries related to nature and environment;

Data collection should be aimed at defining location, quantity and quality.

Analysis of trends

The analysis should aim at identifying changes and trends in physical conditions (quality/quantity/distribution/diversity) of e.g. air, water, forest and soil; pointing out causes and effects of these changes and trends and locating the geographic areas exposed to change.

Boxes 2.1-2.4 give some examples and help to define the depth and breadth of the analysis. The examples of maps and tables show in the boxes are from the Khon Kaen Holistic Provincial Plan 2003.

Keep in mind that we are not doing scientific research – we are simply trying to get an overview of the situation.

Forest

Data analysis for spatial planning on provincial level

Technical Tasks

- Data transformation grouping forest types in a few categories.
- Compare forest cover over a longer period of time and assess the trend
- Compare with targets
- Prepare maps and graphs
- Assess the causes to the trend in forest cover

Important Data

- Existing Forest
- National, Provincial and District Protected Areas
- National parks, wild life sanctuaries
- Watershed classification

Key Result

- Map showing existing forest, National, Provincial and District Protected Areas
- Map showing watershed classification
- Presentation of trend in forest cover

Participatory Methods

- Public Forum
- Field studies, consulting with farmer networks and local administrators
- Technical meetings among professionals

Box 2.1

Soil and Land

Data analysis for spatial planning on provincial level

Technical Tasks

- Compare land use data over a long period of time and assess the trend
- Assess and point out areas with risk of soil degradation
- Assess and point out areas with very good soil quality
- Find out the main causes to the trends in soil quality/land use/drought
- Potential solutions to soil/land problems

Important Data

- Land use
- Soil types and groups
- Land forms and topography
- Local knowledge on soil quality
- Drought risk areas
- Flood prone areas

Key Result

- Map of land use
- Map of soil degradation risk
- Map of drought risk areas
- Map of flood prone areas
- Description of main causes/effects and potential solutions

Participatory Methods

- Public Forum
- Field studies, consultations with farmer networks and local administrators, extension work
- Technical meetings among professionals

Box 2.2

Surface Water

Data analysis for spatial planning on provincial level

Technical Tasks

- Assess trend in water quality
- Assess trend in water consumption
- Compare water quality with standards and classifications
- Point out areas where good water quality is particularly Important
- Point out flood prone areas

Important Data

- Water bodies, lakes, rivers, streams
- Irrigation canals
- Water quality data
- Water pumping stations
- Catchment areas
- Water consumption data
- Water quality classifications and standards
- Sources of pollution
- Protected water bodies

Key Result

- Map of drought risk areas
- Map of flood prone areas
- Map and description of water quality
- Map showing water bodies with high risk of pollution
- Map showing main usage of water bodies
- Overview of surface water consumption

Participatory Methods

- Public forum in critical area (water issues)
- Field studies and consultation with villagers, village headmen, environmental volunteers and local administrators
- Technical meetings among professionals

Box 2.3

Groundwater

Data analysis for spatial planning on provincial level

Technical Tasks

- Analyze and present indicators of yield and water quality in the aquifers
- Transform yield and quality data into a few simple categories
- Identify recharge and discharge areas
- Determine direction of groundwater flow

Important Data

- Groundwater yield and quality (well data)
- Topography and groundwater table
- Groundwater extraction
- Location of wells
- Geological layers

Key Result

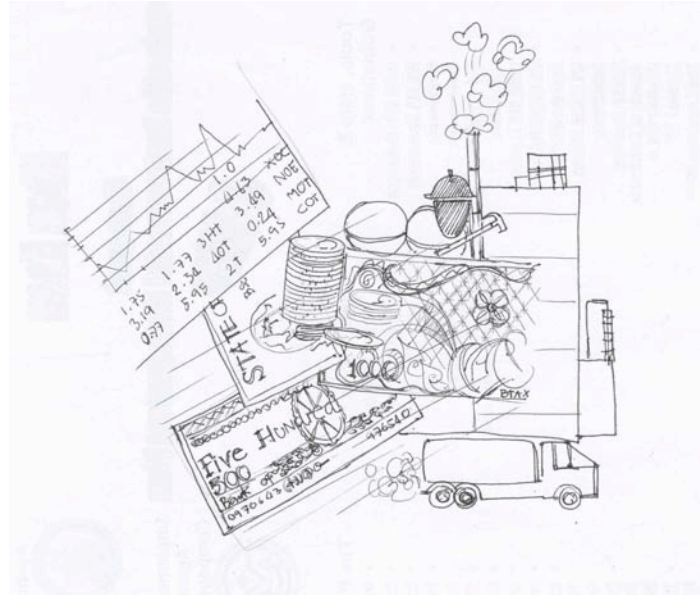
- Map showing aquifer yield
- Map showing aquifer water quality
- Cross-section of geological layers
- Groundwater recharge and discharge areas and flow direction

Participatory methods

- Consultations with stakeholders
- Public Forum
- Technical meeting

Box 2.4

Business and Production



Business and production is a main factor in economy and development; but also in exploitation of resources and generation of waste.

The main data items are listed below:

Data Collection

- ☐ Gross Provincial Product (GPP), Gross Regional Product (GRP) and Gross Domestic Product (GDP) over a longer period of time (10 years);
- ☐ Number, size, and type of enterprises in each major sector;
- ☐ Employment/unemployment figures;
- ☐ Number of employed persons in each major sector and number of employed persons by type of industry;
- ☐ Number of industrial establishments and employees by type and size of establishments;
- ☐ Number and location of industries and other large technical facilities that may cause pollution such as oil products depots, storage of fertilizers, toxic or hazardous chemicals, and waste disposal and treatment plants,

Analysis of trends and impacts

Box 2.5 highlights some important characteristics of Business and Production.

Business & Production

Data analysis for spatial planning on provincial level

Technical Tasks

- Indicate the economic contribution of the main sectors
- Present employment figures in terms of number of employed persons by sector, by type of enterprise and by size
- Analyze the structure of the main sectors in terms of size and type
- Present the geographic distribution of industrial enterprise by type
- Analyze important factors for development of business and production

Important Data

- GPP and GDP - 10 year period
- Number, Size, Type of enterprises
- Employment/unemployment figures
- Location of industries
- Production volume in the main sectors over a 10 year period

Key Results

- Map showing location of industries
- Graphic presentation of main sectors in terms of economy, employment, volume
- Description of the structure and type of main sectors
- Description of main factors for development of business & production (agriculture/industry)

Participatory Methods

- Stakeholder consultations
- Technical meetings among professionals

Box 2.5

As indicated in Box 2.5, general economy could be analyzed by conducting a simple comparison of the sectors' contribution to the Gross Provincial Product (GPP) and how this has developed over a longer period of time, say 10 years. This could further be compared to the Gross Domestic Product (GDP).

The analysis of the employment structure should indicate whether there is a general labor problem - unemployment or lack of labor. Furthermore, by comparing with the economic situation, we may see whether growth sectors employ an equivalent large proportion of the workforce; and whether economically declining sectors holds a proportional part of the workforce.

In terms of spatial planning the most interesting part of this analysis is the structural analysis and geographic distribution. The structural part concerns size and type of enterprises. Size could be in terms of employees, production volume/value, area (e.g. for farms) or storage capacity (e.g. oil depots). This should indicate whether the sectors are dominated by, e.g. SMEs or a few large enterprises and also whether there is a tendency towards concentrating production in fewer larger units or? The types of enterprises would indicate whether the production is diversified or relying on a few production types.

The geographic distribution helps identify areas with potential high pollution and pressure on environment and resources. This would also indicate areas with high demand on infrastructure, energy etc. Knowing about the structure and location pattern of enterprises in each sector can help us to define useful measures and regulations.

Planned and ongoing projects

Information about planned and ongoing projects concerning business development and promotion should be gathered. This information can supplement the analysis and help us characterize the trends.

People and Living



This comprises population distribution and composition, and categorization and ranking of settlements according to their size, provision or lack of services and urban functions.

Population Data

Population data are very important for spatial planning, because it can tell us where there will be high demand for housing, services and infrastructure; and where there will be growing pressure on environment and natural resources.

Focus should be on size and distribution and growth rate of the population. The analysis may be expanded to cover other characteristics such as age structure, occupation and employment, income and poverty, educational level, health, dependency ratio and crime rates.

Box 2.6 gives an overview of useful population analysis for spatial planning.

People & Living

Data analysis for spatial planning on provincial level

Technical Tasks

- Location of human settlements
- Size and distribution of population by districts and municipal/non-municipal area
- Growth of population by districts and municipal/non-municipal area
- Presentation of urban hierarchy

Important Data

- Map with administrative boundaries, villages, towns and cities
- Census data
- Statistics concerning health, education, crime, income

Key Results

- Map showing population distribution and density
- Presentation of trends in (graphical, tables, maps) population growth, dependency ratio,

Participatory Methods

- Consultations with Village Headmen, Provincial and District officials
- Technical meeting with planners and administrators and experts

Box 2.6

Population Analysis

Population statistics and forecasting is a very large subject actually beyond the scope of this Guideline, and population forecasts should be approached with great caution and reviewed critically. Simple calculations can be done only to get an idea of where there may be significant increases or decreases in population.

Urban hierarchy is a way of classifying human settlements according to population size and existence of a range of public services and urban functions.

Socio-economic data and indicators are very useful for integrated planning. To show trends over time, data can be presented by district and year for the most recent 2, 6 and 10-year periods where available. Trends can be presented in tables, graphically or on a map.

Referring back to the Pressure-State-Response diagram, the "pressure" from human population and activity can be measured and monitored by means of indicators which represent various population characteristics and human activities. These indicators can be grouped under the headings of population, land use, household assets, housing, education, agriculture, energy, health, business activity and financial resources. These categories of indicators can be linked to planning issues and planning responses as shown in the table below. Please note that the table is only giving examples and is not a complete list of categories and indicators.

Parameter	Main relationship	Possible interpretations	Planning decisions
Population			
Population density/growth	Use of natural resources and infrastructure	Increasing population = pressure on resources	Increased priority on infrastructure, regulation/protection of resources
Population distribution	Need for infrastructure and services	Increasing urbanization = pressure on resources, infrastructure and facilities	Increased priority on infrastructure and facilities, developing rural areas
Migration	Attractiveness of an area	Out migration = low attractiveness/economic opportunity	Increased priority on infrastructure and facilities in rural areas
Dependency	Productivity	Increasing dependency = lower development potential, human resources	Increased priority on employment, HRD
Land use			
Human settlements/roads in protected areas	Environmental degradation and conflicts	Need for conflict resolution/resettlement/reclassification	Hold public hearings/reclassify land
Crops in protected areas	Land use conflicts	Need for conflict resolution/reclassification	Hold public hearings/reclassify land

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Household assets			
Land ownership	Changes in economic activity/wealth	Decreasing size of landholdings = land fragmentation, lower output of traditional crops	Increased priority on non-traditional crops, land use planning and regulation
Debt/savings	Cash deficit/surplus	Higher savings = rising living standards and development/investment potential	Priority on investment opportunities, business skills and support services
Wealth ranking	Wealth distribution	Disparity among areas	Need for comprehensive socio-economic development plan for poorest areas
Labor and employment			
Household income	Economic trends/household resources	Higher income = higher material living standards	Increased priority on savings, support facilities and services
Unemployment and welfare	Demographic and economic effects	Higher unemployment/welfare = decline in human resources, productive potential	Targeted plan for skills development/ alternative employment


Table indicating relationships between key socio-economic parameters and planning measures

Infrastructure data A very important group of data concerns infrastructure that provide services to people and production. Infrastructure is also an important source of environmental and social impacts.

The main data items comprise:

- ☐ Roads and highways, railways, waterways, airports.
- ☐ Energy supply: Hydropower projects, extraction of energy resources, energy production plants, and transmission networks and service areas;
- ☐ Water supply: Water extraction plants, water treatment plants, supply network or service areas. Amount of water supplied/consumed;
- ☐ Solid waste management system; location of disposal sites, treatment plants and service areas
- ☐ Wastewater system; location of wastewater treatment plants, discharge points and service areas.
- ☐ Irrigation systems; location of irrigation canals and service areas. Amount of water used.

 Communication system and network.

 Planned or ongoing infrastructure projects.

Analysis and trends

In its simple form the analysis of infrastructure should present the location of existing and planned infrastructure and indicate whether this meets the present demands. In a more advanced form the analysis should indicate whether the existing and planned infrastructure can meet future demands.

Initial Integrated Assessment

Cross sector analysis and assessment of trends in development and environment.

When the results of the baseline analysis are emerging, it is necessary to conduct an Initial Integrated Assessment. The objective of this assessment is to get a clearer picture of the main factors and forces driving the present trends in development and to assess what are our options to change the direction if needed.

Analysis

As a first step we have to identify the main problems and potentials in terms of social, economic and environmental issues in each area. The next step is to outline the impacts or pressures causing these conditions. This will form the basis for an assessment of how these problems and potentials are addressed at present, and what will be the consequences if we do not try to change the situation.

To do this, we may use different tools and start from various angles. We may start with a brainstorming on the main issues based on the outcome of the analysis of the individual “sectors”, and make a rough prioritization. Hereafter, the pressures or impacts causing the issues as well as the further effects on other social, economic and environmental conditions should be identified and we should assess the various projects, plans or strategies involved in the issue or intended to influence it.

Analytical Tools

A simple, but effective help tool for integrated assessment is a so-called “problem tree” – a problem tree shows the chain of causes and effects from the root causes and up to the main problem or issue. A problem tree links causes and effects in various sectors and areas and is therefore very good for developing understanding of complex situations, and forms the basis for generating solutions that address the root causes to the problems. In order to make a problem tree operational, it is important to make it as specific as possible pointing out “where” and “what”, and finally the “tree” can be put on a map.

One way of putting a problem tree on a map is by showing where the root causes are generated and where the subsequent chain of causes and effects appear. Another way is to identify a key indicator of a certain problem or issue and produce a map that shows the distribution and degree of this indicator.

These kinds of maps draw our attention to the areas where the problems are most severe and thus may help us prioritize. However, it should be noted that in order to find solutions to the problems in a certain area it is necessary to look at the specific problem tree for that area and identify the root causes. For example, the solution to a drought problem very much depends on the cause of the drought, which cannot be identified only by studying a drought risk map.

Making Strategies and Setting Objectives

Strategy-making for spatial planning builds on the analysis of problems and potentials, but is fundamentally a different type of process

The starting point for developing a provincial strategy to go with the integrated spatial plan are the National Policies including the National Environment Strategy, the National Socio Economic Development Plan and any legal requirements that must be met by the plans.

So, the first activity is to identify the related issues in the National Policies and the legal requirements.

The National Policies and the legal requirements form the framework within which the provincial partners can prepare the strategy, which will be part of the integrated spatial plan.

If an overall provincial vision or strategy already exist this should also be part of the framework.

Strategy-making

Strategy-making is a different process from planning. Strategy-making involves data synthesis; looking at all factors simultaneously; seeing the wholeness – in other words a holistic approach using intuition, non-descriptive mind processes undisturbed by language. Planning, on the other hand is an analytical, rational and formalistic undertaking and trying to make strategies in the same way as planning would not be productive.


However, strategy-making should of course be built on analysis of problems and potentials, and after an outline of a strategy has emerged the more rationale analytically oriented work can return to formulate objectives, prioritize and assess various measures and interventions.

Strategy-making can be a somewhat fluid and intangible undertaking, and in order to structure and prepare for putting the strategy into action it is helpful to draw up a series of governing principles. Translating these principles into plans falls in the

next phase of the planning process. An example of objectives and related principles is shown in Box 3.1

Example of Objectives and Principles

Objectives	Principles
<ul style="list-style-type: none"> • To prevent further degradation of natural resources • To rehabilitate degraded natural resources and make the resources available for sustainable production 	<ul style="list-style-type: none"> • Rehabilitation of natural resources should be a coordinated effort by all agencies concerned. • It is a precondition for rehabilitation that the subsequent use is sustainable. • Rehabilitation should be divided into long term wider scale initiatives and local plot scale initiatives. • Utilization of critical or very sensitive natural resources should be limited or even prohibited if necessary and always based on a permission system. • Rehabilitation measures should be based on local knowledge, scientific research and agreement among the involved.


Box 3.1

Prioritization

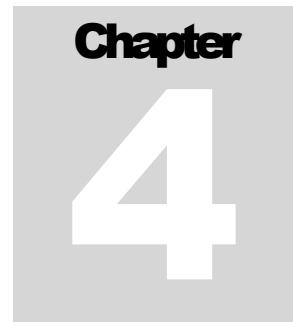
Prioritization should be based on an agreed set of criteria. These criteria could be derived from National policies and sustainable development principles - see Chapter 1, and from the principles included in the draft strategy for the plan. Although very sophisticated scoring systems have been developed, it is recommended to keep it simple and easy.

Example:

- 1) Exclude problems/potentials that cannot be solved/reached by spatial planning or are beyond the capabilities of the planning partners;
- 2) Group all problems that have the same causes in one;
- 3) Rank problems according to their severity;
- 4) Favor problems/potentials related to National policies/sustainable development/principles in the strategy.

Integration

The formulation of a strategy-outline including objectives, principles and priority issues naturally involves integration and balancing to make the strategy coherent and functional.



Integration and Synthesis

Integration and Synthesis in spatial planning is a giant puzzle, where the pieces are changing in the process





The main part of the work in this phase of the planning process comprises preparation of planning maps and development of strategic measures.


The previous two phases have produced:

1. Baseline data and baseline maps;
2. Overview and understanding of major problems and potentials;
3. Prioritized list of development potentials and planning issues;
4. Outline of the strategy including overall objectives and principles for the spatial plan;

These products are the framework for preparing planning maps and setting-up strategic measures and regulations.

The preparation of planning maps and strategic measures involve a number of technical sub-processes. In this process we should keep in mind that one of the main objectives is to make it simple and easy to understand and use. The most important sub-processes are:

-  Setting criteria;
-  Data transformation; map analysis; production of draft maps;
-  Define draft measures, regulations and interventions;
-  Integration; cross-checking; balancing competing or conflicting interests;

 Production and publication of final maps, strategies and measures;

Setting Criteria

Criteria in this context means the factors that determine land use zones, protection zones, risk areas, potential areas for certain activities etc. First of all, criteria can be derived from laws and regulations; secondly, technical guidelines and administrative standards can provide input; thirdly, criteria have to be adjusted to fit the local situation and the availability of data. Selecting criteria also involves a consultative process to ensure that there is broad agreement on the choice of criteria.

Drafting Maps

Preparation of planning maps is most easily done by using GIS-software, but for the purpose of this training we will use paper maps and maps on transparency paper, which we can draw on and mark zones and features. The hand drawn maps will eventually be digitized and included in the GIS for the province.

Firstly, baseline data has to be transformed to suit the objective and principles behind the map and to fit with the criteria. A part of this is about making the map simple and easy to understand. This will make it much easier for people without technical background to understand and use the maps, and in this way it supports transparency and public participation.

Secondly, the data has to be processed manually as in our case or by using e.g. GIS-software. The basic data is the input and the data processing is determined by the criteria. The output could for example be a protection zone or potential area for reforestation. In many cases the full process of preparing a Planning Map consists of a series of such sub-processes, where the output of one sub-process is used as input to another sub-process. This often crosses over from map to map. For example, zones in a surface water protection map could form input to another map determining environmental sensitive areas for new landfills.

It goes without saying that this work requires very careful and systematic recording. The key point is to enable tracking of data, criteria and any aggregated or processed map theme, because inevitably at some stage new data will appear, or the criteria has to be changed and this may affect several planning maps. A good way of keeping track of the data is to prepare a matrix between all the baseline data and all the planning maps. Furthermore, for each map it is recommended to draw a diagram showing the input layers/data, the criteria and the output layers.

A typical planning map often contains some kind of zones or demarcation of areas where certain interventions or measures should be activated.

In some cases a zone can be directly derived from a law or regulation; for example the boundaries of a National Park are sometimes given by law. In other cases, we may have to use a set of criteria to define a certain zone.

What is very important to be aware of for planners and users of planning maps; is that when we group criteria and simplify, we also lose something. We cannot see from the map exactly why a certain area is classified as “High” or “Medium” – to know that, we have to expose the whole set of criteria and see which criteria were significant in that particular area.

Setting Strategic Measures and Regulations

Development of strategic measures and regulations run in parallel with the map preparation. The measures should be targeted towards the defined objectives and principles. The measures may fall within the following categories:

- Prohibitions/restrictions on land use
- Administration of permissions to certain activities/projects
- Spatial priorities/recommendations for activities and investments
- Guidelines for good practices/management
- Encouragements/incentives
- Human Resource Development

Some measures are recommendations that should be followed; others are binding based on existing laws, regulations and standards and must be followed. Binding measures must have reference to the law, regulation or standard which they are based on.

In order to develop the strategic measures and ensure that environmental considerations are well integrated in the development strategies for the province, we need to carry out what is known as Strategic Environmental Assessment (SEA). To do that we will use a simple but effective tool: A Rapid SEA Matrix. as shown on page 54 in this Guideline. The SEA matrix is good for group work and should be developed district by district and for each of the identified development potentials. The idea is first to identify the requirements for each of the development potentials in the districts. This could be in terms of e.g. requirement for land, labor, natural resources, infrastructure and utilities. Then, each development potential including the whole package of requirements should be assessed in terms of potential positive and negative impacts followed by development of strategic measures necessary to prevent/minimize negative impacts and to optimize positive impacts.

Once the SEA Matrix has been completed on district level, the assessment should be lifted up on provincial level.

Another important and useful tool, which works well in combination with the SEA Matrix, is a Matrix of Development Interests (see page 53). This matrix will help identifying and mapping potential and actual conflicting or competing interests in-between the development potentials as well as between the development potentials and the actual usage of land and resources.

Example of Measures

If for example the SEA of the development potentials has identified water quality and quantity in rivers and lakes as a main issue (requirements for water and impacts on water), then the first step would be to clearly define the objective for water quality and quantity. This could be in terms of a general statement such as:

“To ensure that there is sufficient supply of good quality water for a balanced and sustainable agricultural and industrial production and for good quality of life of the population.”

This should be followed by a set of targets such as provision of piped drinking water, Provision of irrigation systems, ambient water quality standards. It is important to define targets for those requirements related to water, which have been described in the SEA Matrix..

The next step is to develop measures directed at ensuring that the targets are met and that impacts are prevented/minimized. In this process, the draft targets and measures should be put on the maps and checked for inconsistencies and conflicts with other issues. This process should result in a series of planning maps and related targets and strategic measures. In this example, their could be a planning map showing the existing water quality, water quality targets and protection zones with certain restrictions in terms of e.g. discharge or wastewater. Another planning map could show the designated water uses in the rivers and lakes including zones designated for hydropower, drinking water resource, etc.

The planning maps should be accompanied by general measures and measures directed towards specific water bodies. Examples of general and specific measures towards water quality targets are listed below:

General Measures

- Any person who wishes to extract or use of water from rivers, streams, lakes, reservoirs or groundwater aquifers must apply for permission from the competent authority;
- Any person who wishes to discharge effluents or any kind to rivers, streams, lakes, reservoirs or groundwater aquifers must apply for permission from the competent authority;
- The competent authority shall ensure that permissions to extract or use water or to discharge effluents are given in strict accordance with the Integrated Spatial Plan;
- All concerned agencies and organizations in the province shall within their responsibility and available resources work towards the achievement of the desired water quality as determined in the Integrated Spatial Plan;
- All concerned agencies and organizations in the province shall make sure that activities and projects under their responsibility does not impede or delay the achievement of the desired water quality;
- All concerned agencies and organizations in the province shall prioritize projects and activities relevant to surface water quality in accordance with the priority of the water bodies set forth in the Integrated Spatial Plan.
- The overall priority for allocation of water is: 1. Domestic drinking water; 2. Agriculture; and 3 Industry.

Specific Measures

- Safe or maximum amounts of water to be extracted from particular water bodies;

- Maximum acceptable load to particular water bodies;
- Agency responsible for monitoring the condition of particular water bodies;
- Specification of what kind of activities and projects that are not allowed in a certain protection zone;
- Specification of what kind of activities and projects that should be carried out by the responsible agency/organization for specific water bodies;

More examples are shown in Box 4.1

Box 4.1

<p>General Measures:</p> <p>Proposals for reforestation projects shall be evaluated and prioritized based on the Reforestation Planning Map in the Integrated Spatial Plan.</p> <p>The [name of agency] is responsible for preparing action plans according to the priorities and zoning directives in the Integrated Spatial Plan.</p> <p>Specific Measures:</p> <p>The target for reforestation is [...%] forest cover equivalent to [...ha] before the end of [...year]. Reforestation should be implemented in the high priority zone indicated in the Reforestation Planning Map in the Integrated Spatial Plan. All agencies and organizations shall ensure that the following activities/operations under their respective responsibilities are not carried out in the High Priority Zone as indicated in the Integrated Spatial Plan: Mining, construction of highways, land allocation for residential or industrial purposes, construction of industries or other large technical facilities.</p>

Integration

Integration has already started in the strategy formulation phase and even during the baseline analysis, but in this final phase integration is more concrete and entails technical cross-checking and a participatory process of balancing competing or conflicting interests. It can be a long process where maps and measures have to be revised several times before a final solution is found.

Implementation

This Chapter deals briefly with the preparation for implementation and application of the Spatial Plan – not with the actual implementation

Provincial spatial planning as described in this Guideline is a framework plan and not an action plan and would therefore not require a full detailed implementation plan with objectives, targets, indicators, activities, time schedules, responsible implementers, budget and monitoring. However, some of these elements are still important for smooth implementation of a provincial spatial plan, and most of them form an integral part of the planning process as described in the previous chapters.

In brief, the following elements will support and help smooth implementation:

- ☞ First of all the legal status of the Spatial Plan has to be determined. If is a statutory plan, then it is directly required by law and carries certain legal consequences for implementation, which must be taken into account. However, even if the plan is non-statutory as such, it will still base the measures on laws and regulations.
- ☞ Common understanding; this is also a prerequisite for proper integration and therefore fundamental for the whole planning process. Building a common understanding of the plan and the measures in the plan will reduce the risk of disagreements and mistakes during implementation.
- ☞ Appropriate organization and management of the planning process; same as for “common understanding” a prerequisite for integration. Ensuring that all concerned agencies and organizations have taken part in the planning process will increase their commitment to the implementation of the plan.
- ☞ Clear objectives and principles set the direction for description of measures in the plan, and also serve as a reference point in case of evaluation of new measures or projects - see Chapters 3 and 4.
- ☞ Targets and indicators are normally less precise than required in an Action Plan due to the framework character of the Spatial Plan.

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- ☞ The Planning Maps and Strategic Measures form the core element in implementation as they show and prescribe where and what should be done. Therefore, it is essential that the planning maps are made as simple as possible without losing in precision and accuracy. The measures should determine responsible agencies.
- ☞ The plan horizon of a spatial plan would normally be around 10 years with regular revisions every 3-4 years, but it should be possible to make amendments outside the regular intervals.
- ☞ The spatial plan as described here does not relate to a specific budget, but the content of the Planning Maps and Measures should be based on financial and budgetary considerations.

Based on an Integrated Spatial Plan it will be fairly simple to develop an Action Plan describing the required or requested public and private investment projects. This will be of great value for the agencies concerned as well as for private investors.

Exercise in Spatial Planning

In this exercise you will learn the basic principles and considerations for preparing an Integrated Provincial Spatial Plan

This exercise takes you through the three main phases in developing an Integrated Provincial Spatial Plan:

1. Baseline Analysis
2. Strategy Formulation
3. Integration and Synthesis

The exercise is based on real data and maps of Oudomxai Province, Lao PDR.

This is a group work exercise and the purpose is to give you a taste of what is involved in Integrated Spatial Planning, so that you after this training are able to explain to your work colleagues what spatial planning is about and how it can be used in practice.

Consider yourself (the group) the Provincial Planning Committee answering directly to the Governor. The Governor has requested you to develop an INTEGRATED SPATIAL PLAN for the province. In particular, the Governor has requested that the plan can function as a development framework as well as a framework for nature protection and environmental management. The Governor has also requested that the plan incorporate vision aspects if relevant from the National Economic Development Plan. As usual the task has to be completed within very short time, so it may be a good idea to start by planning the work ahead to make sure that you can finish before deadline.

However, the Governor has been so kind and hired a group of experienced consultants to facilitate the planning process, but the Governor is also very well aware that without ownership from the planning committee, the plan will not work in practice and the Governor has therefore instructed the consultants only

to facilitate and give advise and by all means to let the committee members do the planning work.

Thus, to facilitate the planning process, the consultants have prepared the following work schedule:

Baseline Analysis

Nature and Environment

Study the maps and data provided and characterize the province in terms of nature and environment.

Discuss and list the types of nature/environment that you believe should be protected.

Mark these areas on a transparency.

Note which criteria you used to define these areas (tourism, bio diversity etc.).

Business and Production

Study the maps and data provided and characterize the province in terms of potentials for business and production development.

Discuss and mark the following areas/localities on a transparency:

- Areas with potential for agriculture;
- Areas with potential for plantations e.g. rubber;
- Areas or localities with potential for extraction of raw materials and mineral resources;
- Areas or localities with potential for industrial development;
- Areas or localities with potential for tourism;

Note the criteria you used for defining and marking these areas/localities;

People and living

Study the maps and data provided and characterize the province in terms of demography. Identify population centers e.g. cluster of villages. Identify areas with growing/declining population. Identify areas with good/poor infrastructure (road network).

Unfortunately, there is a general lack of socio-economic data so the analysis of people and living has a rather limited scope in this case.

Initial Integrated Assessment

You have now a series of draft baseline maps. Try to overlay some of these maps and see if there are overlaps indicating conflicting or competing interests.

Also identify areas where there are no overlaps. Example: are there any areas with potential for agriculture in unpopulated areas.

Discuss and list major positive and negative impacts that the exploitation of the identified potentials may have.

Strategy Formulation

You have now a good basic understanding of the province as it is today and its potentials and you will use this knowledge to formulate a strategy for the development of the province.

However, before you can do that you will develop a VISION for the province. You may consult with the Provincial Socio Economic Development Plan and base your vision on that plan.

You may prepare a series of STRATEGY STATEMENTS, which will serve as the guiding principles for the integration and balancing of interests in the final phase of the planning process.

Make sure that your statements are within the Law and national policies and strategies.

You should divide the statements into the three categories used in the Baseline Analysis: Nature and Environment, Business and Production and People and Living.

Here are some examples:

- *The province should strive towards developing a mining industry including processing industries, but only in areas that are not designated as protected areas.*
- *The province should strive towards self-sufficient production of agricultural products.*
- *All existing forests including flora and fauna should be protected against exploitation and destruction and may only be used for the maintenance of local people's livelihoods;*
- *All areas previously under shifting cultivation except for areas with potential for agriculture should be reforested;*

Integration and Synthesis

You are now ready for a first attempt of putting your strategy on the map.

With your strategy as point of departure, you should list all the different kinds of areas that should or may be developed, rehabilitated or protected. Mark these areas on a transparency.

Based on your previously prepared list of potential impacts, you should prepare a matrix of impacts and development. Use this matrix to find out which maps to overlay with the map showing the development areas.

In the same way assess the needs to be fulfilled in order to reach the development goals for the province, and put these on the map. Consider if this has any further impacts.

Are there any overlaps? If yes, what are the conflicts and possible solutions? Do you have to change your strategy?

Prepare a final integrated map indicating protected areas, areas that require rehabilitation and development areas. Add a brief description to the main areas and what measures and regulations should be implemented.

Vision and Target Statements

Sixth National Socio Economic Development Plan (2006-10)

The Sixth National Socio Economic Plan describes visions and targets that are expected to have minor or major impact on the spatial planning in the provinces.

The following list covering different planning aspect should be used to guide the planning process. The list is a very short summary of visions and statements in the socio economic plan and includes solely statements that are expected to have a direct impact on the spatial planning activities.

Poverty Reduction

- Vision
 - Poverty eradication and the promotion of equity among different groups of Lao multi-ethnic population within a rapid and sustainable economic growth framework.
- Targets
 - Accomplish the programme of Education for All
 - Provide clean water to 65 percent of the rural population
 - Raise the ratio of green areas to 53-55 percent of all natural areas

Natural Resources and the Environment

- Vision
 - Sustainable utilization of natural resources
 - Protect and conserve the environment to ensure the sustainable development of the country
 - Reduction of poverty and enhancing the quality of life and health of the Lao people
- Targets
 - Balance the socio-economic development and environmental protection to ensure clean and nice environment
 - Develop and manage land resources exploitation and natural resources (water and minerals) in better ways
 - Focus on solving the problems of environmental damage in the industrial areas and densely populated areas
 - Aim to plant 25,000-30,000 ha of forest to increase the ration of forest cover to 53% in 2010 and increase forest plantation in national parks, inter-provinces and national routes
 - Plant trees to cover logged areas and bare hills, particular the areas along the Mekong, while at the same time preserving the natural view
 - Develop areas for industrial trees, producing large volumes of goods such as rubber, fruit trees and special trees
 - Put an end to slash-and-burn cultivation by 2010

Agriculture, Forestry and Fisheries

- Vision
 - Ensure food security for all people
 - Maintain an average growth rate in agriculture output of 4-5 percent per annum
 - Stabilize shifting cultivation and eradicate opium poppy cultivation
 - Conserve the natural environment and protect threatened species and habitants
 - Maintain a healthy and productive forest cover as an integral part of the rural livelihood systems, and generate a sustainable stream of forest products
 - Improve rural livelihoods
- Targets
 - Increase the quantity of food stuffs and vegetable

- Develop special industrial plantation area in order to reach a big quantity of production
- Achieve a growth rate of livestock and poultry at 4-5 percent per annum
- Increase the growing and plantation of aquatic products with high economic value, especially the Mekong River and its branches
- Plant 25,000-30,000 ha forest to increase the ratio of forest cover to 53-55 percent in 2010

Rural Development

- Vision
 - Reduce the disparities between rural areas and urban centres
 - Enhance the transport and communications networks
 - Improve the living conditions of the rural people, especially those in mountainous and remote areas
- Targets
 - Reduce the disparities between rural areas and urban centres
 - By 2010, the ratio of poor families in total will reduce steeply and the rural living standards will be improved significantly compared to the situation in 2005

Health

- Vision
 - Improve the health status of citizens
 - Reduce urban-rural health differentials
- Targets
 - Access to fresh water to increase to 75 percent of the people overall
 - Access to fresh water in rural areas to increase to 65 percent of the people
 - Access to basic health care services to reach 100 percent
 - Coverage of toilet facilities meeting general standards to rise to 60 percent
 - In the 72 poor districts 100 percent of the population will have access to Primary Health Care
 - In the 72 poor district 75 percent will have access to clean water and 55 percent to sanitation

Industry and Minerals

- Vision
 - Develop the industry and mineral sector as a key part of the industrialization and modernization process
- Targets
 - Mobilize the annual growth rate of industry at 13-14 percent, in which electricity production is to grow at 41 percent, manufacturing at 10 percent and mining at 11 percent
 - Provide electricity to 70 percent of households
 - Construct electricity transmission lines and install solar energy and other energy systems to villages
 - Make effort to produce two million pairs of leather shoes of different kinds by 2010
 - Continue to diversify industrial development to maintain the rapid growth of the entire industrial sector
 - Concentrate all resources on developing industrial groups with competitive advantages such as electricity, mining, agro-processing, forestry, aquatic products and seafood, wood products, garments, footwear, electronics and motor vehicle assembly
 - Build selected factories producing materials such as metals, machinery, basic chemicals and chemical fertilizers, in order to exploit the natural advantages and the plentiful labour of the Lao PDR
 - Establish and develop some industrial zones with high technology at potential places like Vientiane, Champasak, Savannakhet and Luang Prabang
 - Establish modern industrial centres of high competitive ability on large scale at the centre of three main economic areas as the engines of national industrial development

Infrastructure

- Vision
 - Provide the necessary infrastructure to sustain a modern nation state, where people in all parts of the country could easily communicate and participate in development activities in the country and interacts with people and markets outside the country
- Targets
 - Increase access to remote areas by building firm roads
 - Construct bridges
 - Construct national roads to link provinces with Vientiane capital, and link national roads to neighboring countries

- Construct provincial roads to link districts, particular to link the poorest areas
- Provide water supply to 59 percent of total households
- Construct and arrange for successful river transportation
- Develop and construct a railway system
- Increase the peoples access to electricity, telecommunication, education and health facilities
- Develop sports infrastructure

Services Including Tourism

- Vision
 - Develop the services sector in the coming years to go on diversifying and upgrading the quality of service activities to meet the demands of production, consumption and exports, contributing to economic growth, expansion of employment and improvement of the welfare of the people
- Targets
 - Make effort to achieve a growth rate of 7.3-7.8 percent per year for the service sector during the sixth plan period
 - In the year 2010 the sector will attract more than 1.7 million foreign tourist and 2.5 domestic tourist
 - Mobilize 15 percent of the population to train for sports, 8 percent of the households in 80 percent of the provinces and districts
 - Develop sports infrastructure, with 50 percent of districts having sports structure

Regional Development

- Vision
 - Achieve a balance between regions and among provinces within the regions, building upon the natural and human resources in each area
- Targets
 - The Northern Region
 - Attract a total number of 700,000 to 800,000 tourists with a growth rate of 5.5 percent per year
 - Increase the share of non-agricultural sectors and abolish opium production in all areas
 - The Central Region
 - The proportion of labour in the agricultural sector will be 40-50 percent in 2010
 - The Southern Region

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- Plant high yielding rice on 190-195 ha
- Use the Champasak Plain for high yielding rice production for export
- Increase the number of cattle, buffaloes, pigs, sheep and goats

PROTECTION PRIORITIES

LAND COVER	HIGH PROTECTION	MEDIUM PROTECTION	LOW PROTECTION
BAMBOO			
DRY DIPTEROCARP			
DRY EVERGREEN			
GRASS LAND			
MIXED DECIDUOUS			
SCRUB			
UN-STOCKED FOREST			
WATERSHED CLASS 1			
WATERSHED CLASS 2			
WATERSHED CLASS 3			
WATERSHED CLASS 4			
WATERSHED CLASS 5			

Watershed Classes

1. Areas with very high slopes and rugged landforms. Recharge area where forest required for protection.
2. Areas with steep slopes, usually at higher elevation. Production forest (economic forest) Area lower than class 1. If used for livestock require special protection

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3. Areas with moderate to steep slopes and less erosive landforms. Suitable for agriculture (integrated agriculture), livestock, community forest. Soil conservation required.
4. Gently sloping lands. Suitable upland agriculture. Soil conservation dependent of the characteristic of the area
5. Gently sloping land and flat areas. Agricultural area suitable for rice, corn and other crop. Conservation of the area required.

MATRIX OF DEVELOPMENT INTERESTS

	Mining	Agriculture, paddy field	Agriculture, upland	Industry	Tourism	Residential	Production Forest
Mining							
Agriculture, paddy fields	<i>Mineral resources located in areas suitable for paddy. Provision of water potential conflict. Pollution from mining impacts paddy</i>		<i>No conflicts</i>	<i>Industrial development may impact on paddy and need land which is suitable for paddy</i>	<i>No conflicts</i>	<i>Land needed for residential areas may encroach on land suitable for paddy</i>	
Agriculture, upland							
Industry							
Tourism							
Residential							
Production forest							
Biodiversity							

MATRIX for identifying potential/ actual conflict of interests of competing interests

RAPID STRATEGIC ENVIRONMENTAL ASSESSMENT

District	Potentials	Requirements	Impacts positive/negative	Strategic Measures	Target
	Describe briefly each development potential e.g.	List and describe the expected requirements in terms of e.g.	Identify the main positive and negative impacts of the Development Potential in terms of e.g.	Identify and describe briefly the strategic measures necessary to prevent/minimize negative impacts and to enhance positive impacts	
	1. Paper Industry	<ul style="list-style-type: none"> - Land for factory; - Skilled workforce, - Raw materials; - Water; - Energy; - waste/wastewater disposal; - Drainage; - Access; - sub-suppliers 	<ul style="list-style-type: none"> - Change of Landscape, - Water quality - Air quality - Noise, - Dust, - Resource quantity, ecology, - Bio-diversity, - Fauna and flora - Socio-economic, - Employment, - Education, health 		
	2. Eco-Tourism				
	3. Gold Mining				