Policy Analysis for Watershed Management

Trainor's Manual

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Foreword and Acknowledgment

This manual was initially prepared for the Training on Policy Analysis for Watershed Management, held in Lantapan, Bukidnon on December 3-4, 2003. The participants were the members of the Technical Advisory Committee of the Bukidnon Watershed Protection and Development Council. The participant from the Department of Interior and Local Government encouraged the trainors to come up with a Trainor's Manual wherein the policy analysis framework for watershed management can be brought down to the grassroots level. Thus, this manual was organized so that the trained participants can use it to conduct their own training programs.

The authors/trainors would like to thank the Sustainable Agriculture and Natural Resources Management Collaborative Research Support Program-Southeast Asia (SANREM CRSP SEA) funded by the United States Agency for International Development for the support in the preparation of this manual. Special acknowledgment goes to Ms. Birgit Kerstan, the author of the Gender-Sensitive Participatory Approaches in Technical Cooperation: Trainers' Manual for Local Experts. Her work has contributed a lot in the final shape of this training manual.

The Authors
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Introduction to the Training Manual

This training manual aims to enhance the capabilities of the staff of the Local Government Units and other potential parties in conducting policy analysis for watershed management.

The manual includes the following major topics:

1. Activities to Introduce the Training
2. Policy for Watershed Management
3. Methods for Policy Analysis
4. Closing Activities and Evaluation of the Training Process

Each topic contains session guides for trainors, presentation materials and handouts. Copies of the transparencies could be photocopied and distributed to the participants.

For certain topics, handouts are also provided. These handouts provide additional background information to be read after the sessions.

This training was designed as a two-day activity, approximately 16 hours, from the time the participants will register to the Closing Ceremony.

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SCHEDULE OF ACTIVITIES

Number of hours	Topic/Activity
1.0	**Registration**
2.0	**Topic 1 Introduction to the Training** 1.1 Opening 1.2 Introduction of participants, resource persons and training staff 1.3 Training objectives, schedule and participants' expectations
4.0	**Topic 2: Policy for Watershed Management** 2.1 Definition of concepts 2.2 Policies/Programs/Projects Related to Watershed Management 2.3 Focus of Policy Analysis 2.4 The Policy Analysis Process
6.5	**Topic 3: Methods of Policy Analysis** 3.1 Structuring Policy Problems 3.2 Forecasting 3.3 Policy Recommendation 3.4 Monitoring and Evaluation
2.0	**Topic 4: Closing Program** 4.1 Integration, Evaluation and Closing Ceremonies
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Topic 1

Introduction to the Training

Topic 1.1 **Opening – Background to the training and expectations of the Department of Interior and Local Government (DILG) and the Local Government Units**

Objective : Representatives of the implementing institution (Department of Interior and Local Government) and local government units welcome the participants; explain the background of the training and their expectations of the training.

Time : 30 minutes

Methods : Speeches

Session Guide:

1. Invocation

2. National Anthem

3. Speeches

   Representatives of DILG, local government units and other invited institutions (e.g., government and non-government institutions, and research institutes) give short speeches to welcome the participants.

   The speeches could contain the following aspects:

   The relevance of the training on watershed management and activities related to their work.

   What are the agencies activities related to watershed management, e.g., programs and projects?

   What does the sponsoring agency expect from the participants after attending this training? What would be their commitments after attending this training?

4. The training is officially opened.

Topic 1.2 **Introduction of participants, resource persons and training staff**

Objective : Participants and facilitators are introduced to each other in an informal atmosphere

Time : 30 minutes (depending on the number of participants)

Session Guide:

1. Start the session by the emcee/moderator introducing him/herself.

2. Ask the participants to introduce themselves first followed by the resource persons and the training staff.

Topic 1.3 **Training Objectives, Schedule and Participants' Expectations**

Objective : Participants are informed of the training objectives and schedule of activities. The participants' expectations are accommodated with each other.

Time : 60 minutes

Methods : Presentation, discussion, visualization with metaplan cards.

Aids : Whiteboard, markers, colored metaplan cards

Materials : Overhead 1 "Workshop objectives"

Handout: : Workshop schedule
(Included in the training kit)

Session Guide:

1. Present the training objectives and explain them (Overhead 1).

2. Present the workshop schedule and procedures, including meals and other arrangements.

3. Ask the participants to state their expectations in attending the training. What do they hope to gain from this training and how they are going to utilize their learnings.

   Option 1 – (if the total number of workshop participants is less than 15).

   Distribute three different colored metaplan cards to each participant and ask them to write one expectation on each card, to the following aspects:

   Red card – their expectation regarding the subject matter

   Green card – their expectation regarding their own participation

Option 2 – (if total number of workshop participants is 15 or more):

Ask the participants to split into pairs. Each pair agrees upon one expectation for each of the two aspects listed above and writes them on cards.

4. Collect all cards and group them on the black/whiteboard according to colors. Cards with similar statements can be put on top of each other.

5. The facilitator reads the participants' expectations.

6. The trainor/s comment/s on the participants' expectations and explain how they intend to respond to these expectations.

Emphasize that the training is a participatory event and that the achievement of the workshop objectives depends on an active role and the contributions of all the participants.

Objectives of the Training

At the end of the training program, the participants are expected to have:

- Better understanding of the importance of policy and policy analysis with respect to watershed management; and
- Improved skills in undertaking/carrying out policy analysis for watershed management

Topic 2

Policy for Watershed Management

Topic 2.1 Definition of Concepts

Objective : Participants understand the concepts of watershed, watershed management and reflect the importance of managing the watershed.

Time : 60 minutes

Methods : Presentation and discussion

Aids : Overhead projector/Computer and Liquid Crystal Display (LCD)

Materials :
Overhead 1 "What is a Watershed?"
Overhead 2 "The Watersheds of Lantapan"
Overhead 3 "Watersheds of Lantapan Bukidnon"
Overhead 4 "What is Watershed Management?"
Overhead 5 "Why Watershed Management?"

Handouts :
Handout 1 "Definitions and Types of Watershed"
Handout 2 "Watershed Management"
Handout 3 "Why Watershed-Based Watershed Management Makes Sense"
Handout 4 "Operationalizing the Watershed/Basin Approach to Sustainable Development"
Handout 5 "Philippine Strategies for Improved Watershed Resources Management"

Session Guide:

1. Introduce the watershed concept (Overhead 1).

2. Explain further the watershed concept by telling the participants to think of a funnel. All the water that falls anywhere inside ends up at the bottom. A watershed is the land around a body of water where all rain and other water eventually flows into a lake, pond, wetland, river or stream. Every lake, pond, wetland, river and stream has its own watershed. Ask one or two participants to identify watershed/s in their area. Can they count how

many watersheds and sub watersheds exist? Show examples of watersheds (Overhead 2 and Overhead 3). Refer the participants to Handout 1 (Definitions and Types of Watershed).

3. Tell the participants what is the meaning of watershed management (Overhead 4). Guide the participants in looking for Handout 2 “Watershed Management. “

4. Invite participants to express their opinion as to why is there a need for watershed management. Compare their answers with the contents of Overhead 5 on the importance of watershed management. For further information, ask participants to read Handout 3 - Why Watershed-based Watershed Management Makes Sense; Handout 4 – Operationalizing the Watershed/Basic Approach to Sustainable Development; and Handout 5 - Philippine Strategies for Improved Watershed Resources Management during their free time.

Topic 2.2 Policies/Programs/Projects Related to Watershed Management

Objective : For the participants to comprehend the concept of public policy and be aware of watershed related policies/laws and regulations and programs/projects.

Time : 60 minutes

Methods : Presentation and discussion

Aids : Overhead projector/Computer and Liquid Crystal Display (LCD)

Materials :
- Overhead 1 "What is a Policy?"
- Overhead 2 "Examples of ASEAN Agreements on Watershed Management"
- Overhead 3 "Examples of National Policies on Watershed Management"
- Overhead 4 "Examples of Local/Community Policies on Watershed Management?"

Handouts :
- Handout 1 "Policy as Defined by Various Authors"
- Handout 2 "Major Policies in Watershed Management and Conservation in the Philippines"
- Handout 3 "Allocating Water Rights: The Philippine Context"

Session Guide :

1. Explain the concept of policy. Various authors have defined public policy. Cite the definitions indicated in Overhead 1. Summarize the discussion by emphasizing that public policy is what governments do or do not do. Inform the participants regarding Handout 1 for more definitions of what constitute public policy.

2. Invite the participants to cite policies related to watershed management at the international, national and local/community level. Write their answers on the board.

3. Use Overhead 2 and discuss briefly some examples of the agreements which are related to watershed management among ASEAN member countries.

Examples of International agreements related to watershed management:

1. **Manila Declaration on the Asean Environment (1981) –** an agreement among ASEAN member countries to ensure the protection of the environment and the sustainability of its natural resources so that it can sustain continued development with the aim of eradicating poverty and attaining the highest possible quality of life for the people of the ASEAN countries.
2. **Bangkok Declaration on the Asean Environment (1984) –** among others, the members agree to develop a system of procedures for conducting Environmental Impact Assessment and for their review which can be practically utilized within the ASEAN region.
3. **Asean Declaration on Heritage Parks and Reserves (1984) –** declared national heritage sites and reserves in the Asean Member countries. One of the agreements was that a common cooperation is necessary to conserve and manage such parks and reserves including the setting up of regional conservation and management action as well as a regional mechanism complementary to and supportive of national efforts at implementation of conservation measures.

Source: http://www.aseansec.org

4. Show Overhead 3 for examples of national policies related to watershed management. Cite certain provisions of the national policies related to watershed management. Discuss further that national policies could either originate from Congress (Legislative) or from the executive branch of the government (e.g., Office of the President, Department Secretaries). More examples are enumerated and explained in Handouts 2 and 3.

Legislated Policies:

1. RA7586 (1992) – Establishment and Management of National Integrated Protected Areas System

   Defining its scope and coverage.

2. RA 8978 (2000) – Declaring Mt. Kitanglad Range in the Province of Bukidnon as a protected area and its peripheral areas as buffer zones. Popularly known as the Mt. Kitanglad Range Protected Area Act of 2000.

Executive Policies (issued by the Office of the President)

3. EO 263 (1995) - Adopts community-based forest management as the national strategy to ensure the sustainable development of the country's forestlands.
4. Letter of Instruction (LOI) 1260 (1982) – Created the Integrated Social Forestry Program.

Executive Policies (issued by the Office of Secretary of the Department of Environment and Natural Resources)

5. DAO 97-05 - Procedures in the retention of areas within certain distances along the banks of rivers, streams and shore of seas, lakes and oceans for environmental protection.

5. Show Overhead 4 for examples of local policies related to watershed management. Ask the participants if they are aware of policies related to watershed management originating from the local government unit. Examples are ordinances passed by the Sangguniang Bayan or Sangguniang Panlalawigan.

Local/Community project

1. Maitum Forest Land Use Plan (FLUP) - The FLUP was formulated to come up with policies, which will serve as guide to DENR, LGU and other line agencies in jointly monitoring forestland allocation and management in Maitum. The FLUP will also enable the LGU to have a better access to information and technologies and management options. The FLUP was adopted in March 18, 1999 (Yabes, 1999).

Topic 2.3 Focus of Policy Analysis

Objective : Participants understand policy analysis and differentiate the different focus of policy analysis.

Time : 60 minutes

Methods : Presentation and discussion

Aids : Overhead projector/Computer and Liquid Crystal Display (LCD)

Materials : Overhead 1 "What is Policy Analysis?"
Overhead 2 "Focus of Policy Analysis"

Session Guide :

1. Introduce the concept of policy analysis (Overhead 1).

Definitions of Policy Analysis

- description and explanation of the causes and consequences of government activity.
- is an art because it requires insight, creativity, and imagination in identifying societal problems and describing them, in devising public policies that might alleviate and then in finding out whether these policies end up making things better or worse .
- is a craft because these tasks usually require some knowledge of economics, political science, public administration, sociology, law, and statistics.

Source: Dye 1978.

2. Discuss the different types of policy analyses. Differentiate policy content from policy impact and policy process. Inquire for example, if the participants are aware of the reason/s why Justice Isagani Cruz questioned the legality of the Indigenous People's Right's Act (IPRA). Was there an inconsistency in the current provisions of IPRA and the Constitution of the Philippines?

Focus on policy content is also concerned with the technical rigor of the provisions of the policy such as allowable timber cut, duration of logging ban and species selection.

Analysis of content

- The purpose is to ensure the internal consistency and the logic and provisions in the policy. It is possible that policies may contain provisions that are not consistent with each other, or illogical in relation to the premises established as prerequisites for the provisions.
- The other concern of content analysis is to ascertain the relationship between the policy instrument with the prevailing constitutional, legal, and policy provisions. This will ensure that policies do not violate the constitution or existing laws, and do not contradict or duplicate existing policies.
- Another concern of content analysis is the technical content of the policy. Technical analysis of policies is concerned with the technical rigor of the provisions. This is particularly important in policies that address technical issues such as forest and environmental management, wherein certain scientific information are appropriated to formulate certain provisions.
- Technical feasibility of a policy, particularly in terms of applicability of certain technologies, is another concern of technical analysis.

Source: Contreras, Antonio and UP Open University. 2001.

3. Talk about what is involved in doing a policy analysis, which is focused on impact of a policy. Elaborate on the topic by informing the participants that policy analysis on the impact of government policies/programs could be anticipated or actual. Refer the participants to Handout 1.

4. Since analysis of policy process is longer than the first two focuses, it will be discussed in the following topic, Topic 2.4.

Topic 2.4 **The Policy Analysis Process**

Objective : Participants appreciate and understand the different stages in the policy process.

Time : 60 minutes

Methods : Presentation and discussion

Aids : Overhead projector/Computer and Liquid Crystal Display (LCD)

Materials :
Overhead 1 "Policy Process"
Overhead 2 "Framework for Policy Process"
Overhead 3 "Structuring Policy Problems"
Overhead 4 "Policy Forecasting"
Overhead 5 "Limitations of Forecasting"
Overhead 6 "Policy Recommendation"
Overhead 7 "Policy Adoption/Implementation"
Overhead 8 "Monitoring"
Overhead 9 "Functions of evaluation"

Handouts : Handout 1 "Saving a River: Why Do Local Governments Matter?"
: Handout 2 "The Hidden Cost of Bananas: Imperatives for Regulatory Action by Local Governments"

Session Guide :

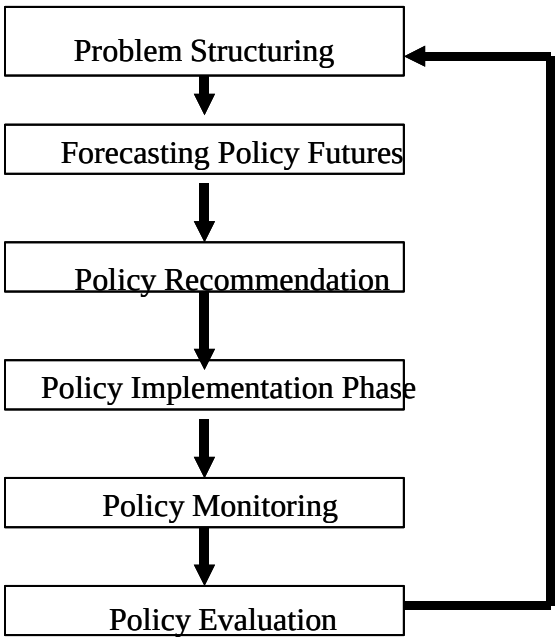
1. Inquire if the participants are aware how policies are developed starting from the perceived problems to the formulation of policies. Show Overhead 1.

Analysis of Policy Process

- Analyzing the policy process is more applicable when the policy is being implemented to have a total picture, from the time the problem is identified to the time the policy is implemented.
- However, policy analysis can also be conducted even in an ex ante mode, or prior to implementation. The analysis can be formulated as a continuing commentary on how the process is developing, and the results of these types of analysis can even be more useful in reshaping the direction of how the policy is being developed, even before it is implemented.

2. Briefly present the different stages in the policy process starting from problem structuring to policy evaluation (Overhead 2). As a result of the monitoring and evaluation, new problems are identified that require new solutions. This brings us back to the first stage, problem structuring as shown below. Inform the participants that each stage will be discussed separately in the subsequent overheads.

Framework for Policy Analysis



3. Define what is problem structuring (Overhead 3). Lay emphasis on the importance of identifying the problem. Talk about meta problem. Meta problem is a problem composed of several problems; thus, it is often difficult to define what the real problem is. A problem has different characteristics, e.g., sociological, economic, or cultural. It is important that problems have to be clearly defined. End the discussion on problem structuring by stating that a clearly defined problem is already half-solved.

Problem Structuring

The recognition of a problems is the first step in the policy making process. This is important because even if a problem does exist, if it is not recognized as a problem, then in the realm of policy, it does not serve any purpose.

What is really causing the problem?

What is its magnitude?

It is only when the problem is clear that options could be formulated

Source: Contreras and UP Open University, 2001.

4. Move to the next stage of the policy process - Policy forecasting (Overhead 4). What is forecasting? What kind of information does this stage produce and what are its limitations (Overhead 5)? Draw the attention of the participants to the importance of data in estimating future state of affairs.

Policy Forecasting

Each of the policy alternatives has to be evaluated.

Information about future states of society on the basis of information about the nature of the policy problem.

5. The third step in the policy process is the policy recommendation (Overhead 6). This stage produces information about the possible consequences of future courses of action. Thus, this phase recommends the best option among those identified during the policy forecasting stage.

> Policy Recommendation
>
> The act of analyzing the alternatives will lead to the emergence of the "best" or "most" preferred.

6. Discuss what is policy adoption/implementation (Overhead 7). At this stage, whatever was recommended is being put into action.

> Policy Implementation/Adoption
>
> The "most" preferred policy option is selected and policy makers promulgate it as the policy.

7. While the policy is implemented through programs/projects, it has to be monitored. Inform the participants that at this stage, the focus is on what happened to the program/project (Overhead 8). Were the planned components activities of the program/project implemented? Were they carried out as scheduled? If not, what were the reasons for not being implemented. Were resources (personnel, time, equipment/machinery, facilities) used as planned? If not, what were the constraints in using these resources?

8. Enlighten the participants on the meaning of evaluation (Overhead 9). Differentiate monitoring from evaluation by stating that monitoring is done while the project is being implemented while evaluation is carried out after the program/project has been implemented. The basic question at the evaluation stage is, "Did the program/project make a difference to the lives of the intended beneficiaries?" An additional question is "Where there unintended benefits generated by the program/project?" The evaluation

stage also produces information which will again lead to the formulation of policy problems and policy recommendations.

Policy evaluation

Evaluation answers the question: "What difference does the policy make?" On the other hand, monitoring answers the question what happened, how, and why?

Evaluation is synonymous with appraisal, rating, and assessment. (Dunn 1994)

9. In doing evaluation studies, programs and projects are evaluated using several criteria. These are effectiveness, efficiency, adequacy, equity, responsiveness, and appropriateness.

Criteria for Evaluation

Criterion	Question
Effectiveness	Has the expected outcome been achieved?
Efficiency	How much effort was required to achieve the expected outcome?
Adequacy	To what extent does the achievement of the expected outcome resolve the problem?
Equity	Are costs and benefits distributed equitably among different groups?
Responsiveness	Do policy outcomes satisfy the needs, preferences or values of particular group?
Appropriateness	Are desired outcomes actually worthy or valuable?

Source: Dunn, W. 1994.

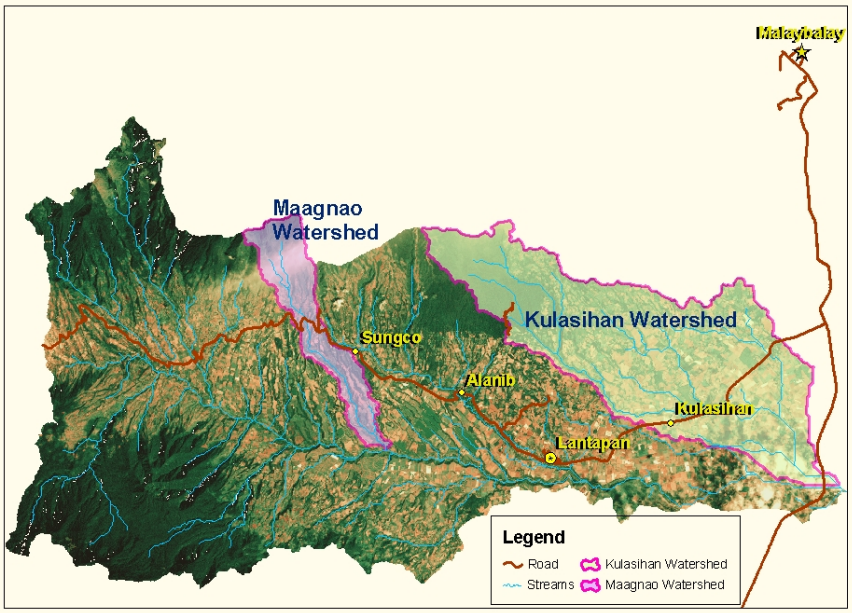
10. Tell the participants that the application of policy analysis are found in Handout 1- Saving a River: Why Do Local Governments Matter?; and Handout 2 - The Hidden Cost of Bananas Imperatives for Regulatory Action by Local Governments.

What is a Watershed?

- An area of land within which surface water flows to single common outlet (AIADP, 1989 1991 cited in EDSP, EMB, DENR 1991)
- Refers to an area that supplies water by surface or subsurface flow to a given drainage system, be it a stream, river or lake (Francisco 2002).
- Area of land drained by a body of water. In other words, a watershed is all the land that "sheds" its runoff water into a particular stream, river, ocean, or lake (http://www.urbanrivers.org/watershed.html)
- Also termed as catchment (AIADP, 1989 1991 cited in EDSP, EMB, DENR 1991)

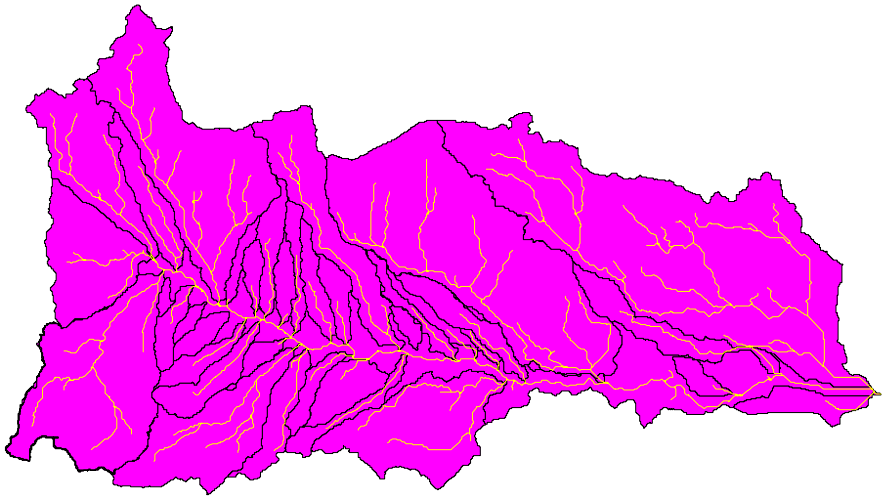
Topic 2.1
Overhead 2

The Watersheds of Lantapan



Topic 2.1
Overhead 3

Watersheds of Lantapan, Bukidnon



Legend:
Streams and Rivers
Watersheds

What is Watershed Management?

- Formulation and implementation of course of action involving watershed and human resources in a watershed to achieve a specific social objective (Dixon and Easter, 1986)

Why Watershed management?

- Large proportion of the population lives in highland-lowland watersheds,
- Ecological linkage between the upstream land uses and downstream water conditions, and
- Land use transformations in upstream areas have impacts on downstream communities, directly or indirectly, through the effects on productivity and other conditions of lowland ecosystems.

What is a Policy?

- Actions, guide to actions or the rules of the game, taken by individuals or group/s of persons, purposively for a particular objective or goal
- What governments do or do not do to address a problem (Dye 1978).
- Tangible manifestations of government actions and decisions

Examples of watershed management policies

Agreements at the ASEAN Region

- Manila Declaration on the ASEAN Environment (1981)
- Bangkok Declaration on the ASEAN Environment (1984)
- ASEAN Declaration on Heritage Parks and Reserves (1984)

Source: http://www.aseansec.org

Examples of watershed management policies

National policies

- **Legislated Policies:**

1. RA7586 (1992) – Establishment and Management of National Integrated Protected Areas System
2. RA 8978 (2000) –Declaring Mt. Kitanglad Range in the Province of Bukidnon as a protected area and its peripheral areas as buffer zones. Popularly known as the Mt. Kitanglad Range Protected Area Act of 2000.

Executive Policies (issued by the Office of the President)

3. EO 263 (1995) - Adopts community-based forest management as the national strategy to ensure the sustainable development of the country's forestlands.
4. Letter of Instruction (LOI) 1260 (1982) - Created the Integrated Social Forestry Program.

- **Executive Policies (issued by the Secretary of DENR)**

  5. DAO 97-05 - Procedures in the retention of areas within certain distances along the banks of rivers, streams and shore of seas, lakes and oceans for environmental protection.

Local/Community project

6. Maitum Forest Land Use Plan (FLUP) - formulated to come up with policies which will serve as guide to DENR, LGU and other line agencies in jointly monitoring forestland allocation and management in Maitum. (Source: Yabes, 1999).
7. Land Management Agreements between upland farmers in the Barobbob watershed and the province of Nueva Vizcaya (www.watershed.org.ph)

What is Policy Analysis?

- description and explanation of the causes and consequences of government activity (Dye 1976).
- any type of analysis that generates and presents information in such a way as to improve the basis for policy-makers to exercise their judgment (Quade 1975).
- an applied social science discipline that uses multiple methods of inquiry in contexts of argumentation and public debate, to create, critically assess, and communicate policy-relevant knowledge (Dunn 1994)

What is Policy Analysis?

- is an art because it requires insight creativity, and imagination in identifying societal problems and describing them, in devising public policies that might alleviate them and then in finding out whether these policies end up making things better or worse.
- is a craft because these tasks usually require some knowledge of economics, political science, public administration, sociology, law and statistics.

Source: Dye, 1976.

Focus of Policy Analysis

- Analysis of Policy Content
- Analysis of Policy Impact
- Analysis of Policy Process

Policy Content

Purpose of Content Analysis

Ensure internal consistency and the logic of the provisions in the policy

Ascertain the relationship between the policy instrument with the prevailing constitutional, legal, and policy provisions.

- Example: Justice Isagani Cruz re: IPRA Law

Determine the technical rigor of the provisions of the policy

- Examples: allowable timber cut, duration of logging ban, on species selection

Policy Impact

The focus on policy impact is whether anticipated (when the policy is still a proposal) or actual (when the policy is already implemented)

Examples of policy impacts being analyzed include: economic development vis-à-vis ecological integrity, economic efficiency vs social equity, and equality vs equity.

Source: Contreras and UP Open University, 2001.

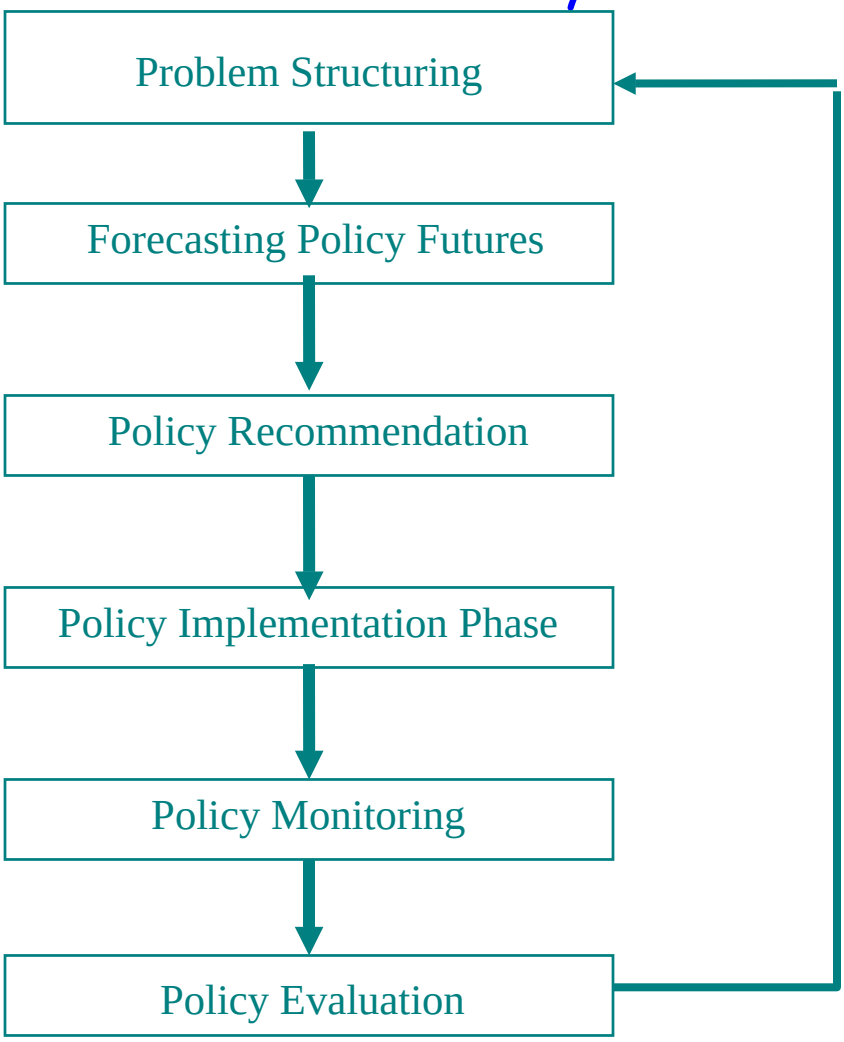
Policy Process

The focus is on how was the policy developed, even before it was implemented

- Parameters of acceptability of policy process:
  - democratic and participatory
  - transparent decision making
  - whole process should be based on informed choice

Source: Contreras and UP Open University, 2001.

Framework for Policy Process



Source: Dunn, 1994.

Structuring Policy Problems

- Policy problems are unrealized needs, values, or opportunities for improvement that may be pursued through public action.

Policy Forecasting

- procedure for producing factual information about future states of society on the basis of prior information about policy problems;
- provide information about future changes in policies and their consequences; and
- to attempt to plan and set policy so that the best possible course of action might be chosen among the possibilities which the future offers.

Source: Dunn 1994.

Limitations of forecasting

- Unexpected, surprising, and counterintuitive political, social and economic changes
  - Examples:
    - financial crisis in 1997
    - bombing of the World Trade Center

Policy Recommendation

- enables analysts to produce information about the likelihood that future courses of action will result in consequences that are valuable to some individual, group or society as a whole; and
- involves the transformation of information about policy futures into information about policy action that will result in valued outcomes.

Policy Adoption/ Implementation

- The "most" preferred policy option is selected and policy-makers promulgate it as the policy.

Monitoring

- What happened, how and why?
- Policy analytic procedure used to produce information about the causes and consequences of public policies

Evaluation

What difference did the policy make?

Functions of evaluation

- Provides reliable and valid information about policy performance
- contributes to the clarification and critique of values that underlie the selection of goals and objectives
- may contribute to the application of other policy analytic methods including problem structuring and recommendation

Definitions of Watershed and Related Concepts

Watershed	An area of land within which surface water flows to one common outlet
Micro-watershed	The smallest watershed that can be identified on the ground. The main drainage line may be a gully that is dry for most of the year, and only contains water after tropical storms or cyclones. Some may contain permanent water sources (spring) for major streams or rivers.
Mini-watershed	Several of many micro-watersheds which have a common drainage outlet for surface water constitute a mini-watershed.
Watershed sub-groups	Several or many mini-watersheds which contribute surface water flow to important actual or potential infrastructure sites or main streams or rivers constitute a watershed sub-group, These sites maybe for dams, mini-hydro, weirs for irrigation water take-off, etc. Watershed planning areas sometimes classified into upper, middle and lower categories to help with land use zoning and environmental impact monitoring, These areas are usually defined by water resource planners or hydrologists.
Watershed group	Several watershed sub-groups that are linked together in a hydrological sense constitute a Watershed Group.
Watershed region	Several or many watershed groups that are collectively important in a regional context constitute a Watershed Region. A watershed region may be a major inland drainage basin containing many watershed groups or may be several watershed groups that contribute water, sediment and water-borne pollution to a major embayment along the coastline.
W-Class watershed	True watersheds are areas from which runoff drains to a single, common outlet, the boundary of which can be delineated by following the drainage divide indicated by the contours on 1:50,000 scale topographic maps.
G-Class watersheds	Grouped watersheds are areas of slopes or small watershed too small to be mapped at 1:50,000 scale, and which have been grouped for planning purposes. Runoff does not drain to a single common outlet, as in the case with a true watershed, but is a series of small micro-watershed or a series of slope surfaces with no surface water flow only sub-surface flow.
F-class watersheds	Lowland watersheds, generally in the form of outwash fans or other alluvial features formed of material washed down from the mountains.
Land use planning	Is a mechanism for articulating local needs, resolving conflict, ensuring rights and enforcing the obligations of land users.
Strategic watershed zoning	Is a village-level land use plan for an individual watershed wherein land use zoning aims to make sustainable use of available resources whilst at the same time promoting sage environment management which takes note of any upstream-downstream bio-physical linkages.

Source: Excerpt from Environment and Development Support Project, Environmental Management Bureau, and Department of Environment and Natural Resources. 1991 “The Role of Watersheds in Integrated Area Planning” EDSP Document No. 3. pp. 1-3.

Watershed Management

Watershed management is defined as the process of guiding and organizing land and other resource uses in watershed to provide desired goods and services without adversely affecting soil and water resources (Brooks et al 1991). It involves the planning and implementation of both technical and policy initiatives to enable the natural and human resources of individual watersheds to contribute to one or more of the following development aims:

- Improved rainwater management within individual watersheds so as to:
    - Provide quality water from both surface and groundwater sources on a sustainable basis, to meet the needs of different water users (human settlements, lowland farmlands/irrigation systems, power generation and transport infrastructure, fish ponds and coral reefs/coastal resources) within and downstream of the watershed; and
    - Provide increased protection from flood and sedimentation damage for the downstream of the watershed.
- Improved standard of living, through the maintenance and enhancement of existing and development of new, suitable livelihood opportunities for those individual households and communities whose welfare needs are met wholly, or in part, by the utilization of watershed resources;
- Improved maintenance, enhancement and protection of those areas that are important for the preservation of the present biodiversity within the fauna and flora of the Philippines;
- Improved care and management of the natural resources within individual watersheds thereby enabling them to be used for economically productive purposes (water, forestry, agriculture, tourism, power generation, etc.) on a suitable basis while maintaining and enhancing their social and environmental service functions.

Source: PCARRD-DOST-DENR-FMB-DA-UPLB-CFNR-FDC/ENFOR. 1999. "Basic Concepts in Watershed Management," in *Guidelines for Watershed Management and Development in the Philippines.* Los Baños, Laguna: PCARRD-DOST-DENR-FMB-DA-UPLB-CFNR-FDC/ENFOR. pp. 3-4

Why Watershed-Based Water Management Makes Sense

Herminia A. Francisco[*]

The issue

The alarming increase in the scarcity of water in various parts of the world has focused global attention on the need for a stronger and more appropriate water resource management solution.

With about 166 million people in 18 countries suffering from water scarcity and about 270 million in 11 countries having "water stresses" conditions (World Bank 2002), it becomes imperative for nations to come up with more focused and direct measures that would address and stem this resource scarcity.

In this regard, how is the water situation, in particular, in the Philippines currently being addressed? Is it enough? What possible other solution(s) may be adopted?

This *Policy Notes* looks into these concerns and presents a more encompassing approach to address them, i.e., through the adoption of a watershed-based water management approach.

The Philippine water situation:
How it is currently being addressed

The current state of water resources in the Philippines and their growing scarcity against a rapidly rising population are causes for much concern among development planners and policymakers. The situation is not expected to improve either unless efforts—both on the demand and supply sides of management—to really attend to it squarely are exerted.

Not that nothing has been or is being done. But it seems that it is not enough.

On the demand side, for instance, not much attention has been given to possible solutions such as the consideration of a pricing policy or scheme that reflects the opportunity costs of the competing uses of water and, more recently, the environmental costs of resource extraction and consumption.

The imposition of a correct water price is expected to send correct signals/incentives that would alter consumer's behavior towards the consumption and extraction of water. It would, however, mean that prices of water might have to increase from its current subsidized level. Expectedly, of course, this may lead to strong resistance since water is viewed more as a social rather than an economic good.

Water is also viewed as a free good—having come from nature and perceived to be free for everybody to extract —or a public/open-access good. This characteristic makes it difficult to

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define property rights over water resources. As such, the solution calls for a clear allocation of water use rights to competing uses and user groups, which may be transferable and fully enforced and protected by law.

Meanwhile, on the supply side, efforts have always been focused on engineering solutions to improve access to water, largely in terms of investment in water infrastructures. This kind of solution implicitly assumes that the supply of water is limitless and all that is necessary is to make it more accessible to users. This assumption, however, has long been challenged since many of the natural resource systems that support water supply have already been degraded while others remain under serious threat. There is now a growing recognition that the infrastructure that provides water supply for whatever uses must be supplemented by efforts to repair and/or protect the ecosystems that support the said infrastructure.

And yet, the efforts to manage the water resources and their ecosystems and watersheds are considered weak on account of the presence of several agencies dealing with water resources, water quality, watershed resources, irrigation, energy/hydropower, domestic water supply and other water-related concerns. Since these agencies belong to different executive departments, the coordination of activities on issues that affect one another is not easy. And while an interagency partnership (the Presidential Task Force on Water) was created to come up with a consolidated action, said body was not given sufficient resources and mandate for it to make a difference. Furthermore, the Task Force was created at the national level and so, it is not surprising that the discussions have remained at the policy level. The implementation aspect where it matters most was not realized. *What could have made more sense was to translate such an interagency collaboration at the level where concrete actions can be carried out. To this end, the logical planning unit is at the watershed level.*

Watershed as the planning unit
for water management

But what exactly constitutes a watershed? How is it defined? And why is it critical to use it as the planning unit?

A watershed, also termed as catchment, refers to an area that supplies water by surface or subsurface flow to a given drainage system, be it a stream, river or lake. The watershed is thus viewed both as a water supply and distribution system, with finite water resources made available to various users (for primary production, domestic and industrial consumption, transportation, or power generation).

Tesoro (1999), in his study, estimated the country's watershed resources to be 21 million hectares of land, representing 70 percent of the country's land area. Of the 21 million, 75 percent (15.88 hectares) are forestlands. The forest vegetation thus plays an important role in the capture, storage and transport of precipitation that falls in a watershed. Any alteration in these processes, by way of changes in land uses within the forestlands, will alter water quality wherein a reduction of the filtering process and increased runoff of water and sediment can occur (Waterlines 2001). Concerns for water quality therefore often translate to forest protection efforts.

But in addition to water, numerous forest products like timber, forage, fuel wood, agri-silvicultural crops, rattan, wildlife, and other minor forest/plant products may also be derived from the watersheds, making the area vulnerable to human encroachment. Thus, the forestland itself is continuously being transformed to agricultural lands and the unregulated removal of forest cover and land conversion bring about watershed degradation, a situation that is now considered as very severe and widespread in the Philippines.

The situation then leads to soil erosion. The latest data indicate that the total soil loss each year in the country is estimated to be 74.5 million tons (DENR 1992). Francisco (1996) estimates it to be even higher at 80.6 million tons. The eroded soil often end up as sediments that fill up important water reservoirs and water bodies, thereby causing water pollution.

Based on the above, a major justification therefore for undertaking land-based resource management and water resource development using the watershed approach is the ecological linkage between the upstream land uses and downstream water conditions. In particular, land use transformations in upstream areas have impacts on downstream communities, directly or indirectly, through the effects on productivity and other conditions of lowland ecosystems.

Taking the watershed as the planning unit will also make it possible for planners to analyze the various sources of stressors to the water quality problem observed in the water body where the watershed drains. With more information, planners can establish a hierarchy of pollution sources as well as identify the contributions of various land uses to water quality conditions.

At the same time, it is easier to identify the relevant stakeholders who have common concerns on the watershed situations. This would facilitate better coordination among the agencies and organizations involved. There is also room for data sharing and pooling of resources among the stakeholders bound by a common ecological goal and resource base given by the watershed. Finally, it is better to implement and monitor various interventions like the restoration and protection of headwaters to improve water quality as well as economic instruments like water pricing, effluent discharge fee and others in a well-defined ecological unit such as the watershed. In sum, the watershed approach is seen as necessary if water quality problems from all sources, especially anthropogenic activities, are to be addressed. The same approach is important in addressing land use degradation in the upper watersheds.

Making it work: elements of an effective watershed-based water management strategy

While the Department of Environment and Natural Resources (DENR) recognizes the need to adopt the watershed as the relevant planning unit for the country's forest resources, it has yet to fully adopt and institutionalize said approach. In order to make this happen, there are a number of certain salient elements and/or factors that need to be considered and adopted.

) ***Appropriate funding support***. Foremost is for the DENR to have a watershed management program with appropriate funding support from the national government. Unless this funding appropriation is made possible in order to boost capacity and capability at the DENR at all levels, such approach will not succeed.

) ***Interagency collaboration***. Concern for water resources cuts across several agencies, thus calling for integrated actions and programs, particularly as they concern the sources of water and water quality conditions. One agency that should be equally concerned, along with the DENR, on the use of the watershed approach is the National Water Resources Board (NWRB). With NWRB's transfer to the DENR expected to happen in the near future, the two agencies' concerns on water quality can now be closely linked with watershed conditions in a more integrated fashion.

) ***Strong LGU support and leadership***. The case of the Maasin watershed in Iloilo demonstrates that a number of forces is important in managing a watershed resource. Strong LGU

support is the pivotal element to this reality. Such support was institutionalized in the Maasin case through provincial legislations, the creation of the Watershed Council and the Barangay Information Centers, all of which have been crucial in sustaining the efforts initiated, mostly with external funding, for watershed management in Maasin. The LGU support was further manifested through a resolution during the First National Conference on Watershed Management held in Davao City in 2001. This example provides an opening to push for this approach on a wider scale since the LGUs now have an appreciation of the merits of watershed management planning.

) ***Clearcut legislative action***. At the same time, there is need to have a legal basis similar to the Clean Water Act of the United States which explicitly mandates that water pollution be addressed with the watershed as the basic planning unit. This need, though recognized, is not explicit in the present Philippine Clean Water Act of 2001. What is needed is a stronger political commitment for the development of a more systematic approach of improving water resource management in the country just as it is currently being done in other countries like the US and some Latin American and Caribbean countries.

) ***Sustained Information, Education and Communication (IEC) campaign***. The significance of IEC activities to increase the understanding and appreciation of the stakeholders on the importance of the watershed approach cannot be overemphasized. Only when the stakeholders themselves have a full appreciation of why this approach is important can a more sustained support to this be realized. An institution similar to the Watershed Academy in the US is one way of promoting this approach on a bigger scale and sustained basis. Through this kind of Academy, the LGUs, along with representatives from the various agencies and other stakeholders, can learn how to manage water and natural resources, with the watershed as the planning unit. Admittedly, one needs to invest in substantial data collection and monitoring activities but the stakeholders' involvement, particularly the local communities', in the long run is the one that will ultimately make the system manageable. Information is particularly critical in establishing downstream-upstream linkages, especially in large watersheds. Assistance for gathering information, bringing parties together and enforcement is often necessary.

) ***Revenue generation for watershed protection and management***. Finally, various ways to raise revenues to finance watershed protection and management activities must be explored. This is because national appropriation is not likely to sustain watershed management initiatives due to economic difficulties faced by many nations. The collection of fees for the use of the environment is supported by the NIPAs Act for Protected Areas in the country and the LGC. However, a stronger law that establishes the rationale and basis of the collection of said fees for the use/extraction of watershed resources and that earmarks them for watershed management efforts is still needed.

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Policy Notes are observations/analyses written by PIDS researchers on certain policy issues. The treatise is holistic in approach and aims to provide useful inputs for decisionmaking. Ms. Jennifer P.T. Liguton helped in recasting/repackaging this *Notes* which is based on a paper entitled "Watershed-based water management strategy: the missing link to sustainable water services" prepared by the same author for the "Water Resources Management Forum" sponsored by SANREM-CRSP/SEA, UPLB and PIDS held on August 12, 2002, Makati, Philippines. The views expressed are those of the author and do not necessarily reflect those of PIDS or any of the study's sponsors.

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Operationalizing the Watershed/Basin Approach to Sustainable Development

Dr. Francisco P. Fellizar, Jr.[1]

Rationale

Environmentally–sound, comprehensive, basin-wide water resources planning and management is the only correct contribution of the water sector towards the strategy of sustainable development. The river/lake basin has become increasingly accepted as a unit for integrated resource management. It is considered as the best territorial unit for managing the interactions between the natural processes and socio-economic factors and forces.

Features of the Basin/Watershed Approach to Development

a) The watershed /basin is a functional region established by physical relationships;

b) The approach is logical for evaluating the biophysical linkages of upland and downstream activities because within the watershed/basin they are linked through the hydrologic cycle;

c) The approach is holistic which enables planners and managers to consider many facets of resource development;

d) Land-use activities and upland disturbances often result in a chain of environmental impacts that can be readily examined within the watershed context;

e) The approach has a strong economic logic. Many of the externalities involved with alternative land management practices on an individual farm are internalized when the watershed is managed as a unit;

f) The watershed/basin provides a framework for analyzing the effects of human interactions with environment. The environmental impacts within the watershed operate as a feedback loop for changes in the social system; and

g) The approach can be integrated with or be part of programme including forestry, soil conservation, rural and community development and farming systems.

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Three perspective of water resources management in the context of a watershed/basin:

As a process:

plan formulation
design
installation
operation
maintenance

As a planned system:

Management measures

- major land-use assignments
- resource utilization and on-site practices
- off-site management practices

Implementation tools

- education and training
- rules, regulations and zoning
- police power
- technical assistance

Institutional arrangements

- land tenure system
- formal and informal legal codes
- organizational development
- public agency roles and relationships

As a set of activities:

1. Divide watershed into land uses
2. Develop set of resource utilization and management practices for each operating unit within each major land use
3. Develop set of downstream management practices

Four issue domains relevant to the basin approach

1. Environmental and social problems arising from water and land use interactions

   a) deterioration of watershed ecological functions due to removal of forest cover through logging, land settlement, and spontaneous expansion of agricultural lands resulting to increased flooding, drought and sedimentation in the downstream area;

   b) Excessive water extraction due to land use activities resulting in water shortages in the downstream areas; and

   c) Increased pressure to construct dams and reservoirs in the upstream for the benefit of downstream communities, giving rise to adverse social effects on the upstream communities.

2. Environmental and social effects of water resources development schemes
3. Problems of access to, and allocation of water resources among competing uses and users
4. Jurisdictional and inter-organizational arrangements

Some considerations leading to operationalization of the approach
(Where do we go from here?)

i) Profiling of critical basin/watershed areas
ii) define users and uses
iii) Formulate programs per basin/watershed
iv) Identify agency roles and responsibilities.
Formalize
v) Develop capabilities for sustained management
vi) Institutionalize the approach
- local autonomy
- water bodies
- programmatic EIA
- legislative means
- modeling/demonstration
- people's initiatives

Source: Forestry Development Center. 1998. Watershed as a Resource: State of the art, Viewpoints and Experiences. General Technical Report Series 2. College, Laguna, Philippines: University of the Philippines Los Baños College of Forestry and Natural Resources. pp. 195-196.

Philippines Strategies For Improved Watershed Resources Management

What It takes to Implement

Rex Victor O. Cruz and Eleno O. Peralta

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INTRODUCTION

The Philippine Strategy for Improved Watershed Resources Management (PSIWRM) was finalized in 1988. Since then, the adoption and implementation of the PSIWRM has been slow and sporadic that is commonly attributed to the absence of policy instrument to enunciate the mandatory shift from the traditional modalities to the strategies embodied in the PSIWRM. The enactment of a policy instrument in the legislature will greatly facilitate the adoption and implementation of the PSIWRM. However the process of enacting a law in congress usually takes a long time while the pressing problems of many watersheds are now begging for immediate solutions. This paper briefly describes the key strategies specified in PSIWRM and the elements of sustainable watershed resources. The key strategies are designed to ensure that the elements of sustainable watershed resources exist in order to cause substantial improvement in managing the watersheds for sustainability of the resources therein and the benefits the society derives from them. The final section of the paper focuses on a list of recommended actions that could be taken to facilitate the adoption of the PSIWRM. The recommended actions are limited to those actions that can be undertaken within the prevailing policy environment and hence will not need to wait for the passage of a law that will institutionalize the PSWIRM.

ELEMENTS OF SUSTAINABLE WATERSHED RESOURCES

The sustainability of watershed resources is premised on four major elements. Namely: appropriate policies, adequate body of knowledge, suitable enabling mechanisms, and capable and properly motivated actors and players in watershed management (Figure1). The state of watershed resources is directly a product of human activities in the watershed under a particular set of environmental circumstances. It is therefore essential that the local communities, the DENR, OGAs, LGUs and other players and actors are properly motivated and possess the competence for the conduct of various activities in the watersheds in ways that will enhance or protect the sustainability of watershed resources. The competence and motivation of the watershed management actors and players depend largely on mechanisms that either enable or provide positive motivation to the actors and players. These include appropriate technologies, ineffective in enabling and motivating the various players and actors in watershed management actors and players depend largely on mechanisms that either enable or provide positive motivation to the actors and players. These include appropriate technologies, adequate training and IEC programs, viable livelihood and appropriate property rights and participation arrangements.

Management decision support systems, resource valuation and pricing schemes, resource information system, conservative and efficient resource use practices and monitoring and evaluation system are key technologies that are needed for effective watershed management. These technologies enable various actors and players to make the best decisions on how to manage and use the different resources in the watershed without degrading the ability of the watershed to provide goods and services over the long term.

Viable livelihood enterprises are essential to help the watershed dependent communities meet their immediate basic needs before they can be predisposed to take on the broader and long term concerns in watershed management. When the sources of livelihood are inadequate, the poor watershed communities will remain focused on meeting their basic needs at whatever cost in whatever way often detrimental to the natural resources that they rely on.

Watershed resources usually have multiple uses that are of interest to more than one user. In most cases, users of common resources have the tendency to rely on the others to invest in the protection of the resource against degradation particularly if the property rights and responsibility are not clearly defined and equitability is uncertain. It is therefore important that the rights and responsibility in the use of watershed resources are clearly drawn and equitably shared among the various users. Where various agencies are involved, appropriate institutional regimes must be set in place.

Training and IEC programs are vital to the development of competence of the various actors and players in applying difference management technologies and adopting the suitable resource use practices. These programs also enhance the level of awareness of the watershed public on issues and concerns on watershed management that could stimulate popular desire to participate in various management activities.

The availability of sufficient mechanisms to enable the various players and actors to participate actively and positively in watershed management is directly dependent on the policy that drives its development and institutionalization. In turn, the formulation of sound policies that will be supportive of the development of appropriate enabling mechanisms is driven by adequate knowledge generated through research. The absence of either well developed science or conduit through which science provides sound foundation to the formulation of appropriate policies more often than not leads to lethargic mechanisms that are ineffective in enabling and motivating the various players and actors in watershed management.

THE STRATEGIES

Policy-related Strategies

1. Sustainable multiple-use management of watersheds should combine water yield and biodiversity protection with compatible economic land use activities (e.g. tree, crops, livestock, fish production, and recreation/eco-tourism) – this strategy is aimed at promoting the efficient use of limited watershed resources particularly in areas where the resource base is relatively small compared with the large population that rely on it. This strategy implies that withdrawing watersheds from productive uses does not always promote the most efficient use of the watershed resources.

2. Integrate watershed management planning concepts and principles into provincial and municipal level comprehensive land use planning procedures.

3. Rapidly delineate the final forest line, and the boundaries of the national parks, and ancestral domains, utilizing a combination of national level data analysis and municipal level field teams.

4. DENR, by means of entering into a Memorandum of Agreement, to devolve to interested Municipalities shared responsibility for the management of specific watersheds, or portions of one or more watersheds, within their area of jurisdiction.

5. Place a price on raw water and other watershed resources according to their true value taking into consideration their scarcity value and the full cost of protecting and harnessing the resources for public consumption.

Institution-Related Strategies

6. Develop a national watershed management programme that is demand-driven, where the initiative for the planning and implementation of individual watershed management plans comes primarily from the local community and the LGU utilizing their own resource inputs (labor, cash, materials, etc.), with as necessary technical assistance and counterpart.

PROPOSED ACTIONS FOR IMPLEMENTATION OF THE STRATEGIES

1. There is a need to develop a critical mass of watershed planners, implementers, auditors and facilitators within the DENR, LGUs, local communities and the POs with aptitude to undertake activities that will directly and indirectly help harmonize and organize various watershed resource uses that are often competing and conflicting by nature. Training programs especially to enhance the ability of DENR personnel to provide technical assistance to LGUs and POs engaged in watershed management planning and implementation,. Priority for training should be those involved in current watershed projects, watersheds with upcoming projects and in watersheds that are priority for development within the next 5 years.

2. Launch vigorous IEC program to increase the appreciation on the principles, concepts, elements, and strategies on watershed management at various levels of the government and sectors of the society. There is a particular need to focus on elevating the awareness of policy makers and local government executives on the value of investing on watershed management enough to drive them to concrete actions. There is also the need to prioritize the development of watershed management consciousness among the young sectors of the population such as through the incorporation of teaching modules on watershed management into the elementary and high school curricula.

3. Capitalize on the provisions of current policies that provide windows of opportunity for collaborative and integrative watershed management planning and implementation such as:

    a. The Local Government Code – that mandates the LGUs as the comprehensive steward of land and other natural resources.

    b. IPRA Law – that provides legal basis for the Indigenous people to be the owner as well as the manager of the natural resources within their ancestral domain.

c. AFMA – that mandates the integrated management of areas including portions of watersheds that are vital to the sustainability of important agricultural and fishery zones.

d. NIPAS – that provides for the integrated management of areas that are critical for biodiversity conservation without withdrawing from production purposes certain areas that are suitable for compatible production uses.

e. EO 263 – that gives the local communities the rights to be entrusted certain portion of the public forest lands for management and development purposes.

f. DAO 99-1 – that mandates the use of watershed as the unit for forest management and planning.

4. The DENR should work closely with the LGUs whenever there us opportunity to develop watershed management plans so that the plans can be readily incorporated in the Comprehensive Land Use Plans of the LGUs. There is enough sense to proactively seek implementers of watershed development projects must also be capitalized on.

5. Following existing models of "adopt a mountain" or "adopt a river" or "adopt a tree" program, the DENR in collaboration with other concerned agencies and stakeholders should develop innovative schemes of engaging government and private agencies, civic and religious organizations, POs, NGOs, and concerned individuals in managing watershed or a portion thereof. Any scheme of developing a watershed or a portion threreof to willing and able stakeholders requires the preexistence of an integrated framework for the management of the watershed. This is to guarantee that the watershed is managed systematically with each and every project undertaken synergistically by one or several sectors to attain the sustainability of watershed resources.

6. Several studies had been conducted on the valuation and pricing of water and other watershed resources (Calderon, 1990; Garcia, 1993; Punzal, 1994; Soguilon, 1996; Cruz et al., 1997; Rull, 1997; and Francisco et al., 2000). There is now a need to test which of the pricing and valuation systems work and which ones do not under certain set of conditions. A good place to start is to conduct a careful assessment of existing laws valuation and pricing scheme can now be undertaken without going beyond the bounds of the law. For instance under the NIPAS Law, there is a scope for collecting fees from users of resources obtained from the NIPAS areas.

7. In watersheds, where formal management scheme is in place or is forthcoming, opportunities for applying the various strategies must be seized. This includes the formation of multisectoral watershed management body where the key stakeholder groups are represented to have a voice in deciding how the watershed will be managed. Opportunities to give prominent role to the LGUs and the POs as members of the watershed management planning team and as principal implementers of watershed development projects must also be capitalized on.

8. Development of viable sources of livelihood especially for upland communities must be given priority over other development projects in the watersheds. This should also include prioritizing support projects for developing viable livelihood enterprises such as improvement of access to the market, integrated processing and value addition, product market development and providing access to sufficient capital resources and technical

assistance to the watershed communities. In collaboration with TESDA, TLRC and other concerned agencies, documentation, assessment and packaging of livelihood enterprises that are viable for upland watershed communities must also be prioritized.

9. Development of a comprehensive watershed research and development agenda and lobbying for substantial financial resources for its implementation must be carried out. It is high time that watershed research be made as a top priority for investment of available research funds of the government and other funds that will be sourced from donor and financing institutions. There will also be the need to review the commodity approach to research as this contravenes in the generation of empirical data and technology that lends accurately well to application on the watershed scale. The establishment of a network of experimental watersheds that represent distinct climatic and biogeographic zones in the country should be seriously considered.

10. There is a prevailing inadequacy of reliable watershed resources information and database that are needed for management planning and decision-making processes. The DENR with the cooperation of the Forestry Development Center and several other agencies developed a prototype integrated database management system for the whole country. The development of the watershed resources information system can be built on the prototype database system previously developed by the DENR. It takes resources to set this system going but within the limits of existing resources, the development of watershed resources information that will be initially fed with existing database. As fresh resources come, the system can then be upgraded and updated.

11. Focus on packaging and stimulating the popular applications of time tested indigenous and traditional watershed management practices. There had been numerous compilations of these technologies made previously. What is now needed is launching of a deliberate program to disseminate these technologies.

12. Building on the gains of past projects dealing with watershed management is crucial in facilitating the implementation of the PSWIRM. The implementation of PSWIRM need not begin from new projects as there are past and existing projects where opportunities either exist or can be created for the purposes of testing and demonstrating the various strategies. Past projects like the GOLD, NRMP and RRMP, and ongoing projects like the Eco-Governance and the WRDP in many ways dealt with watershed management related activities. An assessment should be made to determine how these projects can be used as platforms for PSWIRM implementation.

13. The development of the implementing rules and regulations (IRR) for DAO 99-1 should be sped up. This order is supposed to be the driving force behind the implementation of the PSWIRM within the DENR particularly in the field where most of the strategies are to be applied. Without the IRR, it will be more difficult as it is already to force the shift in paradigm and practices from the traditional to the PSWIRM. The IRR is doubly essential as much of the strategies that can now be implemented without changes in the existing legal framework and without waiting for new funds can already be slowly initiated in the field. This includes the preparation of management plans for all forestlands using the watershed as the unit for planning. Realignment and restructuring of existing projects can also be made to accommodate the active participation of watershed stakeholders. A lot of the IEC requirements of the PSWIRM can also be initiated in the field to elevate the level of awareness of the local communities, LGU officials and other local stakeholders.

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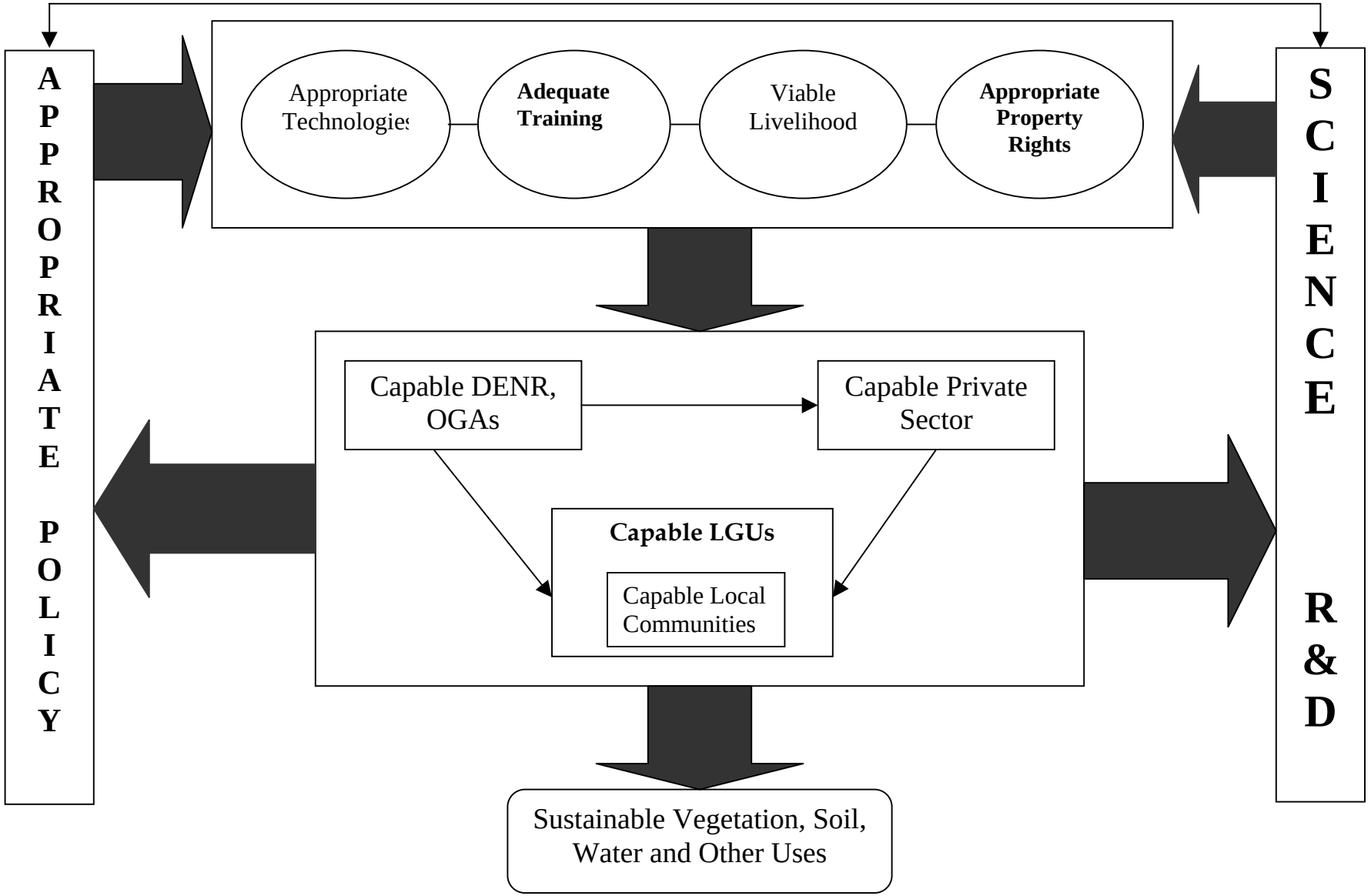

Figure 1. Elements of Sustainable Watershed Resources

Public Policy as Defined by Various Authors

1. "the relationship of a government unit to its environment" – Eyestone, 1971
2. "whatever government choose to do or not to do" – Dye, 1972
3. "a long series of more or less related activities (rather than discrete decisions)" – Rose, 1969
4. "a proposed course of action of a person, group or government within a given environment providing obstacles and opportunities which the policy was proposed to utilize and overcome in an effort to reach a goal or realize an objective or purpose" – Friedrich, 1963
5. "a purpose course of action followed by an actor or set of actors in dealing with a problem or matter of concern" – Anderson, 1975
6. "also a purposive goal-oriented than random or chance behavior, consists of courses of action than separate, discrete decisions; what governments actually do, not what they intend to do or say they are going to do; based on law and is authoritative; broken down into categories of 1) policy demands; 2) policy decisions; 3) policy statements; 4) policy outputs, and 5) policy outcomes." – Anderson, 1975
7. "a rule of action, manifesting or clarifying specific organizational goals, objectives, values or ideas, often prescribing the obligatory and most desirable ways and means of their accomplishment. Such a rule for action established for the purpose of farming, guiding, or directing organizational activities, including decision-making, intends to provide relative stability, consistency, uniformity and continuity in the operations of the organization." – Nicolaidis, 1963
8. "a multi-dimensional entity of the organizational world; has pluralistic purpose, character, form and development; is generally incomplete and sometimes ambiguous to leave enough freedom to the operating levels to shape the (final) policy." – Nicolaidis, 1963
9. "guidance for action" – UN 1975
10. "major guidelines for action directed at future, decided mainly by government organs, formally aim at achieving what is in the public interest by the best possible means? – Dror, 1978
11. "long series of more or less related choices (including decisions not to act) made by governmental bodies and officials dealing with many different issue areas such as defense…" – Dunn, 1981
12. "an identified set of government actions toward some situations perceived problematic; what those actions are from the perspective of the public; and what their consequences are" – Lynn, 1987 as quoted in Crew, Jr., 1992

Source: Mendoza, Fe and UP Open University. 1998. "The Nature and Need for Public Policy," in *Introduction to Public Policy and Program Administration*. College, Laguna: UP Open University, p. 11.

Major Policies in Watershed Management and Conservation in the Philippines

Rosalio B. Goze*

Watershed

- transcends all ecosystems

1. ***Forest Ecosystem*** *– occupies about 25% of the total land area*

Issues include:

- deforestation – rate is 105,000 ha/yr during the last decade
- soil erosion – rate is 100,000 ha/yr at 1m depth or about 1 billion m^3 of materials/yr
- biodiversity – flora/fauna depletion loss
- hydrological cycle changes – resulting to floods and drought

2. Marginal Land Ecosystem

- consists of the converted forests into grasslands, brushlands and barren areas
- occupies about 11.9686 M ha which is about 40% of the total land area

Issues include:

- population boom – 17.5 million in 1990 and 40% of which are in the forest lands
- reforestation pacing is slow due to wildfire and other socio-economic constraints

3. ***Coastal Ecosystem***

- includes mangrove forests and similar areas, marshy areas and coral reefs which occupy about 0.6053 million ha

Issues include:

- Mangrove conversion – remnant of only 38, 000 ha in 1988
- coral reef destruction due to gathering, destructive fishing, siltation, erosion and sedimentation
- mine tailing dispossal
- solid/liquid waste disposal

4. Urban Ecosystem

- total urbanized area is about 130,000 ha inhabited by about 30 M people

Issues include:

- garbage problem, water pollution and air pollution

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*5. **Freshwater Ecosystem***

- consists of riverbeds = 0.0818 M has
- lakes = 0.2054 M has

Issues include:

- water pollution – 70% of pollution comes from domestic sources, 30% is from industrial sources
- salt water intrusion of ground water table
- puts into picture the hydrologic cycle; flood control and disaster mitigation; key production grain areas (KPGA's); regional industrializing centers (RICs) and human settlement areas needing domestic, commercial and industrial water supply; power generation using water turbines and geothermal energy and other various relevant infrastructures.
- Government agencies involved in environment and natural resources use planning

a) National Level – President, Cabinet Members, NEDA and CORD (Cabinet Officers for Regional Development) and Funding Agencies (World Bank. ADB, OECF, etc.)
b) Regional Level – Cabinet Members as Department Secretaries and as CORD Officials; REDs; Regional Development Councils, Governors, House of Representatives and Senators; Funding Agencies
c) Sector Level – REDs, RTDs, Governors, Mayors, POs, NGO's and other middle-management staff
d) Project level – Project managers for EIA process

Government agencies involved in watershed advocacy

- DENR and Regional Offices; NPC, PNOC, NIA, NWRB, LWUA, LWD's, NEDA and LGUs.

Watershed Statistics

I. Total Land Area = 30 M ha

The land area of the country can be categorized in terms of LAND USE OPPORTUNITY and these are:

a. active agricultural – lands that are actively areas utilized for various agricultural activities.
b. agricultural expansion – idle and less utilized areas lands that have potential for various forms of agricultural uses
c. rehabilitation areas – lands within critical watersheds seemingly subjected to various forms of land use abuses
d. preservation areas – lands primarily covered with trees dominated by woody type of vegetation including mangroves that represent areas should be permanently retained to maintain ecological balance.
e. wetlands – rivers, lakes, marshes and swamps
f. miscellaneous uses – urban settlement centers, industrial sites, quarry and open pit mining, airstrips, riverbanks, etc.

Their extent are as follows:

Description	Total Areas (ha)	%
1. Active Agriculture Areas (KPGA's)	10,043,182	33.47
2. Agricultural Expansion Areas	5,652,107	18.84
3. Rehabilitation Areas (Watersheds)	6,241,625	20.71
4. Preservation Areas	6,603,514	22.01
5. Wetland Areas	592,333	1.97
6. Misc. Uses	898,411	2.99

II. Watershed Terrain is divided into:

Upstream and downstream landscape

- 1/3 of total 68.6 M Filipinos are upstream dwellers
- there are 119 proclaimed watershed forest reserves with a total of 1,376,455.10 ha

Summary of Watershed Forest Reserves
(As of August 9, 1996)

REGION	NUMBER	AREA (ha)
CAR	6	113,008.95
1	10	6,167.00
2	5	119,261.00
3	8	221,261.00
4	35	107,399.54
5	10	36,564.95
6	9	131,777.00
7	6	104,163.00
8	8	30,017.24
9	4	11,456.00
10	7	148,717.00
11	7	111,364.29
12	1	52,820.00
ARMM	2	182,354.00
TOTAL	119	

Watershed Management

DENR's mandate is explicitly stated in the Civil Code Chapter 6, Article 67:

a) "Any watershed or any area of land adjacent to any surface water or overlaying any ground water maybe declared by the DENR as protected area. Rules and regulations maybe promulgated by such agency to *prohibit* or *control* such activities by the owners or occupants thereof within the protected area which may cause damage or deterioration of surface or groundwater or interfere with the investigation, use, control, protection, management or administration of such waters".

b) 192 – Reorganization of DENR which partitioned into several agencies the various roles/functions in watershed management.

Forest Management Bureau (FMB) – policies, programs for protection, development, occupancy and management of forest lands and watersheds

Land Management Bureau (LMB) – for administration, surveys and disposition of A & D of the public domain and other lands outside the responsibilities of other government agencies

Mines & Geo-Sciences Bureau (MGB) –pertaining to mineral resources development, geology and extraction

Environmental Management Bureau (EMB) - legislations for environment and pollution control; institutionalized EIS process; proper disposition of solid, toxic and hazardous waste

Ecosystem Research and Development Bureau (ERDB) – formulate/recommend technologies for Phil. Ecosystems

Protected Areas and Wildlife Bureau (PAWB) – for the establishment/management of an Integrated Protected Areas Systems such as national parks, wildlife sanctuaries and refuges; marine parks and biospheric reserves.

Pollution Adjudication Board (PAB)- adjudication of pollution cases

Regional ENR Offices (RENROs) – Regional DENR offices implements laws/policies/plans, programs, projects, rules and regulations of DENR;

Deputized Environment and Natural Resources Officers (DENROs) and these are: (1) duly elected government officials; military and police officers; company foresters, concession guard under the employment of concession holders; (2) qualified employees of mining concessionaires and other holders of indigenous cultural communities' environment and natural resources agreements.

Other Agencies Involved:

1. *Philippine National Oil Company (PNOC)*

- By virtue of E.O. 223 July 6, 1987; and by MOA with DENR – May 26, 1989
- Jurisdiction, control, management and protection of watershed areas where geothermal reservations of PNOC are graded.

2. *National Power Corporation(NPC)*
   - By virtue of E.O. 224 July 16, 1987
   - Vesting NPC over watershed areas and reservations surroundings its power generating plants and properties

3. National Irrigation Administration (NIA)

- By virtue of LOI 1002 (March 20, 1980)

- Vesting NIA with the watershed areas of the Pantabangan and Magat Multi-Purpose Dam Projects

4. *Department of Public Works and Highways (DPWH)*
   - by virtue of LOI 898 – to carry out the Programs of Small Catchment Basins (as of July 25, 1979)
5. *Department of Agriculture/Bureau of Soils ad Water Management*
   - institutional support to expound on active key production grain areas
6. *Department of Agrarian Reform (DAR)*
   - institutional support to award comprehensive Agrarian Reform Package to farmer beneficiaries
7. *National Water Resources Board (NWRB)*
   - policies/regulations/programs for water utilization
8. *Local Water Utilities Administration/Laguna Water District (LWUA/LWD)*
   - for effective watershed protection, management conservation and to preserve and to sustain the hydrological and ecological productivity of the watershed
   - by virtue of MOA signed by DENR-LWUA September 2,1995.

Watershed Policies

On top of criss-crossing watershed policies, the "Water –Crisis Act of 1995" or RA 8041 embodied the policy of the state to adopt urgent and effective measures to meet the nationwide crisis which adversely affects the well-being of the people, food production and industrialization process. RA 8041 addressed the water crisis situation in the country and highlighted the:

- sad state of watersheds
- pollution of rivers
- wasteful use of water
- unabated underground water extraction

Accomplishments of RA 8041:

1. provided the criteria to categorize critical watersheds
2. identified 17 watersheds where developmental activities are suspended in support of the water supply sector
3. aligned responses to water crisis situation in several parts of the country. Devolution of DENR Role to LGUs – RA 7160 or the 1991 Local Government code
   - issuances of ECC for projects and business
   - adjudication of pollution cases
   - solid waste management
   - noise management and
   - CDO implementation by PAB (Cease and Desist Order)

Major Watershed Policies

DENR is mandated by the Constitution for the (a) equitable distribution of natural resources, and (b) conservation of natural resources. Its ultimate objective is to promote the well-being of the Filipino people and the major policies are towards the following:

1. sustainable development of forest/watershed resources
2. optimal utilization of lands and mineral
3. pursuance of social equity and efficiency in resource use and
4. enforcement of effective environmental management.

Policy	POLICY ISSUANCES			
	1989	1991	1992	1993
1. Sustainable Development of Forest/ Watershed resources				
a. Tree Farms	DAO-38	DAO-31		
b. Contract Reforestation	MC-11	DAO-13; MC-8		DAO-16; MC-04 MC-05
c. Timber stand Improvement – Seed Production Areas	DAO-19	MC-11		
d. Industrial Forest Plantation – TLA		DAO-42;MC-08 DAO-15	DAO-16 MC-01; MC-02	DAO-60 DAO-68
e. Old Growth Forests Demarcation - Buffer Zones		DAO-14	DAO-13	MC-16; MC-17 34, 35
f. Shift in Logging to Second Forests		DAO-24	DAO-12	DAO-28
g. NIPAS			RA-7586 DAO-25; MC-22	DENRC-04
h. Submission of Aerial Photographs			DAO-17	
i. Forestry Master Plan			DAO-23; DAO-40	
j. Watershed Proclamations				DAO-23; Proc. 20,23,834,871, 918, etc.
2. Optimal Utilization of Lands and Minerals				
a. CARP inventory				DAO-44
b. Quarry materials	DAO-03			
c. Mining small scale	DAO-05			
– FFTA	DAO-63	DAO-34		
d. A&D Agricultural Lands	MC-22	MC-12		
e. Debt-for-Nature Swamp	DAO-47			
f. Cadastral Survey & Mapping and Records		DAO-49; DAO-51		DAO-35; DAO-36

Continued

Policy	POLICY ISSUANCES			
	1989	1991	1992	1993
g. Forest charges on timber and other products	RA-7161			
h. Land pilots (Handog Titulo Program)			DAO-11	
i. Stewardship				DAO-23
j. Ancestral domain				DAO-02
3. Social equity and efficiency in resource use				
a. Communtiy Foresty Program	DAO-123			DAO-65
b. Integrated Social Forestry Program	DAO-20	DAO-04		
c. ENR Sector Adj. Program			DAO-48	
d. Deputation of ENROs				
• Cultural management	MO-02			
• Others		DAO-41		
e. NGO participation in ENR Management	DAO-120		DAO-51	
• PCSD		EO-15		
f. Local Government Code about ENR Management		RA-7160	MC-17 DAO-30	
g. Small-scale Mining Program		RA7160	DAO-34	
h. Upland Technology			DAO-35	
• Low Income Upland Communities Project (LIUCP)			DENRC-01	
• Technology packaging				
i. Coastal Environment Program				DAO-19
4. Enforce Effective Environmental Management				
a. Issuance of ECC/EC		DAO-8		
b. Information Resources Management Program		DAO-64		
c. EISS			DAO-21	
d. EIMP			DAO-54	
• Solid Waste Management			MO-02	
e. Philippine Agenda			Malacañang Memo #33	

Continued

Policy	POLICY ISSUANCES			
	1989	1991	1992	1993
f. ENR Devolution				RA 7160
g. Cabinet Cluster System				DAO

Policies/Regulations Regarding Watershed Conservation and Management

1969 – Republic Act 5752. An act providing for the establishements of municipal and city forests, tree parks, or watershed, amending for that purpose Republic Act No. 2264, otherwise known as the "Local Autonomy Act"

1970 – Proclamation No. 753. Declaring all watersheds and lakes within watersheds reservations as game refuge and bird sanctuaries.

1973 – Presidential Decree No. 331. Requiring all public forests to be developed, managed and utilized on a sustained-basis

1975 – Presidential Decree 705. Revised Forestry Code of the Philippines. No land of the public domain 18% slope or over shall be classified as alienable and disposable land nor any forest land 50% in slope or over as grazing land; title lands being free of this claim provided that they are kept in a "vegetative condition sufficient to prevent erosion and adverse effect on the lowland and stream"; provisional amnesty to Kaingineros who entered forest lands before 1975 provided they do not increase their clearings.

1976- Presidential Decree No. 953. Requiring the planting of trees in lands adjoining at least five meters on land adjoining the bank of the water course; reserving thirty percent of a subdivision excluding roads as open space for parks and recreation

Letter of Instruction No. 408. Authorizing comprehensive study on catchment basins and reservoirs

1977- Presidential Decree No.1152. Philippine Environmental Code

1978 – Presidential Decree No. 1559. Amending PD 705, emphasizes the relocation of kaingineros and other occupants whenever the best land use of the area so demands to nearest and accessible government resettlement area

Presidential decree No. 1586. Establishing an environmental impact statement system including other environmental management-related measures and for other purposes

Compilation of Watershed Management and Conservation Policies

1979 – Letter of Instruction No. 917. Declaration of all mossy forests, protection forests, critical watersheds and proclaimed watershed as wilderness areas

Letter of Instruction No. 898. SWIM Program committee established

BFD Administrative Order No. 2. Establishment, development and maintenance of Wilderness areas and greenbelts plus definitions and instructions in support of LOI 917 and LOI 971A

Letter of Instruction No. 1002. Vesting on the National Irrigation Administration, the authority to manage, develop and rehabilitate the watershed area of the Pantabangan and Magat Multi-Purpose Dam Projects.

1981- BFD Circular No. 5. Planting of trees along the boundaries of areas covered by Pasture Lease Agreement or Pasture permit

BFD Circular No. 6. Planting of trees along banks of rivers and creeks

1986- Ministry Administrative Order No. 39. Reiterating the prohibition against inclusion of watershed areas in the social forestry programs

Republic Act No. 5752. An act providing for the establishment of Municipal/City forests, tree parks, watersheds amending RA 2264 – "Local Autonomy Act".

1987 – Executive Order No. 192. Reorganization of the Department of Environment and Natural Resources, vesting in DENR the jurisdiction, supervision and control over all forest lands including watershed reservation.

Executive Order No. 223. Vested in the Philippine National Oil Company (PNOC) the jurisdiction, control, management and protection, development and rehabilitation over the watershed areas of geothermal reservations where PNOC has geothermal projects, plants and properties

Executive Order No. 224. Vesting in the National Power Corporation (NPC) the complete jurisdiction, control and regulation over certain watershed areas and reservations supporting its operational water-based power plants and responsibility for management, protection, development and rehabilitation.

1992 – Administrative Order. National Integrated Protection Areas Systems (NIPAS) Implementing Rules and Regulations of RA No. 7586 providing for the establishment of NIPAS

Administrative Order No. 21. Amending the Revised Rules and Regulations Implementing PD 1586 (Environmental Impact Statements System)

Adminstrative Order No. 27 – Management of Mossy Forests

1995-Republic Act No. 7942. Philippine Mining Act of 1995

Republic Act No. 8041. National Water Crisis Act.

Source: Forestry Development Center. 1998. *Watershed as a Resource: State of the art, Viewpoints and Experiences*. General Technical Report Series 2. College, Laguna, Philippines: University of the Philippines Los Baños College of Forestry and Natural Resources.

Allocating Water Rights: The Philippine Context

Atty. Jesus G. de Leon*

Introduction

The efficacy of any water resources management policy depends on the beneficial, regulated and controlled utilization of water rights. That's why the heart of modern day water legislation is on the mechanics of allocating water rights.

The realization that water as a natural resource is not inexhaustible, that in fact its availability is continuously and by large extent being strained, underscores the importance of proper allocation, development and management of the Philippine water and related resources. Water should be treated as an economic commodity more than a God-given resource and being vital to national development, the state must, of necessity, intervene actively in its rational development. This is despite the fact that, by nature, the Philippines is endowed with abundant water resources. Our average annual rainfall is about 2500 millimeters. Dependable supply from rivers is estimated at about 700 million cubic meters per day. This is more than twice the needs of the whole country for the next twenty years. Groundwater reservoirs are found extensively in the plains where most of the people live.

Allocating water rights refers to the granting or recognition of existing water rights with the end in view of developing, conserving, protecting water resources and maximizing their beneficial use. It may also refer to the determination of priorities of rights – both in point of time and preferential use.

Water rights allocation necessities the existence of an authority in regulating and allocating water rights. In the Philippines, such authority is vested with the National Water Resources Council (now National Water Resources Board). The NWRB's creation rose from the need to coordinate and integrate the multifarious plans and programs instituted by various governmental and quasi-public agencies involved in the utilization, exploitation, development, control and conservation of the nation's water resources. It is a result of a continued and concerted effort waged toward a workable solution to inter-agency conflicts for the right to develop and appropriate the same water resources. It also gives life to the 1935 and 1973 Philippine Constitutional provisions declaring state ownership of all waters within the Philippine territory.

To be able to understand the Philippine policy on water rights allocation, it is important to have knowledge on the antecedent legislation of Presidential Decree No. 1067, otherwise known as the Water Code of the Philippines. Thus, a survey of Philippine water laws relative to water rights allocation included the Spanish Law of Waters (SLW) of August 3, 1866 or Ley de Aguas and the

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Spanish Civil Code (SCC) of 1889, the Irrigation Act of 1912 or Act 2512 and the New Civil Code of the Philippines (NCC) of 1950.

These water laws dealt among other things, on the preferences in the use of water when priority in time of appropriation cannot be determined and when water supply is insufficient to meet domestic/municipal, agricultural (irrigation), and industrial demands, and fisheries and mining purposes.

Legal and Historical Background of Philippine Water Laws

The arrival of Ferdinand Magellan in this country on 16 March 1521 presaged a new era in the history of Philippine Law. Spanish laws and codes were extended to the Philippines either expressly by Royal Decrees or by implication by the issuance of special laws for the islands. As we are dealing in waters the most important piece of legislation is –

A. The Spanish Law on Water of August 3, 1866 (SLW) or Ley de Aguas

The SLW promulgated in Spain on August 3, 1866 is the basis of the country's water legal system during the period of Spanish colonization of the Philippines. The applicability of this law was extended and became effective to the Philippines and therefore the latter remained in force and in effect.

The SLW recognizes the existence of private and public ownership over surface and subterranean waters. This legal system, albeit it adheres to the "duality" of water ownership, accentuates the riparian doctrine which is evident in its emphasis in the protection of water rights of owners whose property abuts a source of water. With respect to privately owned water, the owner has the absolute rights to the enjoyment of all the attributes of ownership, limited only by the Latin maxim *Sic utero tuo ut alienum non laedas.* Use your property in a manner that will not injure the rights of others. Ergo, the matter of allocating water rights does not set in. It is only on the area of publicly owned water where allocation becomes relevant and where the intervention of the government is very evident. While SLW of 1866 and its Repealing Act of June 13, 1885, however, places no distinction between surface and underground water considering that both are closely related, have identical characteristics and functions and therefore both are subordinated to public interest and shall be dispensed to the service of the nation. In other words, the new code treats both surface and subterranean water as one single resource which more or less abrogated the concept of proprietary rights of the owner of the water located within his/her property.

The termination of the Spanish-American War followed by the signing of the Treaty of Paris on December 10, 1898 paved the way for the cession of the Philippines to the United States. Upon the establishment of American Sovereignty, the political laws of the Philippines were totally abrogated and Spanish laws, customs and rights of property inconsistent with the United States Constitution and with American principles and instructions were superseded. The government operated under different organic laws; namely President McKinley Instructions to the Second Philippine Commission on April 7, 1900, the Spooner Amendment of 1901, the Philippine Bill of 1902, and several other laws.

It was during the American Era and the Commonwealth period or to be specific in the year 1912, that Act No. 2152 was enacted, otherwise known as the –

B. Irrigation Act (IA) of 1912

No major legal innovations on the system of water rights allocation occurred during the American Sovereign rule over the Philippines. The noticeable change, albeit slightly, is that the IA of 1912 dealt sparingly on water ownership but more specifically on the procedural aspects in the appropriation of public water for irrigation. Under Section 3 of said Act, the order of preference, when priority in time cannot be established are: a) domestic purpose, b) agricultural purposes or power development for agricultural purposes, c) industrial purposes, d) ponds for fisheries, e) mining purposes or milling connected with mining purposes. No radical shift can be noted from Article 207 of the SLW of 1886 in the listing of preference for the grant of administrative concessions to use public water.

PRESENT PHILIPPINE POLICY

A. State Ownership of All Waters

The Philippines adheres to the Regalian Doctrine insofar as ownership of national resources is concerned, that is, "All waters belongs to the state." This doctrine is clearly laid down in its 1935 Constitution, particularly in Section 1, Art. XIII and restated in Section 8 Article 14 of the 1973 Constitution which in part provides:

"All lands of the public domain, WATERS, MINERALS, COAL, PETROLEUM and other MINERAL OILS, all forces of potential energy, fisheries, wildlife and other natural resources of the Philippines belongs to the State. x x x"

Explicit from the aforecited provisions is the fact that the State no longer recognizes private ownership of water – a radical innovation vis-à-vis the counterpart provisions of the SLW and the NCC of 1950.

The provision adverted to above was reiterated in the 1987 Philippine Constitution with little modifications.

The provision declaring that the country's natural resources including water as belonging to the State was reproduced. However, the law sets a limitation in the use of water for power generation purposes to a period of 25 years renewable for another 25 years, unlike the use of water for irrigation, water supply, fisheries or industrial uses in which the measure and limit of the grant is "beneficial use." (Section 2, Art. 12, Philippine Constitution, 1987).

B. The Philippines' Water Code, Its Salient Features

The 1976 Philippine Water Code (CODE) consolidates more than 50 pieces of legislation dealing with various aspects of water resources which are mostly piece-meal in character, sometimes inconsistent and clearly inadequate.

Dr. George E. Radosevich, Professor of Water Law of the Colorado State University and who incidentally was the chairperson for the technical session on Legal and Institutional aspects of the Third Prince Chulabhorn Science Congress on Water and Development in Bangkok, Thailand to which this paper was presented, when he was in Manila some seven months ago as a member of the World Bank team examining means and options for strengthening the National Water Resources Board (NWRB), commented that "the CODE is in many ways, the World's model

water law." Despite the fact that the CODE was promulgated in 1976, some twenty years ago, its provisions are still very relevant, futuristic and all encompassing as it practically covers all aspects of water use, as well as technical, legal, institutional, environmental, among other aspects.

The CODE is predicated on five fundamental principles which determine the nature and extent of water resources development in the country. Said principles are enumerated in Art. 3 of said CODE as follows: 1) All waters belong to the state; 2) All waters that belong to the State cannot be the subject of acquisitive prescription; 3) The State may allow the use and development of waters by administrative concession; 4) The utilization, exploitation, development, conservation and protection of water resources shall be subject to control and regulation of the government through the NWRC (now the Board); 5) Preference in the use and development of water shall consider current usage and be responsive to the changing needs of the country.

1. All Water Belong to the State

As already stated and discussed in the preceding paragraphs of this paper, the first principle declaring that "all waters belong to the State" is not a new concept. It is embodied in the 1935 and 1973 Philippine Constitutions. The declaration that all waters belong to the State in Art. 3 (a) of the CODE is amplified in Articles 5 and 6 thereof, to the extent that the waters recognized to be of private ownership, enumerated in Art. 503 of the NCC of 1950 are now considered as belonging to the State. Waters as used in the CODE refer to waters under the ground, waters above the ground, waters in the atmosphere, and the waters of the sea within the territorial jurisdiction of the Philippines.

To the legalists and constitutionalists, the phrase "all waters belong to the State" is not absolute and all embracing. It should not cover but rather accord respect to private ownership of waters acquired under previous laws. The generally accepted legal tenet that laws should only have prospective effect seemingly supports such contention.

2. Acquisition of Water Rights by Prescription, Abrogated

Prescription as a mode of acquiring ownership and other real rights through the lapse of time is recognized and provided under the SLW of 1886 (Sec. 39, 42, 194), SCC of 1889 (Art. 409) and the NCC of 1950. Although it was not so provided under the IA of 1912, the Supreme Court of the Philippines in a case decided by it declared that "while said law did modify the old legislative procedure in obtaining administrative concessions of public waters still it has not invalidated prescription as a mode of acquiring title thereto, specifically considering that the Civil Code of 1950; Art. 504, reiterates the dual juridical source of title to the use of public waters and even reduces the prescriptive period from twenty to ten years."

The mode of acquiring real rights through prescription as above discussed is no longer recognized in the CODE as Art. 3 (b) so explicitly states. Moreover, Art. 100 of said CODE expressly repealed the provisions of the previous mentioned laws that allow acquisition by prescription of water rights.

3. Use or Development of waters by Administrative Concession

The CODE did not change this rule provided in the previous laws, namely the SLW of 1866 and the SCC of 1889 – recognizing administrative concession as a mode of acquiring rights to the use of public waters. It is only modified the procedural aspects and set limitations by prescribing qualifications of those desiring to appropriate waters. Art. 13 of the CODE states that "no person

including government instrumentalities or government-owned or controlled corporations shall appropriate water without a water right, which shall be evidenced by a document known as a water permit. Water right is the privilege granted by the government to appropriate and use water.

The CODE further added under Art. 15 that "only citizens of the Philippines, of legal age, as well as juridical persons who are duly qualified by law to exploit and develop water resources may apply for water permits." The phrase "juridical persons who are duly qualified by law" refers to associations duly registered, cooperatives or corporations duly organized under the law of the Philippines, sixty percent of the capital of which is owned by citizens of the Philippines.

The general rule laid down under Art. 13 that water cannot be appropriated without a water permit admits of certain exceptions. The second paragraph of Art. 6 provide that the owner of the land where the water is found may use the water for domestic purposes without securing a permit. Likewise under Art. 14 if water is appropriated by means of hand-carried receptacles or when they are using natural bodies of water for bathing or washing, watering or dipping of domestic farm animals, navigation or water crafts or transportation of logs and other objects of floating, securing a permit is no longer necessary.

Other water laws of foreign countries which advocate state ownership of all waters provide similar exemptions. For example, the Spanish Water Act of August 3, 1985, Sec. 48 (1) states: "Everyone, without any prior administrative authorization and in accordance with applicable laws and regulations can make use of surface waters while they flow along their natural beds, for drinking, bathing and other domestic purposes, as well as for livestock watering.

Another example, Art. 12 of the Water Law of the People's Republic of China, provides: "For drawing water directly from ground aquifers, rivers, or lakes the State shall exercise a water drawing permit system. For drawing water for household use and for livestock and poultry drinking and also for small quantity water drawings, it is not necessary to apply for water-drawing permits." (underscoring supplied)

4. Control and Regulation by the Government of the Water Resources Throught he NWRB (Board)

The basis for the State's control, regulations, disposition and all allocation and management of water resources is a necessary implication of the Regalian Doctrine. The state being the owner of all waters can exercise all the attendant attributes of ownership.

Cognizant that water is one of the most important if not the most important among the natural resources, the government opted for stricter control and regulation in the utilization, exploitation, development, conservation and protection of this essentially consumable commodity. When the State through the Water Code vested in a single agency, the Board control and regulation of the nation's water resources, it gives life to the enunciation in the Preamble of the Constitution, that the Government shall "conserve and develop the patrimony of the Nation.

5. Use and Development of Water Resources Shall Consider Current Usages and be Responsive to the Changing Needs of the Country

To ensure a balanced beneficial use according to importance, demand, and the State's socio-economic, ecological, aesthetic and political policies, the Philippine Water Code sets an order of preference for the guidance of the Board in the allocation of water rights.

When priority in time of appropriation from a certain source of supply cannot be determined, the order of preference in the use of the waters shall be as follows:

a. domestic and municipal use
b. irrigation
c. power generation
d. fisheries
e. livestock
f. industrial use, and
g. "other uses."

This order of preference is resorted to only when priority in time of appropriation cannot be ascertained.

However, Article 95 is qualified by Article 22 to the effect that the time of appropriation is not the sole yardstick for the determination of priority. Specifically, Article 22 provides: "Between two or more appropriators of water from the same source of supply, priority in time of appropriators shall give the better right, except that in times of emergency, the use of water for domestic and municipal purposes shall have a better right over all other uses; provided, that where water shortage is recurrent and the appropriator for municipal use has a lower priority in time of appropriation, then it shall be his duty to find an alternative source of supply in accordance with conditions prescribed by the Board".

C. Criteria for Domestic Water Supply Allocation

Lately, the Board, adopted some guidelines for a more prudent and equitable allocation of water for municipal/domestic water supply users. This was because it is felt that the present liters per capita per day (LCPD) allocation to water users for such purposes is inequitable and is dictated by force of circumstances rather than actual needs and generally is intended for planning purposes.

Consumption statistics obtained from reports of various water supply agencies, such as the Metropolitan Waterworks and Sewerage system, and the Local Water Utilities Administration through the Water Districts, reveal the following:

For Metro Manila Areas	-	300 LPCD
Other Urban Areas	-	250 LPCD
For Rural Areas	-	60-100 LPCD

The higher urban areas' per capita consumption is mainly due to adequate distribution facilities although sometimes it is limited by condition of low pressure in the main. In the rural areas, inadequate water supply distribution facilities are major factors in limiting per capita consumption while in areas supplied by public faucets, consumption is usually limited by the need to carry water from the faucet to the house.

For general planning purposes, the above figures are deemed sufficient at the moment. However, for more equitable policy in allocating water rights, a uniform value should be adopted anywhere nationwide. The reason behind this is that, while certain limitations exist in the use of water, it is also a fact that a user no matter where he lives has as much the same rights to the same amount of water as those in more developed areas.

The Board therefore, unanimously agreed in Resolution No. 05-0388 S. 1988 to adopt a uniform value of 250 LPCD in determining municipal/domestic water supply requirements for water rights allocation.

D. Criteria for Irrigation Water Supply Allocation

The Board has likewise developed a scheme in determining irrigation water requirements based on various types of soils as classified by the Bureau of Soils. The amount of water needed for the following types of soil are as follows:

Sandy Loam	-	2 LPS
Loam	-	1.6 LPS
Silk Loam	-	1.2 LPS
Clay Loam	-	1.0 LPS

In the evaluation of water permit allocations, the allocation of the proposed service areas is superimposed in the Water Duty Map and the appropriate water duty is accordingly selected for the service area. There is a possibility, however, that a given service area may be located within two or more soil types. If for instance the irrigable land is 50 percent clay loam and 50 percent sandy loam, the estimated water duty therefore will be:

1.0 (Clay Loam) x .50 x 2.0 LPS (Sandy Loam) x .50 = 1.50 LPS

Lately, however, the Board promulgated Resolution No. 00-0 S. 1989, amending the scheme and adopting as a matter of policy the minimum water duty for irrigation at 1.5 LPS/HA.

E. Water Rights Allocation, Its Effects and Implications for Watershed Management

When we speak of water rights allocation, we are in effect doing a management activity of the watershed. Watershed, as defined in the proposed Land Use Act now pending in Congress, refers to the "catchment area or drainage basin from which the waters of a stream system are drawn." Watershed management on the other hand, refers to the activities relating to the watershed, such as soil and water conservation, land use planning and management, agroforestry, mining and other features of water and land resources development programs. Thus, when we are confronted with the issue of how much water we have to allocate or is still available for allocation, we take into consideration the drainage area of that particular watershed. It is only when the Board is convinced that the minimum stream flows for rivers and streams and minimum water levels for lakes are maintained that it decides on the amount of water to be granted to an applicant. In short, due regard is given to ecological resulting from the construction of the proposed water resources project in order to balance the needs of development and protection of the environment.

In fact, a reading of the Water Code would readily reveal that an entire chapter thereof (Chapter VI) is devoted to the conservation and protection of waters and watersheds and related land

resources. The adoption of water conservation measures in order to be assured of steady supply of water for water rights allocation is underscored in this chapter. It had taken into consideration the indubitable fact that water resources are part of a system which includes component elements of soil, plant life, animal human life, and that, there is woven into very fabric of these component elements, a symbiotic relationship among themselves so that the survival of each and everyone of them depends upon the continued existence of each and everyone of the other.

The interplay of functions of the different agencies of our government towards a common goal is very evident such as the provision which states that DENR had the authority to declare any watershed or area adjacent to a river or lake or areas overlying the underground course of water a protected area (Art. 67), the prohibition of the introduction of sewage, industrial waste beyond tolerable limits as set by the NPCC now EMB (Art 75) the prohibition against the establishment of cemeteries and waste disposal areas near a source of water supply or water reservoir for domestic and municipal use as set by the Department of Health (Art. 76); and other similar provisions designed to protect the environment as a result of ecological disruptions.

F. Proposals for Reform

1) When the CODE was promulgated, the basic economic policy of the Philippines was agricultural. It is not surprising, therefore, that agricultural connected water user enjoy preference over industrial use.

Recently, however, there has been an accelerated shift to agro-industrial economy. In this light, it is opined that a re-assessment of priorities should be undertaken – that is, industrial use be elevated to the level of irrigation use, if not above such level. Reasons for such alteration in priority are not wanting in view of the changing demands on the use of water. While many countries give the highest priorities for domestic use over all other users, adopting this policy would result in conflicts between existing water users and the new applicants for water supply to use the same water resources. Good planning would go a long way towards easing the situation since it would facilitate assessment not only of existing but also of future demands and supply in the granting of water rights. Systematic reservations of water for high priority uses could substantially ease future conflicts.

2) A feasibility study should be initiated regarding the re-use of water. The possibility of adopting the suggestions made by the California State Department of Water Resources and the State Water Resources Control Board whereby water permits should incorporate provisions for re-use or reclamation of water for human consumption should be considered. In the Philippines, while we do not disregard re-use of wastewater when feasible, we see to it that "it shall be limited as much as possible to such users other than direct human consumption and, no person, agency shall distribute such water for public consumption until it is demonstrated that such consumption will not adversely affect the health and safety of the public." (Art. 36)

3) Two other issues may also have to be addressed. First, permits under the CODE are dependent on continued beneficial use for the purpose for which they are approved. Given the widespread changes in land use and other factors, it may be necessary to "audit" existing water rights to establish how far beneficial use is being maintained. Second, the CODE allows leases and transfer in water rights subject to the approval of the Board. Such transfers have occurred infrequently, in part due to ambiguity in the procedures for compensation and evaluation. Additions to the Implementing Rules and Regulations of the CODE may be necessary so as to clarify the situation and account for full economic value in determining compensation

arrangements. In the longer term, it may be possible to develop market mechanisms which encourage voluntary sales and transfers.

It would not be out of context, therefore, if this author exudes optimism that more seminars of similar nature such as this be held as frequently as possible in order to have a vehicle for the exchange of ideas and outstanding contributions in the field of water resources development and management, especially in the field of water law.

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Saving a River: Why Do Local Governments Matter?

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Abstract

Studies show that rivers die due to improper waste disposal, water pollution from industrial and agricultural use and degradation of forest reserve. Several Philippine national agencies are tasked to appropriate, control and conserve water resources. Water laws abound, but implementation of these remains a problem.

This study investigates the national laws pertaining to river management, and the local implementation of these. The results showed that the Philippines has enough water policies; but that local implementation is lacking. Local government units do not have the needed ordinances for effective river management. The paper demonstrates the use of environmental economics methods to come up with market-based instruments for river management. A case study of a river in Lantapan, Bukidnon was used to illustrate the rural household's valuation of the river resources. Local political economy can influence the adoption of these types of policy instruments.

Key words: *river management, market-based instruments, contingent valuation, local government legislation*

THE PROBLEM

A recent study by the Department of Environmental and Natural Resources (DENR) showed that 180 of the 421 rivers and other bodies of water nationwide are so heavily polluted that may be soon declared biologically dead (*Philippine Star, Sept. 5, 2001)*. Fifty of these major rivers are now considered "biologically dead" a term used to describe places that no longer support any life form because of pollution. Among these are four rivers in Manila; four in Cebu and four in Negros Occidental (*State of the Philippine Environment 1998).*

But, why do rivers die? The three main causes of death of a river are improper waste disposal, water pollution from industrial and agricultural use and degradation of the forest reserve leading to soil erosion and sedimentation (LOGODEF 2000). These problems are difficult to solve without any community involvement. However, it is not commonly recognized that communities through good governance could play a central in sustaining healthy rivers. Local governments could encourage good river management and could promote policies that will optimize the use of water among the different types of users, as well as minimize water pollution. There are national policies

that govern the use, the appropriation and conservation of surface water. However, in most instances, the implementation of these laws lies beyond the mandate of local officials.

This paper investigates how water laws that govern the utilization and management of river waters are being translated at the local level. A hypothesis that is suggested is that because of: 1) lack of clear institutional set-up, 2) absence of fines and penalties, and 3) noncompliance with the laws, degradation of the river resource is taking place. A review of the literature on the valuation of the resources is done. Valuing the resource can serve as the basis for quantifying economic incentives for more sustainable river management. As a practical application, a field study that did the valuation exercise in Lanpatan, Bukidnon, Philippines is cited (*Tabien 2000*). A sample of households who are both users and non-users of the river resource was selected to elicit the value of potable water attribute of the river in the village. From the results, a draft local ordinance was developed for possible action by the local government in the area. In this study site, river death is very likely if proper ordinances to sustain river health are not put in place in the short run. Lessons learned from the first-hand experience can be adapted to similar environments facing similar problems.

REVIEW OF THE NATIONAL LEVEL WATER LAWS

The Philippines has an abundance of surface waters found in the different river basins throughout the country (Table 1). But the observed scarcity of available water supply in some areas and the increasing cost of development and management of these has made it necessary for the government to rationalize investments in the water resources sector.

Table 1. Main river basins of the country.

RANK	RIVER BASIN	REGION	DRAINAGE AREA (sq.km.)
1	Cagayan	Cagayan Valley	25649
2	Mindanao	So. Mindanao	23169
3	Agusan	No. mindanao	10921
4	Pampanga	Central Luzon	9759
5	Agno	Central Luzon	5952
6	Abra	Ilocos	5125
7	Pasig-Laguna Bay	So. Luzon	4678
8	Bicol	Bicol	3771
9	Abulug	Cagayan Valley	3372
10	Tagum-Libuganon	SE Mindanao	3064
11	Ilog-Hilabangan	W. Visayas	1945
12	Panay	W. Visayas	1843
13	Tagoloan	No. Mindanao	1704
14	Agus	So. Mindanao	1645
15	Davao	SE Mindaano	1623
16	Cagayan	No. Mindanao	1521
17	Jalaud	W. Visayas	1503
18	Buayan-Malungun	SE Mindanao	1434

Source: Villena, 1994.

The Water Code of the Philippines (PD 1067) is the overarching law that governs water use and management in the Philippines. The code defines that water, like other natural resources, belongs to the state. This includes rivers, and their natural beds; continuous or intermittent waters of springs and brooks running in their natural beds and the beds themselves; natural lakes and lagoons; all other

categories of surface waters such flowing over lands, and water from agricultural runoff, seepage and drainage; atmospheric water; subterranean or ground waters; and sea water.

Water resources policies are incorporated in the Water Code and its Implementing Rules and Regulations (IRR). The Philippines' National Water Resources Board (NWRB) further defines policies regarding the appropriation, utilization, control and conservation of water resources in the country. It also stipulates that water found on private lands belong to the state, however, the owner of the land where water is found may use the same for domestic purposes without securing permit, provided that such use shall be registered when required by the NWRB. The following are the provisions of the Water Code (NWRB 1979):

Appropriation of water. This is the acquisition of rights over the use of water or the taking or diverting of waters from a natural source in a manner and for any purpose allowed by law. It is provided that no person, including government instrumentalities or government-owned or controlled corporations, shall appropriate water without water right, which shall be evidenced by a document known as water permit. Only citizens of the Philippines of legal age, as well as juridical persons, who are duly qualified by law to exploit and develop water resources may apply for water permit.

Utilization of waters. The utilization of subterranean or ground water shall be coordinated with that of surface waters, such as rivers, streams, springs and lakes, so that a superior right in one is not adversely affected by inferior one in the other. A control area shall be declared by the Board for the coordinated development, protection and utilization of subterranean or ground water and surface waters. A control area is an area of land where subterranean or ground water and surface waters are so interrelated that withdrawal and use in one similarly affects the other. Likewise, no person shall develop a stream, lake, or spring for recreational purposes without first securing a permit from the Board. No person shall raise or lower the water level of a river stream, lake, lagoon or marsh nor drain the same without permit.

The banks of rivers and streams and the shores of the seas and lakes throughout their entire length and within a zone of three meters in urban areas, 20 meters in agricultural areas and 40 meters in forest areas, along their margins are subject to easement of public use in the interest of recreation, navigation, floatage, fishing and salvage. No person shall be allowed to stay in this zone longer than what is necessary for recreation, navigation, floatage, fishing or salvage or to build structures of any kind.

Control of waters. When a river or a stream suddenly changes its course to traverse private lands, the owners of the affected lands may not compel the government to restore the river to its former bed; nor can they restrain the government from taking steps to revert the river or stream to its former course. Thus, the owners of the affected land are not entitled to compensation for any damage sustained thereby. However, the former owners of the new bed shall be owners of the abandoned bed in proportion to the area lost.

The owners of the affected lands may undertake to return the river or stream to its old bed at their own expense. But this is provided that a permit is secured from the Secretary of Public Works, Transportation and Communication, with work along this to commence within two years from the change in the course of the river or stream.

It is further stipulated that water from one river basin may be transferred to another river basin only with the approval of the Board. In considering any request for such transfer, the Board shall take into account the full cost of transfer, the benefits that would accrue to the basin of origin without transfer, the benefits that would accrue to the receiving basin, and other relevant factors.

Conservation and protection of waters and watersheds and other related land resources. One of the basic policies is that all water development projects shall be undertaken based on a multi-purpose concept using the river basins or closely related river basins approach. The Board further establishes that any watershed or any area of land adjacent to any surface water or overlying any ground water may be declared by the DENR as protected area. Most importantly, when priority in time of appropriation from a certain source of supply cannot be determined, the order of preference in the use of waters shall be as follows: 1) domestic (utilization of water for drinking, washing, bathing, cooking or other household needs, home gardens, and watering of loans and domestic animals) and municipal use (utilization of water for supplying the water requirements of the community); 2) irrigation (utilization of water for producing agricultural crops); 3) power generation (utilization of water for producing electrical or mechanical power); 4) fisheries (utilization of water for propagation and culture of fish as a commercial enterprise); 5) livestock raising (utilization of water for large herds or flocks of animals raised as a commercial enterprise); 6) industrial use (utilization of water in factories, industrial plants and mines, including the use of water as an ingredient of a finished product); 7) recreation (utilization of water for swimming pools, bath houses, boating, water skiing, golf courses and other similar facilities in resorts and other places of recreation); and 8) other uses.

Finally, the NWRB is also authorized by law to impose and collect reasonable fees or charges for water resources development from water appropriators, except when it is purely for single family domestic purposes. However, the rate of water fees where formulated about three decades ago, and may need some updating. The Water Code also stipulates that the Board may revive the above water charges or impose special water rates from time to time or as the need arises, taking into consideration, among others, the intended use of water and the environmental effects of such use *(NWRB nd)*.

Aside from the Water Code, the Philippines has several policy statements on the management of surface waters and river waters in particular. The following are a summary of the provisions of these national policies.

The **Public Act Land** stipulates that applicants wishing to use the riverbanks would agree to maintain as permanent timberland a strip measuring 40 meters wide starting from the bank on each side of any river or stream. The timberland is to be planted exclusively to trees of known economic value, and that the user should not make any clearing thereon or utilize the same for ordinary farming purposes even after patent shall have issued to him or a contract lease shall have been executed in his favor.

The **Forestry Code** also provides the twenty meter strips of land along the edge of the normal high waterline of rivers and streams with channels that are at least five meters wide should be devoted for forest purposes; and strips of mangroves or swamplands at least 20 meters wide, along shorelines facing oceans, lakes and other bodies of water and strips of land at least 20 meters facing lakes, should also be maintained.

The Department of Environmental and Natural Resources Administrative Order 1997-23 (DAO 97-23) has defined minimum criteria for quality of surface waters. Based on this order, all surface waters of the country shall be free from:

a. *Domestic, industrial, agricultural or other man-induced non-thermal components of discharges which along or in combination with other substances or in combination with other components of discharges: that settle to form putrescent deposits or otherwise create a*

nuisances; or that float as debris, scum, oil or other matter in such amounts as to form nuisances; or that produce color, odor, taste, turbidity or other conditions in such degree as such to create a nuisance; or that are acutely toxic; or that are present in concentrations which are carcinogenic, mutagenic, or tetratogenic to human beings or to significant locally occurring wildlife or aquatic species; or that pose a serious danger to the public health, safety or welfare.

b. Thermal components of discharges which along or in combination with other discharges or components of discharges (whether thermal or non-thermal): that produce conditions so as to create nuisance; or that increase the temperature of the receiving body of water so as to cause substantial damage or harm to the aquatic life or vegetation therein or interfere with the beneficial uses assigned to the RBW.

The **Philippine Environment Code (PD 1152)** likewise stipulates the dumping or disposal of solid wastes into the sea and any body of water in the Philippines, including shorelines and river banks, where the wastes are likely to be washed into the water is prohibited.

As mentioned previously, the Water Code is implemented by the NWRB. The Philippine laws task the Environmental Management Bureau (EMB) of the Department of Environmental and Natural Resources (DENR) to have the primary responsibility to promulgate national rules and policies governing water resources quality. The Philippine Coast Guard has the primary responsibility to enforce the laws, rules and regulation governing these. The shortcoming of all these arrangements is that most river-polluting activities are done at local level, while enforcement is at the national level. It is then perceived that local governments are in a strategic position to monitor pollution laws and define fines and penalties for noncompliance.

POLICY TRACKING: NATIONAL WATER LAWS AS TRANSLATED AT THE LOCAL LEVEL

The sorry state of our rivers today speaks of poor implementation of our river laws. But this state should be reversed to achieved the level of sustainability of the functions of our river resources. The question, however, is: Who is really responsible? In the developed economies, water ordinances are defined for the use of particular rivers. In the Philippines, the logical institution to monitor compliance of the national laws as far as rivers are concerned would be the local governments. But how are these national laws translated into local ordinances?

Republic Act (R.A) 7160, otherwise known as the Local Government Code of 1991, is a national law which grant autonomy to local government units (LGUs). It aims to effectively allocate powers, functions, responsibilities and resources among the different LGUs. Hence, one of the powers enjoyed by the LGUs is the power to create and broaden their own sources of revenue.

The LGUs can also adopt adequate measures to safeguard and conserve land, mineral, marine, forests and other resources of the province. They can impose appropriate penalties for acts that endanger the environment. The LGUs can provide for establishment, maintenance, protection, and conservation of communal forests and watersheds, tree parks, greenbelts, mangroves, and other similar forest development projects. It should be noted that authority given by **R.A. 7160** to municipalities over their municipal waters refers only to revenue-generation. The Code also authorizes the municipality to penalize, by ordinance, deleterious method of fishing and to prosecute any violation of fishery laws. But the law is silent with respect to other issues of jurisdiction over

municipal waters, such as the enforcement of pollution control laws and the regulation of other resource-utilization activities within municipal waters.

Due to this gap in the law, the question that remained unanswered is whether or not the LGU could prohibit, through its ordinance making or enforcement powers, certain activities within municipal waters not withstanding a valid license or a permit issued by the national government for the particular activity or activities.

An older **P.D. 1160 (1997)** stipulates that the barangay captain, barangay councilman, and barangay zone chairman are deputized as peace officers, with authority to effect arrest of violators in accordance with the law for purposes of enforcing and implementing national and local laws, ordinances and rules and regulations governing pollution control and other activities which create imbalance in the ecology or disturbances in environmental conditions. An examination on the implementation of this at the barangay level showed that these types of duties do not exist. Furthermore, there are no fines and penalties that are defined to put teeth to the law.

VALUING THE ENVIRONMENTAL ATTRIBUTES OF RIVERS: A REVIEW OF LITERATURE

The difficulty to establish fines and penalties may also be due to the difficulty of defining the rates to be used. This valuation of the resource by the communities is not quite common especially in developing economies like the Philippines. As well, there have not really been a lot of literature that has investigated non-market valuation of multi-attribute resources such as rivers.

The challenges presented in applying non-market valuation estimation techniques in the context of water reforms go beyond those normally associated with such applications *(Bennett et al. 2000).* For each water system that could be considered, a wide variety of possible water management scenarios are evident. Each management scenario is likely to yield different environmental outcomes and different values. Furthermore, the relationship between management scenario and environmental outcomes is likely to differ across the different bio-physical conditions that exist across the river system. In addition, it is possible that similar environmental outcomes in each of the catchments will be valued differently, depending on the socio-economic and locational characteristics of the people that are affected.

Because of this potential variability in the value estimates, any non-market valuation technique that tackles only one environmental outcome in any application is likely to be too costly to be practical. The contingent valuation method (CVM) would need to be applied across many different samples to provide estimates of values for a single change in an environmental condition away from the status quo *(Bennette et al. 2000).* CVM applied in the valuation of the environmental attributes of rivers is considered to be an expensive process.

Bennette et al. *(2000)* proposes a model they call choice modeling (CM). CM involves a sample of respondents being asked, *via* a questionnaire, to select their preferred resource use options from a sequence of a group of options. The choices made by the respondents provide information on their willingness to make trade-offs between the non-monetary and the monetary attributes. This allows the estimation of a functional relationship between non-marketed environment and social attribute **(e)** as well as the socio-economic and locational characteristics of respondents **(s)** and estimated value **(V):**

$$V = v(e,s)$$

This implies that instead of each application yielding a single value estimate for a single management outcome, a range of value estimates can be generated corresponding to potential resource allocation outcomes described by their non-marketed environmental and social attributes and the socio-economic and locational characteristics of the people that are affected *(Bennette et al. 2000).*

One of the key tasks involved in undertaking such a series of CM applications is determining which attributes should be used to depict the environmental outcomes of alternative water management strategies. It is important because unless the natural resource that is being valued can be decomposed into a parsimonious and meaningful set attributes, then the validity and usefulness of the estimates could be compromised *(Bennette et al. 2000).* While this may seem straightforward, it is argued to be one of the most difficult and critical tasks in any environmental choice modeling application. It is likewise necessary to select levels of attributes. For marketed consumer goods and services, levels are usually defined. But it is not the case in the environmental applications. For example, consider all the different ways that water quality is measured. Which one should be used? Which one would be most meaningful for the general public?

There is not a lot of research done that examined the value of the different attributes when improving the quality of rivers. Bennette et al. (2000) reviewed some of these studies, the earlier of which did not seek to isolate the attribute of the different aspects of improved river quality. For instance, the early work of Whitmore and Cavadias (1974) described the water quality ladder as follows: 1) no life; 2) the present, i.e., the current situation; 3) swimming; 4) drinking; and 5) natural. The study by Smith and Desvousges (1986) defined five levels also, namely: 1) worst possible water quality; 2) okay for boating; 3) gamefish like bass can live in it; 4) safe for swimming; and 5) safe to drink. While these and other such studies have found applications in other countries, in the Philippine setting, these kinds of studies have not yet been done.

Because of the limitations of this study, the CVM was used to estimate the willingness to accept compensation (WTA), the result of which could be a basis for a user charge. In this method, it is assumed that the society is the one that owns the resource and the community has the right to protect the resource.

In the following section, an attempt to value the river quality in terms of its meeting its function is described. [2]The purpose of this exercise is to determine the levels of economic incentives that could be used by local government or the community for resource use charges. In view of the competing and conflicting uses of surface water in the years ahead, efficient allocation of water is necessary. Economic instruments could help guide policy makers design local ordinances for sustainable river management. Economic instruments could also potentially change behavior of people using resource.

[2] There are two general functions attributed to rivers and bodies of water, in general: 1) as respiratory waste materials of industries and other sectors, and 2) as a productive input to production. In the first function, appropriate payment of use is through polluter charger, while the second is through the use of user charge. While the empirical work estimates the willingness to accept as a user charge, future work could pursue the estimation of the polluter charges of the firms.

DESIGNING A LOCAL ORDINANCE FOR SUSTAINABLE RESOURCE MANAGEMENT: THE CASE OF MAAGNAO RIVER IN LANTAPAN, BUKIDNON

The municipality of Lantapan, Bukidnon is blessed with a climate that is favorable to cultivation of temperate crops in its upper slope, and rice, corn and sugar in middle and lower slopes. The presence of six major rivers in the municipality has promoted almost year-round irrigation of the various crops cultivated.

In terms of the standard criteria for assessing water quality, the rivers in Lantapan in 1990s were considered to be very healthy. Fish and other water creatures abound. Water in the upper slopes where population density is not high is pure and still fit for drinking.

It was, however, observed that in the density populated villages, certain pollutants abound *(Deutsch et al. 1998).* Rivers on those areas are depositories of household and human wastes. Intensive cultivation of vegetable crops also was a source of inorganic pollutants, i.e., fertilizers and pesticides. The rapid pollution loading assessment conducted by the DENR in 1997 revealed that nitrates and phosphates in the river upstream of this municipality exceeded their minimum tolerable levels.

The recent shift in land use in the area is the more serious threat. In 1998, banana plantations were established in Lantapan, Bukidnon. The intensive cultivation of bananas in the pristine environment of the municipality is viewed by the outside observers as a serious threat to the health of the rivers. This apprehension is guided by the fact that the other locations in the Philippines, banana plantations were perceived to have severe effects on both water quality and quantity. Will Lantapan suffer the same fate? Will Lantapan rivers die?

In order to address this question, a survey was done to determine the value of attributes of the rivers to the local people. This was done through group interviews and house visits. Respondents were asked about the usefulness of the rivers to them. In terms of the valuation of attributes, only the attribute “safe for drinking” was valued. Respondents were asked how much they are willing to pay for clean water and how much compensation they are willing to accept for polluting the river and hence, making it unsafe for drinking. The detailed survey methodology is found in Tabien *(2000).*

Results of the survey in the surface water valuation showed that rivers in the study site are indeed a very important resource **(Table 2).** The group of respondents who rented out their farms to banana plantations still depends on the rivers for drinking water (72%), for domestic use and livestock production (82%), and for recreation and fishing. Similarly, the group respondents who did not rented out any land, but regard the river as important source of life, is dependent on the rivers for their domestic water supply (98%) and for the recreation (35%).

Table 3 shows that 67 or 92 % of the interviewed farmers believed that when water becomes contaminated, it would be no longer be a source of drinking water. Others stated that polluted water would be unsafe even for domestic and animal use and would result in a reduction and/or death of fish and other life forms. Moreover, 32% of them claimed that contaminated water causes diseases and irritations.

Willingness to Accept Compensation

One method to evaluate the cost of water pollution that would lead to unsafe drinking water is by asking the respondents their willingness to accept compensation (WTA) that also represents

their willingness to pay for safe drinking water. Water pollution in the Lantapan rivers is expected to increase because of the intensive chemical use especially in banana production.

Table 2. Perceived uses of the river by the type of respondents, Lantapan, Bukidnon, 2000

USES	TYPE A *(N=11)		TYPE C *(N=54)	
	No. of Responses	%	No. of Responses	%
Drinking	8	72	11	20
Domestic use/Livestock production	9	82	53	98
Irrigation			7	13
Fishing	7	64	7	13
Recreation or Picnic place	9	82	19	35

Note: Multiple responses.
*Type A: those who use the river and rented out their farms; Type C: those who are use the rivers, but did not rent out their farms.

Table 3. Respondents' perception on the consequences of pesticide runoff from banana farms to the rivers in Lantapan, Bukidnon, 2000

CONSEQUENCES	No. of Responses (n=73)	%
Water becomes unsafe to drink	67	92
Water no longer suited for domestic uses	69	94
Reduction and/ or death of fish and other aquatic life forms	59	81
Sickness/skin disease	24	33

Note: Multiple responses

Type A (those who use the river and rented out farms) and B (those who do not use the river but rented out farms) respondents revealed that they are willing to accept P304.25 and P1, 200 per annum, respectively **(Table 4).** Type B's higher valuation could be due to the higher level of awareness with regards to water fees, as they pay for water use. (Note: Some households in the area have other water source that has some actual cost, in terms of water delivery.) They could also forecasted that the present rate will surely increase once the demand for clean water increase. This is anticipated to happen when every household in the community will depend solely on the potable water sources.

Table 4. Valuation of clean water by different respondents using the willingness to accept (WTA) compensation, Lantapan, Bukidnon, 2000.

RESPONDENTS	WILLINGNESS TO ACCEPT COMPENSATION (WTA)	
	P/mo	P/year
Type A (river user and rented out farm)	25.35	304.24
Type B (not user but rented out farm)	100.00	1,200.00
Type C (river user but did not rent out)	442.89	5,315.00
Type D (not user and did not rent out)	342.83	4,116.00

Type C respondents (those who use the river but did not rent out lands), on the other hand, have the valuation of P5, 315.00 per year while Type D (those who either users of neither rivers nor rented out farms) valued at P4, 116.00 per annum. It was observed those absolute values of WTA vary among respondents. Several factors could explain this variation. This includes educational

background, age, income level, level of the awareness as to the importance of water and water resources.

The demographic characteristics of the respondents indicate that Type C had the lowest reported income per month while type B had the highest. Thus, it makes sense that Type B would have the high WTA for the water resource. Type C would have some knowledge of the amount of cost that they have to pay that indeed the river water is not potable. They seem to be the most intensive users of the resource. The WTA quoted by the Type D respondents is the one closest to the result of the survey, conducted by the local water district, on the monthly willingness to pay of Lantapan households for piped water service.

Based on the WTA values stated earlier by the respondents (average of Type A and C, as they are the river users), a water tariff[3] could be paid by the commercial users of water in the locality. Results of the computation by Tabien *(2000)* showed that the commercial water users may be asked to pay a tariff of P33, 681.00 per hectare per year or 26% of their net income per hectare. If the LGUs and the community members would agree and would pursue an ordinance to this effect, then the total water tariff collection for the community would amount to P16.8 M per year for the 500 hectares cultivated to banana. While it may be easier to calculate this at the commercial level, other users such as poultry and hog businesses and small vegetable producers may also have to pay these charges.

Ideally, the tariff that would be collected could be used for activities to ensure good management of water resources. The appointment of the municipal environmental officer (MENRO) in the area, which currently not mandatory according of the provision of the LGC, would be better justified if there are funds to pay his/her salary.

At present, there are some concerned citizens who do volunteer work by acting as guards or watchers over resources. However, such arrangements may not be sustainable. If there are funds to pay hired guards, there will be a higher probability that the environment would be better protected and that guards would be accountable for the resource quality in the locality.

Linking Research and Local Legislation

Based on this research, an ordinance to impose water charges or tariff was drafted in collaboration with Lantapan SB Chairman of the Environmental Committee, but, is currently on hold due to constraints posed by national laws and institutional arrangement. The most obvious of these is the mandate of the NWRB to collect charges. But there is no NWRB representative at the local level. Water charges were deemed necessary so that the municipality would be able to raise funds that would be used for environment protection.

A local "Kapihan" (coffee table discussions) was also conducted in Lantapan, Bukidnon on Aug. 9, 2000 to validate the result of the study. This "Kapihan" was attended by the Association of the Barangay Chairmen and some Sanggunian Bayan members. The awareness level of the barangay leaders was heightened especially on the potential impacts of the banana technology on their water resources, which at present are still considered healthy.

[3] While the tariff system could be implemented, the Philippine law states that water is a common wealth and thus, user charges are not feasible legally, as interpreted by some. However, NWRB has some defined fees for appropriated water, rates which may need updating.

CONCLUDING REMARKS

This paper highlights the inability of the local government to implement laws pertaining to natural resource management focusing on river resources. The use of economic instruments was demonstrated to facilitate the enforcement of laws in terms of defining user charges for the damages that will lead to changes in the status quo. However, the current institutional set-up of surface water governance does not permit the local governments to manage and control their water resources. Thus, there is an urgent need to design policies that could define these jurisdictional issues.

In this exercise, the authors tried to collaborate as much as possible with the LGUs, other local government offices, and the community members, from the earliest stage until the formulation of the relevant policies necessary to resolve the resource management problems in the area. Identification of the specific problems in the locality was very easy with the insights from the local officials that are in touch with the grassroots. Then, guided by the knowledge from trainings on policy analysis, these local officials and representatives from other organization became instrumental in formulation of local policy alternatives. Finally, solutions were offered/presented to the clients for verification. Through this process, both the local policy makers and the intended clients agree on the solutions based on their own assessment rather than those of researchers or national policy makers.

Through conduct of workshops, trainings, and public consultations by multi-stakeholder groups on critical environmental issues, more and more local officials, and civil society groups will appreciate the relevance of formulating measures to manage the environment based on the research data. Ultimately, drafting of these local measures would have to depend on science and its empirical results. When this happens, researchers would indeed have done their job.

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The Hidden Cost of Bananas
Imperatives for Regulatory Action by Local Governments

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While the banana is a major dollar earner for the Philippines, it is also the heaviest user of pesticides on a per hectare basis. In fact, about 55% of the total production cost accounts for the use of these chemical inputs. This use of pesticide can lead to serious environment and health problems. The policy challenge is to minimize the unintended negative impacts of pesticide use in banana production.

This issue is difficult to address without any local government involvement. And yet, it is not commonly recognized that local government through good governance could play a central role in regulating pollution causing activities.

This *Policy Brief* illustrates potential hazards of banana production, particularly, in the environmental critical areas[4]. It also recommends regulatory measures for local government units' action to ensure environmental quality on banana producing areas.

Banana Trade, Public Health and the Environment

Banana is the world's fourth most important commodity and food crop. In the world banana trade, the developing countries share is 68% (UNComtrade, 1998). The developing countries' share of banana**s** to total fruits and vegetable exports is 14%. The US, Japan, and the EU countries are the major importers of bananas. Central and Southern America and several EU countries are the major exporters of banana. The Philippines, accounting for 5% of the total banana trade, ranks fifth among the banana exporters in the world (Wilson and Otsuki 2002).

The Philippines host several major banana multinational companies such as Dole, Del Monte and Chiquita. These companies are located in Mindanao, specifically in Davao and recently in Bukidnon. Their production technologies involve intensive use of pesticides.

Scientific findings in pesticide hazards indicate that farm workers and those exposed to pesticide residues face greater health risks. For instance, one of the world's largest banana companies uses

[1] Environmentally critical areas refer to areas in fragile environments such as those near water ways, sloping lands,etc.

chlorpyrifus, a pesticide that control insect infestation. Exposure to this pesticide can cause death (Gallagher et al. 1998). It is also highly toxic to aquatic animals such as fish, crabs, shrimps, as well as wildlife. Communities dependent on water sources near banana plantations are most vulnerable to these hazards.

Expansion of Banana Plantation in Bukidnon

Banana production consistently grew by 6.17% annually during 1996-2000. Traditionally, banana plantations were put in uninhabited lands. Due to rising international demand for banana, current production encroached in densely populated areas. In fact, in mid-1999, banana plantations started operations in Bukidnon. Bukidnon is ideal due to its climate and abundance of water. Lantapan, Bukidnon one of the sites of banana plantations is a densely populated town with population growth rate higher than the national average. To date, there are two companies operating banana plantation in this municipality. Lantapan bananas are claimed to be sweetest in the world.

Based on field interviews, the LGU gave lower priority to environmental concerns in favor of economic benefits of the banana plantations. This decision to allow entry of these firms is justified considering that it is a fifth class municipality.

Emerging Environmental Problems

Intensive banana cultivation brings serious threats to the water quality and quantity of major river systems. This is true in the case of Lantapan which has six major rivers and several tributaries.

WaterQuality. Rivers in Lantapan are indeed a very important resource (Rola and Tabien, 2001). Farmers who rented out their farms to banana plantations still depend on the rivers for drinking water (72%), for domestic use and livestock production (82%), and for recreation and fishing (Table 1). Similarly, farmers who did not rent out any land but regard the river as important source of life, are dependent on the river for their domestic water supply (98%) and for recreation (35%).

Table 1. Perceived uses of the river by type of respondents, Lantapan, Bukidnon, 2000.

Uses	Type A *(n=11)		Type C *(n=54)	
	No. of Responses	*%*	*No. of responses*	*%*
Drinking	*8*	*72*	*11*	*20*
Domestic use/livestock production	*9*	*82*	*53*	*98*
Irrigation			*7*	*13*
Fishing	*7*	*64*	*7*	*13*
Recreation/picnic place	*9*	*82*	*19*	*35*

Note: Multiple Responses
*Type A: those who use the rivers and rented out their farms
**Type C: those who use the rivers but did not rented out their farms
Source: Rola and Tabien, 2001

The rivers in Lantapan were very healthy in the 1990s, as claimed by the local residents. Fish and other water creatures abound. Water in the upper slopes where population density is not high is pure and fit for drinking. In 2000, the residents observed signs of water pollution (Tabien 2000).

Table 2 shows that 67 or 92% of interviewed farmers believed that when water becomes contaminated, it would no longer safe for drinking. Other stated that polluted water would be unsafe even for domestic and animal use and would result to reduction and/or death of fish and other aquatic life forms. Moreover, 32% of them claimed that contaminated water causes skin diseases and irritations.

Analysis of water in four major tributaries showed that water quality is already approaching the lower limits (Deutsch et al. 1998). In 1997, a rapid pollution load assessment conducted by the Department of Environment and Natural Resources (DENR) revealed that nitrates and phosphates in the upstream river had exceeded the minimum tolerable level. Chemical residues from banana plantations could aggravate this situation.

Water Quality. Another emerging problem associated with banana production is increasing competition for irrigation water. This will be more evident as banana production areas are expanded to increase production. Banana production requires large amount of water for irrigation and chemical application. On average, water requirements of application amounts to 45 cum/ha/day (Tabien 2000).

Water discharge of the major tributaries in Lantapan is showing instability and declining over time (Deutsch et al. 2001). Because of low discharge of water in the rivers, conflicts on water among users in the upstream and downstream may arise. For instance, because of limited supply, only about 32% of total rice area were irrigated during second cropping of CY 2000 (Tabien 2000). Increased water demand from banana plantations will exert additional pressure on the already limited water supply and may create conflict among users.

Table 2. Respondents' perception on the consequences of pesticide runoff from banana farms to the rivers in Lantapan, Bukidnon, 2000.

Consequences	No. of Responses (n=73)	**%**
Water becomes unsafe to drink	67	92
Water no longer suited for other domestic uses	69	94
Reduction and/or death of fish and other aquatic life forms	59	81
Sickness/skin disease	24	33

Note: Multiple Responses
Source of basic data: Rola and Tabien, 2001.

Reducing Environmental Risks: the role of LGUs

The Philippine Water Code (PD 1067) provides that the use of chemicals in agricultural production may be prohibited or regulated when application may cause pollution of a source of water supply (*Art. 78).* In line with this national policy, the municipal government of Lantapan passed an ordinance prohibiting aerial spraying of banana plantations. Also, through external intervention by a research group working in the area, volunteer community water watchers were trained to monitor water quality in the rivers. These data could be useful to the Regional Environment Bureau (EMB) in

their monitoring function. The EMB requires industries to collect water samples for quality analysis and results of analysis are submitted to the DENR field office.

These initiatives are not enough to effectively reduce pollution due to pesticide use in banana production. The LGUs must have a stronger role in regulating entry, operation and expansion of banana plantation. Specifically:

- LGU should actively participate in the conduct of initial environmental examination (IEE), and/or environmental impact assessment (EIA). These are the bases in the issuance of environmental compliance certificate (ECC)[5].

- Water quality standards in the rivers should be strictly observed and monitoring should be done by the LGU on the regular basis. Multi partite monitoring team (MMT) should be formed immediately after issuance of the ECC. The LGU should be an active partner in MMT.

In the case of Lantapan, the LGU could harness the services of the community-based water watchers by including their activities in its regular functions. Municipal Environment Officer (MENRO) could assume the function of supervising the monitoring of water quality in the locality.

- For non-compliance of the water quality standards based on monitoring results, LGUs may impose polluter taxes high enough to afford rehabilitation of polluted river waters.

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[5] ECC is a document issued by the Department of Environment and Natural Resources (DENR) Secretary or Regional Executive Director to ensure that any projects or undertaking will not cause any significant negative environmental impact.

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http://www.watershed.ph.

Topic 3

Methods of Policy Analysis

Topic 3.1 Problem Structuring

Objective	:	Participants appreciate, understand and work out the methods used in problem structuring.
Time	:	90 minutes
Methods	:	Discussion and workshop
Aids	:	Overhead projector/Computer and Liquid Crystal Display (LCD), brown paper (one per group), marker (one per group)
Materials	:	Overhead 1 “Structuring Policy Problems” Overhead 2 “Brainstorming” Overhead 3 “Pairwise Ranking”
Handouts	:	Handout 1 “Brainstorming” Handout 2 “Stakeholder Analysis”

Session Guide :

1. Inform the participants that there are many methods of structuring policy problems. However, for this workshop, only two methods will be presented (Overhead 1). These are: brainstorming and stakeholder analysis. Brainstorming analysis is presented in Overheads 2 and 3 and Handout 1. Stakeholder analysis is the identification of persons, groups or organizations with interest in a given policy action. For further discussion on stakeholder analysis, refer the participants to Handout 2

2. Explain to the participants that brainstorming is a method for generating ideas, goals, and strategies that help identify and conceptualize problem situations (Overhead 2). Identify the procedure for carrying out the brainstorming session.

3. In a brainstorming session, different tools could be used in prioritizing the issues. One of these tools is the Pairwise ranking. Demonstrate to the participants how the Pairwise ranking method is used in identifying/prioritizing policy problems. In Overhead 3, the example is to determine which among the recreation activities has the most destructive impact on the watershed. The first step is to identify the recreational activities, e.g., hunting, fishing, birding, canoeing, and camping. Then, ask the participants which do they think is more destructive between the two pairs of activities, e.g., hunting and fishing, hunting and birding, hunting and canoeing, and hunting and camping. Write the answer for each pair of activities in the space provided for. The most number of times an activity was mentioned is the most destructive recreational activity. In the example, hunting was identified as the most destructive with four counts and was rated A. Birding was never mentioned as a destructive activity, thus having a 0 entry and a rating of E.

4. For Exercise 1, group the participants into several groups, about four members each, depending on the number of participants. Ask the groups to identify specific watershed problems in the area. Use the Pairwise ranking in determining which problem is the most serious and needs to be addressed by a public policy. Remind the participants of the meta problem discussed in Topic 2.4.

5. After 30 minutes, the participants are asked to present their output in a plenary session. Give each group ten minutes for the presentation and five minutes for open forum.

Topic 3.2 Forecasting Methods

Objective : Participants appreciate, comprehend and work out the methods in Forecasting.

Time : 90 minutes

Methods : Discussion, workshop, and presentation of output.

Aids : Overhead projector/Computer and Liquid Crystal Display (LCD), brown paper (one per group), marker (one per group).

Materials : Overhead 1 "Forecasting"
Overhead 2 "Delphi Technique"
Overhead 3 "Exercise 2: Political, Economic, Social, Technological (PEST) Analysis"

Handout : Handout 1 "Delphi Technique"

Session Guide :

1. Review the concept of forecasting (Overhead 1). Further explain that forecasting is needed so that the best possible course of action might be chosen among the possibilities which the future offers. There are several techniques/methods to forecasting. However, only the Delphi Technique and the Political/Economic/Social/Technological Events/Trends or PEST are presented in this training.

2. Introduce the Delphi Technique of forecasting (Overhead 2). Discuss one-by-one the steps involved in the undertaking a Delphi method of forecasting. Refer the participants to Handout 1 for further details on the Delphi Technique.

3. Another simple but effective tool that can used in forecasting is the PEST analysis. This technique directs the analyst to scan political, economic, social and technological contexts for events and trends which may be important. The factors which could be considered in each of the four areas (Smith 1994 cited in Joyce and Woods 1996) are listed below.

Political –	government initiatives, public expenditure controls, employment law, health and safety legislation, machinery of government.
Economic -	economic growth, employment, costs (labour, materials/ building), standards of living, competition, international trade
Social -	population, demographic trends, changes in lifestyle, expectations of people, lobby groups (e.g., environmental lobby, minorities lobby), family structures, attitudes to society, authority.
Technological –	communications at work, research expenditure and progress, new products

Source: Joyce, Paul and Adrian Woods. 1996`. 'Techniques and Models for Analysis," in *Essential Strategic Management: From Modernism to Pragmatist.* Butterworth-Heinemann. pp. 80-81.

4. For exercise 2, group the participants (a group should have at least 3 members). Ask the participants to identify the most likely scenario in the watershed (closest to their area), without improved management, in the next five years. What is the probability of its occurring and its importance? Use a scale of 0-10, with 10 as most likely. Copy the matrix in a brown paper as shown in Overhead 3. Then fill-up the matrix. After 30 minutes, a member of the group presents their output for ten minutes and allocate five-minutes for open forum,

Topic 3.3 Policy Recommendation

Objective : Participants appreciate and understand selected methodologies and tools in policy recommendation and complete the exercise on appraisal of strategy proposals.

Time : 120 minutes

Methods : Discussion, workshop and presentation of outputs

Aids : Overhead projector/Computer and Liquid Crystal Display (LCD), brown paper (two per group), pen markers

Materials : Overhead 1 "An Approach to Recommendation: Cost-benefit analysis"
Overhead 2 "Methods/Techniques of Cost-Benefit Analysis"
Overhead 3 "Appraisal of Strategy Proposals"
Overhead 4 "Exercise 3: Appraisal of Strategy Proposals"

Handout : Handout 1 "Cost- Benefit Analysis"

Session Guide :

1. Repeat the definition of policy recommendation.

2. Introduce the concept of cost-benefit analysis (Overhead 1). Identify the strengths and limitations of cost-benefit analysis.

3. Discuss the methods/techniques in doing cost-benefit analysis including discounting, net present value, benefit-cost ratio, and internal rate of return (Overhead 2). Refer the participants to Handout 1 for further discussion of the cost-benefit analysis.

4. Introduce another technique to evaluate each policy recommendation - the appraisal of strategy proposals. In this technique, the first step is to decide the criteria to be used in appraising each policy recommendation. The selection of criteria may be influenced by the need to devise a strategy to suit the specific situation, but commonly used criteria are (Joyce and Wood 1996):

Criteria

1. feasibility – can the strategic action be made to happen?
2. suitability – will the strategic action solve the strategic issue?
3. acceptability – will the strategic action produce results that will be perceived as satisfactory by important stakeholders (e.g., will probability be sufficient)?
4. timeliness – will the strategic action have its beneficial impact in the required timescale

Source: Joyce Paul and Adrian Woods. 1996. "Appendix: Worksheet 8: Appraisal of Strategy Proposals," in Essential Strategic Management: From Modernism to Pragmatism. Butterworth-Heinemann. p. 273.

5. Explain the mechanics of the appraisal strategy proposal method (Overhead 3) for Exercise 3. Identify at least two alternative policy recommendations to improve the worst case scenario during the Workshop on Pairwise Ranking. Appraise your recommendation using the matrix in Overhead 4. Copy the matrix in a brown paper.

6. After 30 minutes, each group will present its output. A group is given ten minutes to present and five minutes for open forum, if necessary.

7. End the session by commenting the presentation of the group outputs. Highlight the common strategies and comment if there are inconsistencies in the presentations.

Topic 3.4 **Monitoring and Evaluation**

Objective : Participants appreciate and understand further the concept of monitoring and evaluation in the policy-making process.

Time : 90 minutes

Methods : Presentation and discussion

Aids : Overhead projector/Computer and Liquid Crystal Display (LCD)

Materials :
- Overhead 1 "Monitoring"
- Overhead 2 "Evaluation"
- Overhead 3 "Examples of tables and graphs to monitor the implementation of programs/projects"
- Overhead 4 "Data Storage"
- Overhead 5 "Exercise 4: Monitoring and Evaluation"

Handout :
- Handout 1 "Criteria for Evaluation"
- Handout 2 "Using Community-Generated Data for Water Management Policy"
- Handout 3 "Economic Development in the Philippine Uplands: Who Wins, Who Losses?"

Session Guide :

1. Again, define the concept of Monitoring and Evaluation (Overheads 1 and 2).

2. Tell the participants that there are a number of appropriate techniques for monitoring purposes. These are graphic displays, tabular displays, and index numbers.

Some Techniques for Monitoring

Graphic displays – pictorial representations of the values of one or more action or outcome variables Examples of graphs: time-series, scatter diagrams, bar graph, histogram, and Lorenz curve..

Tabular displays - a rectangular array used to summarize the key features of one or more variables. An example is a frequency distribution in which the numbers of persons or target groups in particular categories (for example, age or income) are presented.

Index numbers - Index numbers are measures of how much the value of an indicator/s change/s over time relative to a base period. Index numbers may focus on changes in prices, quantities, or values.

Source: Dunn, 1994.

3. Show examples of the graphs and tables (Overhead 3). Invite the participants to share their experience of using graphs and tables in presenting the outcome of their programs and projects. Did they find it effective in informing their audience of the progress/accomplishments of their programs/projects? Did the use of graphs/tables catch their attention? What were their reactions?

4. Inform the participants that a number of methods and techniques can assist analysts in evaluating policy performance. Nearly all of these techniques, however, may also be used in conjunction with other policy-analytic methods, including problem structuring, forecasting, recommendation, and monitoring. Examples of techniques for evaluation include: graphic displays, tabular displays, index numbers, brainstorming, Policy Delphi, and discounting. Refer the participants to Handout 1 where the Lorenz Curve techniques was used in identifying who among the people of Lantapan benefited from economic development.

5. Ask participants if they can make other suggestions to make the presentation more effective in sending the message across.

6. Discuss to the participants what data and which agency collect information and how these are being stored (Overhead 4). For instance, the Bureau of Agriculture Statistics collect agriculture data, the Department of Environment and Natural Resources, forestry and other natural resources data, and the National Statistics Office for population data. Also add that these national agencies have corresponding agencies at the municipal level, however, it was not the case for the DENR. The question is? Who will be responsible for the collection, storage, and processing of ENR data at the municipal level? The answer is the Municipal Environment and Natural Resources Office (MENRO).

7. Explain the mechanics of Exercise 4 on the identification of indicators to be monitored (while the project is on-going) and evaluated (after the project completion) based on the number one problem they have identified in Group Exercise. For each indicator to monitor, recommend the frequency of data collection.

8. After 20 minutes, each group will present its output. A group is given ten minutes to present and five minutes for open forum, if necessary.

9. End the session by commenting the presentation of the group outputs. Highlight the common strategies and comment if there are inconsistencies in the presentations.

Structuring Policy Problems

- Methods of Problem Structuring
  - ✓ Brainstorming
  - ✓ Stakeholder analysis

Brainstorming

- is a method for generating ideas, goals, and strategies that help identify and conceptualize problem situations
- Highly versatile procedure involving relatively structured or unstructured activities
- Discussion of policy problems are informal and largely spontaneous

Source: Dunn, 1994

Brainstorming…

- May also be relatively structured, with various devices used to coordinate or focus group discussions
  - Continuous decision seminars
  - Construction of scenarios

Brainstorming…

- **Procedure**
  - Selection of persons knowledgeable about the given situation;
  - Atmosphere of brainstorming should be kept as open and permissive as possible in the idea-generating phase;
  - Idea-evaluating phase should begin only after all ideas have been exhausted; and
  - At the end of the idea-evaluating phase, the group should prioritize ideas.

Topic 3.1
Overhead
3

Exercise 1: Pairwise Ranking

Destructive Impact of Recreational Activities on the Watershed							
Hunting	Fishing	Birding	Canoeing	Camping		Total	Rank
	Hunting	Hunting	Hunting	Hunting	Hunting	4	A
		Fishing	Fishing	Camping	Fishing	3	B
			Canoeing	Camping	Birding	0	E
				Camping	Canoeing	1	D
					Camping	3	B

Source: CIFOR, 1998 as cited in Contreras, 2001.

Forecasting

Provides information about future changes in policies and their consequences

To attempt to plan and set policy so that the best possible course of action might be chosen among the possibilities which the future offers

Delphi Technique

- Steps
  - Issue specification
  - Selection of advocates
  - Questionnaire design
  - Analysis of first round results
  - Development of subsequent questionnaires
  - Organization and group meetings
  - Preparation of final report

Source: Dunn, 1994.

Topic 3.2
Overhead 3

Exercise 2: Political, Economic, Social, Technological (PEST) Analysis

Question: What would be the most likely scenario in the watershed, with and without improved management, in the next five to ten years? What is the probability of it occurring and its importance?

PEST events/trends	Probability 10-most likely 0 – least likely	Importance 10-most important 0 – least important

Source: Joyce and Woods, 1996.

Approaches to Recommendation

- **Cost-Benefit Analysis**
  - Permits analysts to compare and advocate policies by quantifying their total monetary costs and total monetary benefits
  - Strengths
    - Both costs and benefits are measured as a common unit of value, allows analysts to subtract costs from benefits

Cost-benefit analysis…

- Limitations:
  - Exclusive emphasis on economic efficiency
  - Monetary value is an inadequate measure of responsiveness, since the actual value of income varies from person to person
  - When market prices are not available for important goods, analysts are forced to estimate shadow prices

Methods and Techniques of Cost-Benefit Analysis

Discounting

- Procedure for estimating the present value of costs and benefits that will be realized in the future

Net Present Value (NPV)

Difference between the present values of project
benefits and costs
Decision rule: accept project with NPV greater than or equal to 0

$$NPV = \sum_{i=0}^{n} \frac{b_i - c_i}{(1 + r)^i}$$

Where b^1 = benefits in period i
c^1 = costs in period I
r = discount rate
n = discounting period

BC Ratio: (Benefit Cost ratio)

- The ratio of the present value of gross benefits to the present value of gross costs
- Decision rule: accept projects with B/C greater or equal to 1

$$\frac{B}{C} = \frac{\sum_{1=0}^{n} \frac{b_i}{(1+r)^i}}{\sum_{1=0}^{n} \frac{c_i}{(1+r)^i}}$$

IRR: (Internal Rate of Return)

- Discount rate which equates the present values of the project's benefit and costs
- In equation form, IRR is that r where:

$$NPV = \sum_{1=0}^{n} \frac{b_i}{(1+r)^i} = \sum_{1=0}^{n} \frac{c_i}{(1+r)^i} \text{ so that}$$

$$\text{NPV} = \sum_{i=0}^{n} \frac{b_i}{(1+r)^i} - \sum_{i=0}^{n} \frac{c_i}{(1+r)^i} = 0$$

Appraisal of Strategy Proposals

- For each proposal, put weight in each criterion (10 most critical, 1-least critical)
- Rate each proposal (4-ideal, 3-meets criterion satisfactorily, 2-fairly meets criterion, 1-fails criterion)
- Multiply weight and assessment rate of proposal for each criterion and add the scores to compute the total score for the proposal

Exercise 3: Appraisal of Strategy Proposals

- Identify at least two alternative policy recommendations to improve the worst case scenario in Exercise 2. Appraise your recommendation using the matrix below

Criteria	Weighting (W)	Assessment of Proposal (A)	Score (W*A)
Feasibility			
Acceptability			
Suitability			
Timeliness			
		Total =	

Source: Joyce and Woods, 1996

Monitoring

What happened, how and why?

Monitoring

policy analytic procedure used to produce information about the causes and consequences of public policies

Evaluation

Did the policy make a difference?

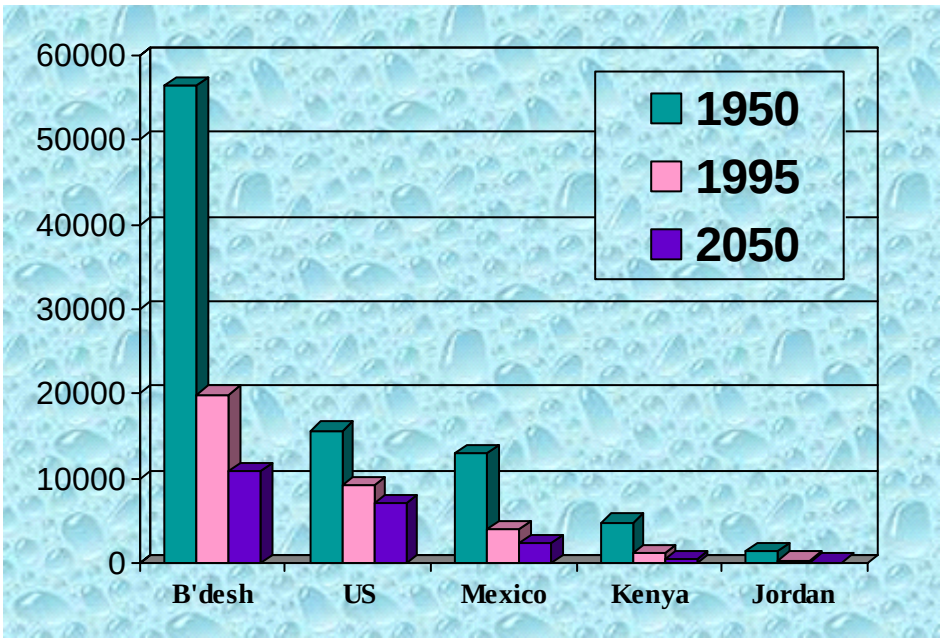
Examples of tables and graphs to monitor the implementation of programs/projects

Forest destruction (in hectares)

Year	Kaingin	Illegal logging	Typhoon	Forest fires
1980	6,302	7,348		18,324
1985	941	1,918		11,743
1991	759	72		5,872
1996	94	10	524	4,558
1997	4,693	93	16,567	3,539

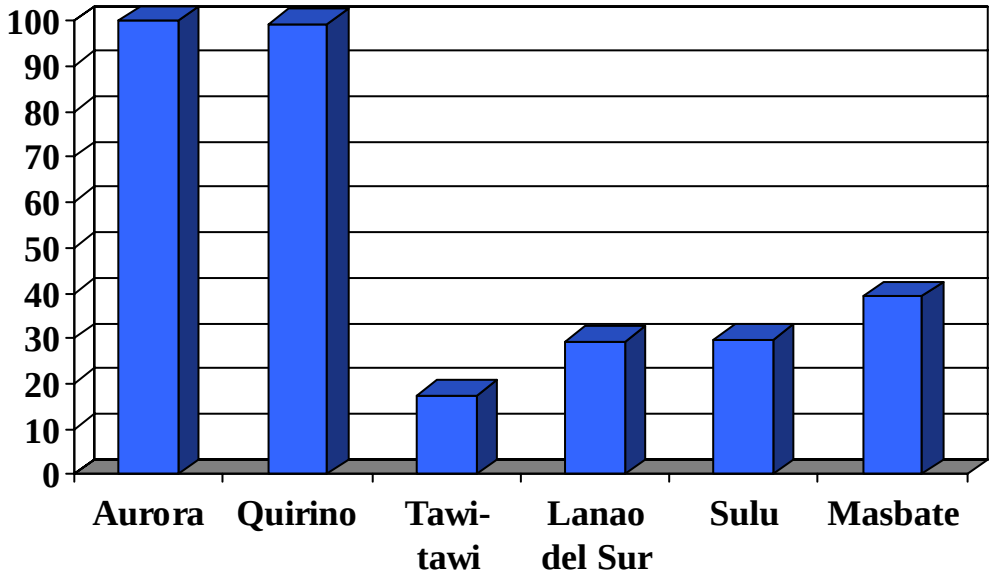
Source:FMB. nd.

Per Capita annual renewable freshwater availability (in cubic meters)



Source: Cornelius and Cover. 1997.

Families with Access to Safe Drinking Water, selected provinces: 2000



Source: NSO.

Data Storage

- National level: statistical bureaus and agencies (e.g., BAS for Agriculture)
- Local level: corresponding local agencies (e.g., Municipal Agricultural Office)
- For environmental data, there is a need for a **MENRO**

Exercise 4: Monitoring and Evaluation

- Based on the number one problem you have identified in Workshop 1, identify and rank the indicators to be monitored while the project/intervention is on-going and evaluated after the project implementation. For evaluation, indicate when it will be done after project completion.

Indicator	Frequency of data collection
A. Monitoring	
B. Evaluation	Period after project completion

Brainstorming

Brainstorming is a method for generating ideas, goals, and strategies that help identify and conceptualize problem situations. Originally designed by Alex Osborn as a means to enhance creativity, brainstorming used to generate a large number of suggestions about potential solutions for problems.[66] Brainstorming involves several procedures:

1. Brainstorming groups should be composed in accordance with the nature of the problem situation being investigated. This usually means the selection of persons who are particularly knowledgeable about the given situation, that is, experts.

2. Processes of idea generation and idea evaluation should be kept strictly apart, since intense group discussion may be inhabited by premature criticism and debate.

3. The atmosphere of brainstorming activities should be kept as open and permissive as possible in the idea-generating phase.

4. The idea-evaluating phase should begin only after all ideas generated in the first phase have been exhausted.

5. At the end of the idea-evaluating phase, the group should prioritize ideas and incorporate them in a proposal that contains a conceptualization of the problem and its potential solution.

Brainstorming is a highly versatile procedure which may involve relatively structured or unstructured activities, depending on the analyst's aims and the practical constraints of the situation. Relatively unstructured brainstorming activities occur frequently in government agencies and public and private "think tanks." Here the discussions of policy problems are informal and largely spontaneous, involving the interaction of generalists and specialists from several scientific disciplines or fields.[67] Brainstorming activities may also be relatively structured, with various devises used to coordinate or focus group discussions. These devices include the establishment of *continuous decision seminars* which, seeking to avoid restrictive atmosphere of conventional committees, involve a team of highly motivated experts who meet with high frequency over a number of years.[68]

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[66]Alex F. Osborn, Your Creative Power (New York: Charles Scribner, 1948).

[67] See Edgar F. Quade, Analysis for Public Decisions (New York: American Elsevier Publishing Co., 1975), pp. 186-88, and Olaf Helmer and Nicholas Rescher, On the Epistemology of the Inexact Sciences (Santa Monica, CA: The Rand Corporation, February 1960).

[68]Harold D. Laswell, "Technique of Decision Seminars," *Midwest Journal of Political Science,* 4, No. 2 (1960), 213-26; and Laswell, *The Future of Political Science* (New York: Atherton Press, 1963).

Another device for coordinating and focusing brainstorming activities is the construction of scenarios, which are outlines of hypothetical future events that may alter some problem situation. Scenario writing, which has been used to explore potential military and political crises, involves the constructive use of the imagination to describe some aspect of a future free-form. In constructing a free-form scenario the analyst is "an iconoclast, a model breaker, a questioner of assumptions, and in – rare instances—a fashioner of new criteria.[69]

Source: Excerpt from Dunn, William. 1994. "Structuring Policy Problems" in *Public Policy Analysis: An Introduction.* Engelewood Cliffs: Prentice Hall. pp. 173-174.

[69]Seyon H. Brown, "Scenarios in Systems Analysis," in *Systems Analysis and Policy Planning: Application in Defense*, ed. E. S. Quade and W.I. Boucher (New York: American Elsevier Publishing Co., 1968), p. 305.

Stakeholder Analysis

Stakeholder analysis is a tool to map the politics of policy alternatives, choices or decisions. It provides an understanding of the future political implications of policy decisions; thus, enabling one to think through policy adoption and implementation strategically. It gives clues on whether to go on with a preferred option, redefine it a bit, compromise with strongly contending parties or do something else.

Technically, SA is defined as political feasibility analysis or a systematic evaluation of the political implications of policy decisions. Its main proponents include Arnold Meltsner (1972) of the University of California at Berkeley, Graham Allison (1971) of Harvard University, and Weimer and Vining (1989, 1994) of the University of Pennsylvania.

Meltsner's "Loose Algorithm" for stakeholder analysis include the following, boxed for your convenience, easy reading and recall:

Inventory of Actors

- Who is/are usually concerned about the policy issue or area?
- Who will benefit or lose if a particular policy is adopted?
- What other groups might become involved?

Beliefs and Motivations

- What do the actors believe about the policy issue/area?
- What are their frames of reference?
- What are their policy preferences?
- What are their fundamental 'non-negotiable' values?

Resources

- What does each actor have at his or her disposal to get what they want or block what they don't want—money, prestige, power, a *de facto* vote or what?

Probable Effectiveness

- Estimate which actors can be politically effective and discard those who are seemingly ineffective.
- Be concerned with those actors who are likely to use their resources to secure political support for their preferences.

Source: Excerpt from Mendoza, Fe and University of the Philippines Open University. 1998. "The Policy System and Policy Research Analysis" in *Introduction to Public Policy and Program Administration.* College, Laguna. pp. 176-177.

Delphi Technique

Delphi Technique is a judgmental forecasting procedure for obtaining exchanging and developing informed opinion about future events. Delphi technique, named after Apollo's shrine at Delphi, where Greek oracles sought to foresee the future) was developed in 1948 by researchers at the Rand Corporation and has since been used in many hundreds of forecasting efforts in the public and private sectors. Originally, the technique was applied to problems of military strategy, but its application gradually shifted to forecasts in other contexts: education, technology, marketing, transportation, mass media, medicine, information processing, research and development, space exploration, housing budgeting and the quality of life.[1] While the technique originally, emphasized the use of experts to verify forecasts based on empirical data. Delphi began to be applied to problems of values forecasting in the 1960s.[2] The Delphi technique has been used by analysts in countries ranging from the United States, Canada, and the United Kingdom to Japan and the Soviet Union.

Early applications of Delphi were motivated by a concern with the apparent ineffectiveness of committees, expert panels, and other group processes. The technique was designed to avoid several sources of distorted communication found in groups; domination of the group by one or several persons; pressures to conform to peer group opinion; personality differences and interpersonal conflict; and the difficulty of publicly opposing persons in position of authority. To avoid these problems early application of the Delphi technique emphasized five basic principles: (1) *anonymity*: all experts or knowledgeables respond as physically separated individuals whose anonymity is strictly preserved; (2) *iteration*: the judgments of individuals are aggregated and communicated back to all participating experts in a series of two or more rounds, thus permitting a social learning and the modification of prior judgments; (3) *controlled feedback*: the communication of aggregated judgments occurs in the form of summary measures of responses to questionnaires; (4) *statistical group response*: summaries of individual responses are presented in the form of measures of central tendency (usually the median), dispersion (the interquartile range), and frequency distributions (histogram and frequency polygons), and (5) *expert consensus*: the central aim, with few exceptions, is to create conditions under which a consensus among experts is likely to emerge as the final and the most important product.

Source: Excerpt from Dunn, William. 1994. "Forecasting Policy Futures" in *Public Policy Analysis: An Introduction.* Engelewood Cliffs: Prentice Hall. Pp. 242-243.

[1] Thorough accounts may be found in Harold Sackman, *Delphi Critique* (Lexington, MA: D.C. Heath and Company, 1975), and Jun Pill, "The Delphi Method: Substance, Contexts. A Critique and an Annotated Bibliography, *Socio-Economic Planning Sciences*, 5 (1971), 57-71.

[2] See, for example, Nicholas Rescher, *Delphi and Values* (Santa Monica, CA: The Rand Corporation, 1969).

Benefit-Cost Analysis

Benefit-cost analysis or BCA measures the net gain or loss that a policy or action brings to society. The objective of BCA us to compare the benefits and costs to society of policies, programs, or actions relative to allocative rules vis-à-vis forest resources. It requires an enumeration, evaluation, and valuation of the different benefits and costs, and comparing them to determine whether society will gain or lose. BCA can be used in analyzing a single policy option, or in comparing, several options. It is mainly an *ex-ante* analysis focused on impact.

The following, are the steps involved in conducting a BCA:

Step 1: Identification and description of the policy or action to be evaluated, including information about its location, timing and the scope of its effects.

Step 2: Description and quantification of the effects of the policy or action, and identification of the benefits and costs. Benefits are those effects that will lead to an increase in the supply of real resources of society, while costs are those that will lead to a decrease.

Step 3: Valuation of benefits and costs by using economic values, instead of financial values. Thus, benefits and costs must be expressed not in terms of financial expenditures and financial gains from the point of view of one sector, but as economic gains and losses from the point of view of society. Box 6-2 gives a summary of the various methods of valuation.

Step 4: Comparison of the present values of benefits and costs. This will require discounting the future values of benefits and costs from their present values, using a social discount rate specified by pertinent authorities. The general formula for discounting is:

$B_o=B_1/(1+r)^t$ where Bo is the present value of a Benefit derived at time t, or B1 and r is the social discount rate.

$C_o=C_1/(1+r)^t$ where Co is the present value of a Cost incurred at time t, or C_1 and r is the social discount rate.

When the total discounted benefits exceeds the total discounted costs, then the policy or action is deemed acceptable. A measure, called the Net Present Value (NPV) is used as an indicator. It is computed as:

$$NPV = \sum(B_1 - C_1)/(1+r)^t$$

An NPV greater than 0 indicates an economically efficient policy or action. When comparing several policy options or actions, the one with the highest positive NPV is the most preferred option.

Source: Excerpt from Contreras, Antonio and University of the Philippines Open University. 2001. "Analysis of Environment and Forest Resource Policy," in *Governance of Upland Ecosystem.* College, Laguna, UP Open University. pp. 152-157.

Criteria for Evaluation

In producing information about policy performance, analysts use different types of criteria to evaluate policy outcomes. The main difference between criteria for evaluation and criteria for recommendation is the time at which criteria are applied. Criteria for evaluation are applied retrospectively (*ex post*), while criteria for evaluation are applied prospectively (*ex ante*). These criteria are summarized below.

Table 9-1 Criteria for Evaluation

Type of Criterion	Question	Illustrative Criteria
Effectiveness	Has a valued outcome been achieved?	Units of service
Efficiency	How much effort was required to achieve a valued outcome?	Unit cost Net benefits Cost-benefit ratio
Adequacy	To what extent does the achievement of a valued outcome resolve the problem?	Fixed costs (type I problem) Fixed effectiveness (type II problem)
Equity	Are costs and benefits distributed equitably among different groups?	Pareto-criterion Kaldor-Hicks criterion Rawls criterion
Responsiveness	Do policy outcomes satisfy the needs, preferences or values of particular groups?	Consistency with citizen surveys
Appropriateness	Are desired outcomes (objectives) actually worthy or valuable?	Public programs should be equitable as well as efficient

Source: Excerpt from Dunn, William N. 1994. "Conclusion: Evaluating Policy Performance" in *Public Policy Analysis: An Introduction*, Engelwood Cliffs, New Jersey: Prentice-Hall, pp. 405-406.

Using Community-Generated Data for Water Management Policy

Jim Orprecio, Agnes Rola, William Deutsch,
Ian Coxhead and AntonioSumbalan[*]

As population and their demands for water continue to rise, water resources in turn become more scarce. In the Philippines, where surface water constitutes about three quarters of the country's fresh water supply and comes largely from rivers and lakes sourced from the forest ecosystem or the watersheds, its growing scarcity is thus largely associated with the degradation of watersheds. And because of the spatial nature of such concerns, their solutions require locally-based action that is consistent with decisions and support at the watershed and national levels.[3] Certainly, communities located within watershed areas and headwaters are the most affected by problems in the watersheds. As such, it is only appropriate that they should take on a more active role in addressing such concerns and in influencing decisions and policies that relate to them.

It is in this context that this *Policy Notes* presents the case of such a community—Lantapan in Bukidnon— and examines how the initiatives that it has taken to address some of its water resource problems may serve as a starting point to influence a more concerted water management policy.

Significance of the place

Why Lantapan? Why is it important to present its case?

The municipality of Lantapan is contained wholly within a watershed area. It is located at the Upper Manupali River watershed, running west from about 15 km. south of Malaybalay City in Bukidnon, along the south- ern boundary of the Mount Kitanglad Range Nature Park. It consists of four subwatersheds, namely, from west to east: Tugasan, Maagnao, Alanib and Kulasihan, that drain from the Mt. Kitanglad range to the Manupali River. At its lower part, the river runs into a dam which diverts flow into the Manupali River Irrigation System, a 4,000-hectare system constructed by the National Irrigation Authority in 1987, which in turn ultimately drains into the Pulangi River, one of the major waterways of Mindanao Island.

Like many other upland communities in Mindanao, Philippines, the rich natural resources at the Lantapan area have attracted many migrants from all over the country. In particular, the abundant supply of water from the numerous rivers and springs in the area became natural attractions for people to settle in and pursue profitable economic activities like agriculture. Propelled by certain trade policies and price support measures at the national level, agriculture became so extensive that it eventually led to the conversion of forest lands into corn and other annual cropped land. Land conversion also eventually spread to the higher-altitude areas and more steeply sloping

[*] *The authors are Researchers of the Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program for Southeast Asia (SANREM-CRSP/SEA).*

[3] [1]See PIDS Policy Notes No. 2002-09 entitled "Why Watershed- Based Water Management Makes Sense" by Herminia Francisco for a clearer understanding of the linkage and rationale

lands. This histor y of agricultural expansion in Lantapan is no different from the pattern followed in many other Philippine watersheds.

As such, the site may be considered as a representative example of many upland Philippine areas. However, more than this, the case of Lantapan takes on greater significance because for almost a decade now, it has been the focus, as a pilot site, of intensive data-gathering, analysis and action at the farm, community, project and local government levels by a research project adopting a landscape-lifescape development approach to food production and natural resource management.

In particular, Lantapan has extensive time series data on water quality and quantity sampling in its four subwatersheds located at the Upper Manupali River. The data, which date back to 1994, represent one of the very few time series sets capable of linking water trends to agricultural development and deforestation. *The importance of these data cannot be overemphasized because they provide concrete evidence of the effect and negative consequences of certain economic activities on the natural resources, in particular, water resources, if not accompanied by appropriate environmentally-friendly policies. The data also provide the basis on which local governments and other authorities concerned can decide accordingly on the course(s) of action to undertake*.

Community "Water Watch" group: monitoring water quality and quantity at Upper Manupali

Nearly a decade ago, a group of citizen volunteers, encouraged and assisted by the previously-mentioned SANREM-CRSP/SEA project, formed themselves into a citizens' "Water Watch" group that would regularly collect water samples from the various water bodies in the area and test and monitor their quality and quantity in order to establish trends that could help assess and improve environmental conditions.

The "Water Watch" group used a combination of methods, some of which were modeled after those employed by the Alabama Water Watch, a citizen volunteer and water quality monitoring program in the United States, and some techniques customized by Filipino researchers and scientists for the local situation. The methods and equipment used were practical and relatively inexpensive. They also made use of locally available materials.

Initially testing the water for a set of 8-10 parameters or indicators, the group eventually focused on the parameters related to *soil erosion, disrupted stream flows* and *bacterial contamination* to monitor the quality and quantity of the water in the area. They likewise applied the tests with the use of both qualitative methods like community perception, memory and experience, and science laboratory-based methods.

What the results show: clear and disturbing trends

The three parameters/indicators monitored over a certain period of time all reveal patterns of water quality and quantity degradation directly or indirectly linked with agricultural development.

Data for *soil erosion*, for instance, manifested in the level of total suspended solids (TSS) in the water bodies, show differences in erosion rates at the four subwatershed levels, with the TSS

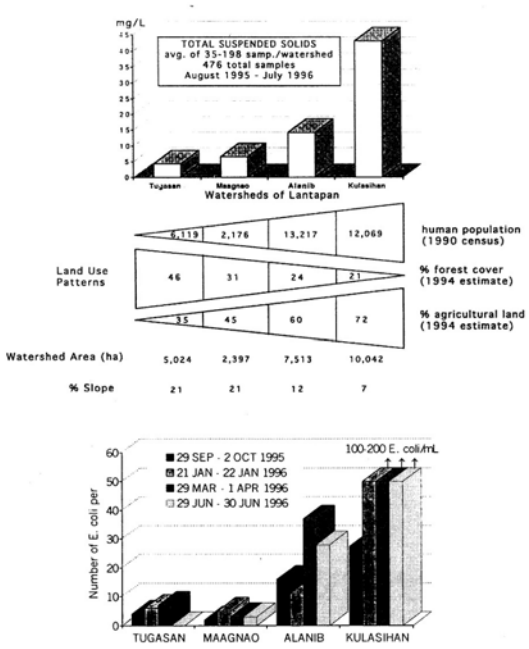
concentrations sharply increasing as one moves from the heavily forested and lightly cultivated western area of Maagnao to the intensively farmed eastern subwatershed at Kulasihan.

For the measurement of *stream discharge* which shows the hydrologic cycle, the data gathered by the community water watch group indicate that the surface flow in the eastern Kulasihan River is much more dependent upon seasonal rainfall patterns than the western-located Maagnao River. What this implies is that the Kulasihan River has become more unstable in its flow and more prone to "flashiness" or abrupt flooding and drought cycles, thereby posing a serious problem to its municipality.

The four bacteriological surveys, meanwhile, conducted in different seasons throughout 1995-96 show the *concentration of E. coli bacteria* in the waters of the four subwatersheds of Lantapan. The results of the surveys reveal exactly the same pattern and location as that of the TSS concentrations, reinforcing the impression drawn from the erosion and stream discharge data that degradation is occurring in a west-to-east gradient across the landscape.

When compared with demographic and land cover patterns in Lantapan, all of the above results indicate a clear but very disturbing trend as shown in Figure 1 that the progressive decrease in forest cover and corresponding increase in cleared land for agricultural purposes and settlements from west to east across the subwatersheds of Lantapan are *closely correlated* with the patterns of water quality degradation. In short, this implies that the *watershed degradation problem* has been brought about by changes in land use resulting from ag- ricultural activities that were made in response to certain favorable economic policies.

Figure 1. Total suspended solids, land use patterns and concentration of E.coli bacteria in four subwatersheds of the Manupali River, Aug. 1995-July 1996.



As gleaned in the Figure, TSS is higher in subwatersheds where the forest cover falls below 30 percent and agricultural land makes up more than 50 percent of the area. To make matters worse, the subwatersheds in the western side which have steeper slopes—Tugasan and Maagnao—are more vulnerable to severe erosion due to deforestation; thus, any further deforestation in that side will lead to a higher cascade of TSS in the lower eastern subwatershed areas. Furthermore, due to the larger populations and more lands in the eastern side, Alanib and Kulasihan experience higher E. coli concentrations and other water-related problems.

What do these pieces of information imply? Can revealing information help Lantapan "turn the tide" in its watershed situation? To get a better appreciation of the meaning of this question, it is best to describe the local policy and administrative scenario in Lantapan, Bukidnon.

Policy and administrative environment in Lantapan

In 1991, the Philippines' Local Government Code (LGC), a landmark legislation in local administration, was passed. Among others, the Code provides powers to local governments to serve as local enforcers and implementers of national environmental laws, with the Department of Environment and Natural Resources (DENR) issuing an administrative order in 1992 that spells out the devolved functions.

It was, however, only in July 1998 that a manual operationalizing such functions was adopted by both the DENR and the Department of Interior and Local Governments (DILG). Unfortunately, even to this date, this manual is not familiar to most local officials.

But in Lantapan's case, its local government invoked its mandate from the Code which enjoins local governments to prepare their own local environmental programs as early as in 1996. It developed its Natural Resources Management Plan (NRMP) focusing on the improvement of water quality, quantity and distribution; conservation of soil for sustained productivity; and protection of the remaining forests. In 1998, the Lantapan local government also passed a municipal ordinance setting up the Natural Resources Management Council (NRMC) to implement the Plan and in August 2001, created the Lantapan Watershed Management Council (LWMC), a multisectoral group in the area, in response to an urgent call to save the rivers from certain demise.

Surely, all these were made possible by an active and concerned local government and leadership. But more important, the decisions and actions came about because the local government, leadership and citizenry were kept informed by the data and regular monitoring results of the Water Watch group as well as by the studies related to the watershed situation in Lantapan.

The pressure coming from the multisectoral LWMC who reacted positively and quickly to the disturbing trends of the data presented to them by the water group and other related studies strengthened the local leadership's resolve to implement the conservation and environmental protection program prepared for Lantapan.

And while several proposals for water sector policy reforms are already contained in a number of pending legislative bills, policy papers and water forum discussions, the data collected from the grassroots at Lantapan indicate the *urgency* of having those proposed reforms implemented for areas like Lantapan and its watershed.

Prospects for sustainability: need for supporting and consistent policies at both national and local levels

Yet, the implementation of the watershed protection and management plan cannot be sustained at the local level if there are no supporting and complementary policies and programs made at the national level.

The forces of globalization and decentralization have accelerated economic activities in the rural areas. However, without proper institutional safeguards, these activities may negatively affect the fragile environments, especially of the upland communities.

The community-based monitoring of water quality and quantity energized local policy action. But in order to sustain it in view of future production intensification, there has to be an *optimal water resource management strategy* that combines both national and local policies affecting the use, access and control of environment services, specifically water resources.

Recommendations
What are some of these decisions/actions that therefore have to be made?

A set of recommendations is hereby being put forward, to wit:

- Consider economy-environment wide models, taking into account the environmental impacts of various economic policies like those in agriculture.

- Streamline the national level institutions to create an effective approach to policymaking for water resource use.
- Strengthen national-local government collaboration in water resource management.
- Strengthen the Local Government Code provisions on environmental management. In this regard, real devolution can take place if the DENR effectively abrogates its powers to the LGUs. Moreover, the manual of procedures for the DENR-DILG-LGU partnership defining the step-by-step procedure for the devolution of environmental services should be properly disseminated to the LGUs and funds for such activities should be allocated.
- Facilitate the proposed amendment in the LGC about host watershed communities, especially in the uplands, being given a share in the management of and revenues earned from watershed facilities
- Carefully consider the formation of multijurisdiction entities for a most efficient management of watersheds.

Hopefully, these measures can create a more effective and efficient water management policy and help turn the tide" for a more sustained prosperity in the fragile upland environments.

Annex

Community-Based Water Quality Monitoring: Rationale and Methodology

The quality and urgency of policy reforms, especially for certain sectors, depend a lot on the availability of timely and credible data. For the water sector in the Philippines, a number of proposals for policy reform have been put forward in terms of conservation measures, market-based mechanisms, pricing policy, institutional reforms, ecosystems management approach and many others. Unfortunately, many of them—which are written as House bills, policy papers and highlights of water fora—have remained unimplemented. Water resources being site-related, what would normally signal the urgency of the situation and the need to push for the implementation of such reforms are site-specific data. Site-specific data that accurately record and monitor the quality and quantity of the water resources and indicate the state of degradation or nondegradation of the resources.

The data collected by a community-based or grassrootslevel group for the water resources in Lantapan, Bukidnon at the Upper Manupali watershed demonstrate how information may help in alerting communities and local governments on the critical state of their resources and thus help in averting a possible water crisis.

The water monitoring project

In 1994, an environment and natural resource management project named the Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program for Southeast Asia (SANREM-CRSP/ SEA) chose Lantapan as its pilot site in espousing a landscape-lifescape development approach to food production and natural resources management. It designed a number of interdisciplinary research projects, one of which was on local water quality assessment and management whose goal was to develop community-based water monitoring groups and to collect credible water quality and quantity data that could lead to environmental and policy improvements.

The approach of the project was to develop and test water quality indicators that would be appropriate for natural resource management by community volunteers and local government units. The choice of indicators was based on the following criteria:

- scientifically valid methods, for credible qualitative and quantitative information,
- relevant to the community, for their endorsement and participation in data collection, and
- practical and relatively inexpensive, for sustainable use and applications using locally available materials.

Many of the methods used were modeled after those developed in the Alabama Water Watch, a citizen volunteer, water quality monitoring program in the US. Filipino partners in the activity helped customize techniques to the local situation. Community volunteer water monitors selected 16 sampling sites in four main tributaries of the Manupali River, including subwatersheds of varying degrees of forest cover, agricultural land and population.

After several months of testing water for a set of 8-10 parameters presented in the project's training workshops, the data began to suggest that the relatively few parameters related to soil erosion, disrupted stream flows and bacterial contamination were the most productive to pursue as indicators. Both the citizen monitors and researchers concurred. There then followed more indepth studies and application of these indicators.

The following is a summary of the rationale and methodology behind each of the key indicators, starting with the qualitative indicator of community perception, memory and experience before the science-based project began.

Indicator #1: community perceptions, memories and experience

The first dialogues set up between community members in Lantapan and the project researchers regarding poten- tial environmental indicators revealed that residents were concerned with water contaminants such as pesticides and pathogens, in addition to soil erosion and sedimentation of streams and irrigation canals. Some farmers did not bathe their livestock in streams during rainfall events, citing cases of death or illness of their animals due to the pesticide runoff. Public health records, although scanty, indicated a higher than average infant mortality and morbidity rates in the community. Many of the common ailments were caused by waterborne pathogens.

Besides water quality concerns, residents also lamented that some streams were no longer maintaining regular flows but were just cycling through seasonal floods and drought. Memories

of stable stream flow and clean water were within the last few decades. Flash floods were increasingly common in the eastern part of the Manupali watershed, resulting in severe soil erosion, crop loss and occasional loss of livestock or human life. Overall, the pattern of watershed degradation experienced by the community was typical of that in upland landscapes of the Philippines and in many other parts of the world.

Indicator #2: eroded soils in streams

Since the community of Lantapan is primarily agrarian, measurements of soil loss and sedimentation were particularly relevant to volunteer monitors. Farmers generally understood that soil loss usually meant a reduction in the fertility of their fields, with accompanying reduction of crop production. Most of the total sedimentation solids (TSS) monitoring by the community was done once or twice monthly at four main sites (bridge crossings of the four major tributaries of the Manupali River) in daytime, base flow conditions. By using the TSS indicator in this way, monitors tried to determine important trends and patterns occurring in the river valley. Their overall measurements, however, were an underestimate of the greatly increased erosion rates during strong storms. Recognizing this fact, the monitors began to measure TSS more frequently, just before and during selected rainfall events in each subwatershed. Results were sometimes dramatic, and the TSS indicator became an increasingly important way for the Lantapan residents to quantify environmental change and lay the foundation for local action and policy changes.

Indicator #3: altered stream flows and soil export

TSS is only a relative indicator of erosion and watershed degradation (a concentration value) and does not provide important estimates of soil loss in water past a given point. Because the streams of the four subwatersheds in Lantapan are similar in size, TSS trends were generally comparable. However, in monitoring stream discharge measurements, the use of TSS in its full potential was required to calculate soil export. Said patterns of stream discharge provide important clues to the watershed stability and the effects of land use change.

Typically, stream discharge measurements are made by researchers using expensive and fixed structures and instruments. Such methods are usually impractical for rural communities using their own resources. Thus, low-tech methods were developed and adapted for use by the volunteer water monitors in Lantapan. Stream velocity and discharge measurements were made with locally available materials, including rope, measuring sticks and a float. A cross-sectional map of each of the four streams was made at the main bridges, using the regular, concrete sides of the revetment wall under the bridge as boundaries when possible. A rope was stretched perpendicularly across the stream between two fixed points and stream depth was determined at one-meter intervals along the rope. Measurements of stream width and depth were used to draft cross-sectional maps and calculate areas.

Another rope of known length was stretched parallel with the stream bank to mark the distance that a floating orange (or other tropical fruit) would travel while being timed. Multiple measurements of the time required to float a known distance in different parts of the stream were used to determine average current velocity. Together, the cross-sectional area of the stream (square meters) and its current velocity (meters per second) were used to estimate stream discharge (cubic meters per second).

Indicator #4: bacterial contamination of water

Levels of potentially harmful bacteria in streams, wells and piped drinking water were of primary concern to many citizens of Lantapan because of obvious public health risks and personal experiences of illness. Like the related memories of community members regarding stream

degradation from pesticides and silt, older adults recounted how they freely drank from streams in the past. Today, though, drinking from streams in these same places would cause them to become ill.

Evaluation of water for bacteria in the community had been infrequent before this water watch monitoring project. The occasional tests done by the Department of Health or the barangay health workers only detected the presence or absence of fecal coliforms without determining a concentration value.

For the project, a relatively new technique of measuring concentration of E. coli and other coliform bacteria was used for the monitoring. Said technique was based on simplicity, accuracy and low cost. With this method, a one milliliter sample of water is collected using a sterile, plastic pipette and squirted into a 10 ml bottle of sterile, liquid medium. The medium (with color indicators for coliforms) containing the water sample is poured onto a sterile, plastic dish which is designed to induce the liquid to solidify. Incubation of sample plates at ambient tropical temperature was sufficient to grow the bacterial colonies for enumeration in about 30-36 hours. No incubators, sterilizers or glassware were needed for this technique and the necessary supplies (which cost about US$1 per sample) could easily be transported to remote areas for sampling scores of sites per day. After the incubation period, the bacterial colonies of E. coli and other coliforms were enumerated and reported for feedback to the community. The same procedures used to monitor coliform bacteria in Lantapan were approved by the U.S. Environmental Protection Agency for the Alabama Water Watch Program in January 2000 (Deutsch and Busby 1999).

While the initial participants in the water quality training workshops and monitoring were predominantly young men, bacteriological monitoring generated much interest among women and girls. It is believed that this parameter was of particular interest to women because of its direct effect on the family health, especially on infants and children. It may also have been more relevant than other parameters because the measurement was made from community faucets and public springs that had a close connection to household affairs and daily chores. The strong involvement of the Federation of Lantapan Women's Organizations and other women of the community added a new dimension to the community-based water quality indicators and their applications. On the whole, the concentration of coliform bacteria has become an important indicator of water quality and is used by diverse sectors of the community.

Below is a summary of the indicators and the situation or specific problem that each of them monitors. Given the usefulness and impact that they had in informing the local residents and officials in Lantapan on the state of their water resources and pulling them into action to save such resources, it may be worthwhile to consider the possibility of setting up similar community water monitors in other areas of comparable landscape and resources in the Philippines.

Summary of community-based water quality indicators

Issue/problem	Indicator	Unit of measure
General environmental degradation	Community perceptions, memories, experiences	Anecdotal or questionnaires/surveys
Soil erosion	Suspended soils in water	Mg/l TSS
	Soil loss in water	Kg/h soil export
Disrupted stream flow	Stream discharge	Cu meters/second flow (monthly measurement)
	Flow variability	Coefficient of variation
Bacterial contamination	Coliform concentration	No. colonies/ml of water (E. coli and other coliforms

Source: Philippine Institute for Development Studies. Policy Notes. Nov. 2002. 2002-10.

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Economic Development in the Philippine Uplands: Who Wins, Who Loses?

Agnes C. Rola, Ian Coxhead, Isidra B. Bagares, and Erica T. Villavelez[4]

ABSTRACT

Both trade liberalization and decentralization hastened economic development in the uplands. Upland dwellers are seen to be increasingly integrated in crop and labor markets. But this economic encroachment on peoples' way of lives has differential impacts on various groups of people in the uplands. This paper examines those differential impacts. By using the data from surveys of the SANREM-CRSP Project based in Bukidnon, we find that, in general, the older members of the population and the females are negatively affected by economic development. Social policies at the local level of governance should be in place to secure safety nets for these vulnerable groups. Livelihood opportunities for women and the ageing population could minimize the inequities that economic development brings.

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Economic Development In the Philippine Uplands: Who Wins, Who Loses?[5]

Agnes C. Rola, Ian Coxhead, Isidra B. Bagares, and Erica T. Villavelez[6]

Introduction

Several theories characterize economic development. A prominent one is the structural change model (Todaro, 1989) manifested by a change from a subsistence economy to a market-oriented one; from a predominantly agricultural economy to a mixed system of agriculture, commerce, and industry; and the increasing share of the non-agriculture sector as a source of household income. In this model, both domestic and international constraints influence development. The domestic constraints include the country's natural and human resources, as well as government policies and objectives. The international constraints to development include access to external capital and international trade, among others.

In the Philippines today, two types of constraints served as drivers in economic development. One is trade liberalization and, as a result, the country is increasingly being integrated in the international markets. The other is change in domestic governance structure where local governments have a significant role to play in making resource allocation decisions. These conditions were indeed the trigger that transformed the economy, including those of the uplands.

In the uplands of Bukidnon, for instance, agribusiness firms were enticed by the tax holidays declared by the provincial officials in 1998.The area became an exciting place to conduct business. These firms have flourished as a result of increasing demand for the products in both local and international markets. The province also boasts of a plentiful water supply and relatively fertile soils that are suited to plantation agriculture. The wide expanse of the areas in the province also became a come-on to commercial livestock (swine and poultry) growers. Local governments, in turn, have generated enough revenues to afford, for instance, building new infrastructure and roads. While it is enough regard to observe the new structures as a result of the economic boom, it is likewise legitimate to ask who are favored and who are marginalized by this modernization.

This paper will provide answers to this question using the results of the end-of- phase survey for the project called Sustainable Agriculture and Natural Resources Management – Collaborative Research Support Program (SANREM CRSP) in Southeast Asia. This project is being conducted in Lantapan, Bukidnon, an upland municipality and host to the headwaters of the Manupali and Muleta rivers. The project which started fieldwork in 1994, has been ongoing until 2004. When researchers started working in the area in 1994, the town was a sleepy one, with agriculture as the source of income of about 76% of the people (MOL, 1994). A survey done in

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late 2002 aimed to understand the differential effects of development on the various categories of people in Lantapan.

Differential Effects of Economic Development: A Framework of Analysis

Economic development means different things to different people. Traditionally, economic development is equated with increased income and wealth. During the 1970s, economic development came to be redefined in terms of reduction or elimination of poverty, inequality, and unemployment within the context of a growing economy. Development is seen to have at least these three objectives (Todaro, 1989): 1. to increase the availability and widen the distribution of basic-life-sustaining goods such as food, shelter, health, and protection; 2. to raise levels of living, including the provision of more jobs, better education, and greater attention to cultural and humanistic values; and 3. to expand the range of economic and social choices available to individuals.

Economic development then is not just improved financial capital but increased welfare, in terms of general satisfaction about life in general, food security, and health security. However, economic development also incurs social costs in terms of harm to the environment, as a result of pollution-generating activities. A side effect is increasing urbanization and thus, a fierce competition for area services, including health and employment.

The framework of analysis for this case study consists of an understanding of the differential effects of economic development indicators on various categories of people inhabiting the community. The categories proposed are ethnicity, security of tenure, age, gender, location in the watershed, and, in some instances, practice of soil conservation technologies in agricultural production. The indicators include welfare variables in terms of feeling of general satisfaction, food security, health status, natural capital, and traditional measures--- household income and wealth. Analysis of changes in income distribution patterns for the various categories, for the last five years (1998-2002) is also conducted to understand the equity impacts of the development in the study site.

The Industrializing Lantapan: An Overview

Lantapan is a land-locked plateau, situated between the Kalatungan and Kitanglad ranges in northern Mindanao. The place was named after the word “Lantapan” which means the “level on top.” It was formerly a barrio of Malaybalay. In 1968, it became a separate municipality and classified as 6th class, the lowest class in terms of income (MOL, 2001). It was reclassified into a 4th class municipality in 1995 (NSO, 1995) and has not been reclassified since.

The municipality is contained wholly within the Upper Manupali River watershed, which runs west from a point about 15 km south of Malaybalay City along the southern boundary of the Mount Kitanglad Range Nature Park. Lantapan's landscape climbs from river flats (300-600 m) through a rolling middle section (600-1100 m) to high-altitude, steeply sloped mountainsides (1100-2900 m). Soils and rainfall patterns are typical of Mindanao uplands. The municipality consists of several sub-watersheds draining south or southeast from the Mt. Kitanglad Range to the Manupali River. In the lower part of the municipality, the river runs into a dam which diverts flow into a network of canals comprising the Manupali River Irrigation System (MANRIS), a 4,000-ha system constructed by the National Irrigation Authority in 1987. The entire system ultimately drains into the Pulangi River, one of the major waterways of Mindanao Island, about

50 km upstream from the Pulangi IV hydroelectric power generation facility, one of the six largest hydro power-generating plants in the country.

As in other upland areas of the country, Lantapan's population has risen since 1980 at an annual average of 4%, much higher than the Philippine average of 2.4%. In spite of rapid growth in recent decades, agriculture continues to dominate the economy of the municipality and of the province. In 1988, 71% of provincial employment was in agriculture, 5% in industry, and 23% in services; agriculture provides the primary income source for 68% of Bukidnon households (NSO, 1990).

Lantapan has had a significant growth of business establishments (**Table 1**). From the available data, these establishments number 252 in 1999 but have since grown by 185 in 2001. Plantation agriculture and commercial hogs and poultry came into the town after 1998, the year that the province has passed an ordinance declaring a tax holiday for agribusiness firms' establishment in the area. In 2001, additional establishments included 2 banana plantations, 2 commercial piggeries, 3 commercial poultry, and 12 corn mills.[3] Nonfarm incomes have also become a sizable source of income beginning 1998 (**Table 2**). Agricultural wage rate is not competitive with the nonfarm wage rates, especially those from the banana plantations (**Table 3**). Thus, the popularity of these plantations as employers overshadows the potential social costs of the agribusiness operations (Rola et al. 2003, Calderon and Rola, 2003).

Land use data in Lantapan from 1994 to 2001 reveal a constant figure for agriculture at 53% of the total land area (**Table 4**). Farming has remained a dominant economic activity among the Lantapanons. At present, the production of cereals (corn) is expected to decrease due to increase in the area devoted to sugar plantations and the establishment of two banana plantations (MOL 2001). Cabbage and potato are also major crops, especially in the upper watershed. Table 4 also reveals that the proportion of forest areas has decreased by about 4%, and the built-up areas increased by about 6%. This is an indication of a still ongoing conversion of buffer zone areas into agriculture and the seeming increase in the areas for commercial, residential and related establishments, converted from agriculture.

The End of Phase (2002) Survey in Lantapan, Bukidnon

SANREM CRSP[7] researchers have kept records of a sample of farmers in the area in terms of land use, production technologies, practice of soil conservation measures, and price expectations, as well as demographic characteristics. These surveys have run every year since 1994. Results of the several surveys are reported in a number of publications (Coxhead, 1995; Rola and Tagarino, 1996; Coxhead et. al. 2001; Rola and Coxhead, 2001, 2002).

In October 2002, the household survey included questions on incomes and general welfare, basically to answer the question: Have people become better off with the industrializing economy of Lantapan?

A total of 109 household respondents from eight barangays of Lantapan were interviewed. These households were a part of the panel data source of the economic team of SANREM CRSP. Characteristics of the respondents and the survey sampling procedure are explained in Coxhead (1995).

[7] *SANREM-CRSP SEA Phase I report of activities is contained in Coxhead and Buenavista, (2001).*

For the foregoing analysis, the respondents are grouped into several categories to generate differential impacts of development. The first category is ethnicity, where respondents are classified as to whether they belong to the Talaandig tribe, the most dominant indigenous tribe in the town or whether they are migrants (or non-Talaandigs). It is expected that indigenous tribe members are not as fully mainstreamed to the economy, and hence, could be marginalized by the development process.

Respondents are also grouped according to security of tenure. Development is said to have positive effect on the people with more secured tenure---their land can be a collateral to business transactions. Development could likewise have differential effects on age groups. Younger people are more likely to be mainstreamed to the economy because of their skills and high education. The older ones are more at a disadvantage. Gender was also a category, where males are assumed to be more active in the economy than females. The location in the watershed will also matter in terms of access to non-farm income opportunities and state of physical resources or what can also be termed as natural capital.

In the analysis of the state of natural capital, an additional category was included-- the ones practicing and not practicing soil conservation measures. It would be interesting to note the perceptions of these two types of people in assessing the quality of natural resource during the process of development.

These classifications and the number of respondents are shown in **Table 5**.

Results and Discussion

V.1 General Welfare

1. By ethnicity

In terms of general welfare, respondents were asked about their satisfaction in life in general, whether they have greater food security now and whether there is more prevalence of illnesses now than 5 years ago. A greater proportion of the Talaandigs said that they were satisfied with their life right now than 5 years ago (**Table 6**). The reason for this feeling of satisfaction was that about 57% of the Talaandig respondents have access to jobs, both off-farm and nonfarm. About a quarter of those who were satisfied with life cited household food security as a reason. Most non-Talaandigs said that income is not enough for daily needs. A slightly higher proportion of non-Talaandigs said that they have experienced hunger, but not as frequent as the Talaandigs who have experienced the same. This means that the poorest Talaandigs experienced extreme depths of hunger. In terms of illnesses, the responses of both groups were similar. Most respondents cited the change in weather as the cause of illnesses. Some, however, mentioned the increasing use of chemicals in agriculture as a cause.

2. By security of tenure

This feeling of satisfaction was also shared by both the landed and the landless. Our data also showed that the landed had lesser proportion of respondents who experienced hunger, but then those who did were frequently experiencing this. These are the segments of the population who rented out their farms to the plantations. The cause of the frequent hunger was the fact that no harvest was expected at the end of the season. The income from the nonfarm jobs was not enough to take these families through food security status all-year-round. The landless

experienced hunger less frequently inasmuch as they could get off-farm and nonfarm jobs. Landed households depended so much on the promise of jobs by the plantations and were not scampering for other off-farm work. It also did not seem to follow the norm, inasmuch as households with land did not usually go out for off-farm work. In terms of health, households with no land perceived greater incidence of illnesses now than 5 years ago.

3. By age group

Older persons say that they were satisfied with life now than 5 years ago. The younger ones also experienced food insecurity, but not with the same degree as did the older members of the population. Younger persons also observed illnesses to be more prevalent now than 5 years ago.

4. By gender

About half of the male respondents and only 40% of the female respondents were satisfied with their lives currently. More males experienced food insecurity and they also experienced this more frequently. However, the prevalence of illness was seen to be more by women. The more frequent illnesses observed by women were illnesses among children.

5. By location

More respondents in the upper part of the watershed felt satisfied with their lives. This could be due to the high incomes obtained from vegetable growing and other off-farm income sources that are available. Vegetable is a labor-using activity. A lesser proportion of respondents from the lower watershed mentioned episodes of food insecurity, but those who reported these have been experiencing hunger more frequently. A similar proportion of the respondents in both the upper and the lower parts of the watershed mentioned that illnesses were more prevalent now than 5 years ago.

V.2 Wealth Status

1. By ethnicity

The Talaandigs were relatively competitive with the non-Talaandigs in terms of wealth status (**Tables 7-9**). The former have a fewer number of head of animals kept than the non-Talaandigs. More non-Talaandigs own television and motor vehicles than the Talaandigs, where these were acquired during the past 5 years. However, about 40% of the Talaandigs and only 25% of the non-Talaandigs had home improvements during the past 5 years. This could be the outcome of the good income in vegetables in the upper slopes, as well as the income from land rentals by the plantations. Both groups of respondents had very low proportion of people who save in the bank (**Table 9**).

2. By security of tenure

Both the landed and the landless had almost the same number of head of cattle, but the value of the cattle owned by the landed was significantly higher than that of the landless. Landed households owned bigger animals and hence were more valuable. Also, as expected, more landed households owned television sets and motorcycles. Also more landed households had home improvements during the past 5 years. But it is the less secured households who have money in

the bank. Landless households in Lantapan then were not as poor as a typical landless household. This again indicates that the Lantapan economy is getting to be a cash economy and persons, even without land, would have enough cash, and this enables them to save.

3. By age groups

Younger persons had more animals raised and had more value for these animals than older persons. Older persons did not usually own television sets and no one owned any motorcycles. A slightly higher number of older persons had home improvements during the last 5 years compared with younger persons. However, none of the older respondents had money in the bank. While this may mean a high feeling of insecurity, especially during emergencies and when children are living far away, older persons in rural areas did not have a culture of saving in the banks. They would have money tacked in their house posts, or in other places not easily discernible. But interviewing the older respondents in Lantapan gave the impression that they depended so much on their children for all their needs. This was a problem when children live farther away.

4. By gender

Women, being the holders of livestock, were seen more prominently in this survey. Females hold twice as much livestock as males, but the value was not as much because women kept only the small ones such as chickens and ducks. Males owned the bigger animals such as carabaos and cows. As also expected, males owned the household appliances, and in more significant numbers than the females. Only 3% and 1% of the female respondents owned television sets and motorcycles, respectively. In terms of home improvement, more male-headed households were able to do improvements during the past 5 years than the female-headed households. Also, it was revealed that slightly more males saved in the bank than females.

5. By location

Respondents in the lower part of the watershed had more animals than those in the upper watershed. This variation could also be attributed to climate, where livestock do not thrive so well in high-elevation areas. However, more respondents in the upper watershed had television sets, while more respondents in the lower watershed had motorcycles. More respondents in the lower watershed also had made home improvements during the last 5 years. Both types of respondents had some money in the bank, but as in the previous categories, these were just a low proportion. However, this finding showed that some upland farmers were also net savers (**Table 9**).

V.3 Natural Capital

Natural capital was expressed in terms of quality of soil and water. It was observed that intensive agriculture, brought about by economic development, would negatively affect the quality of these natural resources. The respondents were asked, among others, their perceptions of the changes in quality of these, as expressed by the declines in agricultural productivity (for soil quality) and in the color of water (for water quality). Furthermore, respondents were asked whether they perceive people in the community as being aware of water and soil conservation programs in the area, and the fact that government programs are supported by taxes. Respondents were asked whether they were willing to pay additional taxes for water and soil conservation programs.

1. By ethnicity

A high proportion of the respondents belonging to both Talaandigs and outside the tribe observed that soil quality was declining; on the other hand, 60% of the Talaandigs compared with only 31% of the non-Talaandigs mentioned that water quality was also degrading (**Table 10**). Talaandigs cited as reason the increasing acidity of the soil, as well as the increasing use of fertilizer. Non-Talaandigs who observed an increase in the soil quality mentioned the practice of contour plowing as a probable cause.

Furthermore, the Talaandigs also mentioned that the use of surface water for gardening as well as erosion had contributed to the eroding quality of surface water in the area. A high proportion of respondents for both ethnic groups perceived that people were aware of environmental conservation programs and that government programs were supported by taxes. Ninety-one percent of the Talaandigs and only 76% of the non Talaandigs were willing to pay additional taxes for soil conservation measures (**Table 11**). Being their ancestral domain, Talaandigs valued their environment more than did the migrants.

2. By security of tenure

A bigger proportion of the landed respondents observed a decline in both soil and water quality. Their reasons were that the soils were overexploited and had become acidic. Soil erosion and water use in the gardens were seen to cause surface water degradation. In the same vein, a higher proportion of respondents with more secure tenure mentioned that people were aware of conservation programs, that they were also aware that government spends for these programs, and that they were willing to pay extra taxes for water and soil conservation programs. Most of these respondents were also natives, hence, the answers were consistent with those given by the ethnic tribe.

3. By age group

Eighty-seven percent of the older respondents observed a decline in the soil quality. But these could be a function of time that they spent farming. Older respondents said that they spent more on fertilizers now than before, thus, the seeming decline in soil quality. A similar proportion of both categories of respondents observed the decline in water quality, mostly as a result of soil erosion. More of the younger respondents perceived that people in the area were aware of the conservation programs. A similar proportion mentioned that government programs were supported by taxes. More of the younger respondents were willing to pay additional taxes for soil and water conservation programs. This is just so because younger people would benefit more from these programs than the older ones.

4. By gender

A greater proportion of female respondents observed declines in both soil and water quality. Respondents had the same reasons as above-- i.e., overexploited and acidic soils and highly eroded soils that cause water quality degradation. More male respondents perceived that people were aware of the ongoing conservation programs in the area. A similar proportion in both categories was also aware that these programs were funded by governments through taxes, and they said they were willing to pay additional taxes for soil and water conservation programs.

5. By location

Expectedly, more respondents in the upper watershed observed the decline in soil quality. A slightly higher proportion of the upper watershed respondents also observed the decline in water quality. This was because farmers in the upper watershed did not usually use fertilizers, but the intensive cultivation makes the soils acidic and overexploited. Traditionally, upland farmers would have a long fallow period. But the integration to the markets now induced them to continuously crop the same areas. More respondents in the upper watershed perceived that residents were aware of soil and water conservation programs. Almost all respondents in the upper watershed were aware that soil and water conservation programs were government-funded. However, only about 91% of the upper watershed respondents were willing to pay taxes to fund these conservation programs. In contrast, only 73% of respondents in the lower watershed were willing to pay additional taxes for environmental conservation purposes.

6. By soil conservation practice

Analysis of natural capital also looked at replies of respondents who practiced soil conservation measures. A greater proportion of respondents who practiced soil conservation measures observed a decline in soil quality. A similar proportion, however, of both respondents believed that there was likewise a decline in water quality. Soil acidity, soil erosion, and non-application of fertilizers were the reasons for the decline in soil quality. Soil erosion was the primary culprit in the change in color of surface water.

V.4 Household Income

Monthly incomes of households were also analyzed according to different categories. The sources of household incomes are varied: farm, off-farm, and nonfarm.

Table 12 describes the income patterns of various categories of respondents from 1998 to 2002. The mean current income in 1998 was PhP 3244 per month. The mean current income in 2002 was estimated to be PhP 7441 per month. Table 12 also indicates the percent movements of these figures from the annual mean. This analysis can give us some indication of whether people in any category have become better off or worse off during the 5 years under study. The subsequent figures also present the income distribution per category of respondents. These figures are called Lorenz curves and they imply that the farther away the curve is from the diagonal line, the more unequal is the income distribution for the period for the particular category of respondents.

1. By ethnicity

The results show that migrants had indeed captured the benefits of development, given the increase in their monthly incomes during the 5-year period. In terms of income distribution, Talaandig tribe members had slightly better income distribution in 2002 than in 1998 (Fig. 1). On the other hand, the non-Talaandigs were better off in 1998 than in 2002 (Fig. 2). While the mean incomes increased for this group, the distribution seems to indicate that the members were differentially affected.

2. By security of tenure

The landless had more income per month than the landed. This amount grew substantially in 2002. The reasons for this may be obvious: these migrants (the landless) were skilled to do nonfarm work. They also were active in off-farm work, and hence they had better opportunities. The income distribution of persons with security of tenure compared with those without showed similar patterns for both years under study (Figs. 5 and 6).

Landless persons were mostly migrants and younger persons. They would have enough skills for nonfarm work.

3. By age group

The older people actually fared a little bit better in 2002, compared with 1998, though the absolute figure was still below the mean. The income distribution in terms of age groups revealed very distinctly that the older members of the population were hardest hit by the consequences of economic development processes. This may be true in general because older persons would not have the skills to be employed in poultry farms or the plantations. Rural social policies have to address the needs of this group. In the olden times, the norm was that older persons were fully dependent on their children for their survival. However, in the modern times, children usually live far from the villages. The safety net was thus not as tight. Children living in villages with their parents would usually have fulltime jobs, and the grandparents are relegated to become babysitters. Since this is a form of economic activity, grandparents also earned their non-monetary incomes in this sense.

4. By gender

Expectedly, females were worse off than males and they have also been getting worse off through time. The older females who were landless were observed to be the ones so marginalized in this economic development process.

5. By location

Respondents in the upper watershed became worse off in 2002 than in 1998, while those in the lower watershed portion were observed to be a lot better off. This can be explained by the many nonfarm job opportunities existing in the lower watershed villages.

6. By soil conservation practice

Interestingly, the respondents who were not practicing soil conservation measures had higher incomes than respondents who were practicing these soil conservation measures. Apparently, farmers who were older were the ones doing soil conservation practices (Rola and Coxhead, 2002), and did not have other sources of incomes. On the other hand, persons who have the better skills to do work in plantations and other nonfarm activities would not have the time to do labor-intensive soil conservation practices.

Conclusions

Our analysis reveals that economic development has differential impacts on different groups of people. The hardest hit seems to be females and older persons, the traditional special groups deemed vulnerable to outside shocks. To cushion the impacts of development, social policy could address some particular concerns. Among these are the security of the older persons and special programs for small enterprises that especially target women.

Currently, there is no social security for farmers in general, and for older farmers in particular. Unlike government employees who would have pensions, albeit measly, and health care, the rural folks have no facility to have these benefits. While it is a common saying that farmers don't retire, they just fade away, the current times seem to suggest that older farmers now need social security. Farmers as a group could be enticed to be members of the Social Security System. The really older ones may be taken care of by local government units (LGUs) in terms of free health care. Old people are also alone and lonely, given that children live far away and far between. Senior citizen organizations are active in other areas of the country, especially in the urban centers. In the study site, senior citizen organizations are present, but not all older people are members. A community-based organization that takes care especially of old people living alone is needed.

In the study site, the local government has initiated a program consisting of micro credit. Most of the applicants are women. LGUs can be encouraged to pay particular attention to the needs of these women, especially the older ones. Credit can be given to enable them to raise animals. Swine and poultry are the two popular kinds of animals raised by women in the area. Given the advent of the livestock revolution (Delgado et al., 1999), women can be integrated to the markets and have sustained incomes. They can also be provided technical and other support to make their operations sustainable. These programs can also provide women more capacities in other spheres of life.

Economic development is good, but the fruits of development will only be meaningful if the people will be better off, with no one getting worse off. It is thus imperative for policymakers to understand these differential impacts on the different target groups.

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Table 1. Number of registered commercial establishments in Lantapan, Bukidnon, 1999 and 2001.

Type of establishment	1999	2001[a]
Agricultural supplies	4	-
Hardware (motorparts)	1	2
School supplies	1	-
Sari-sari stores	227	154
Bakery	4	2
Transport services	4	1
Drug store	1	1
Buy and sell	5	3
Tailoring	2	-
Electrical shop	3	-
Videoke	2	3
Poultry	-	3
Corn mill	-	12
Piggery	-	2
Banana plantation	-	2
Total	254	185[a]

[a] *New entrants in 2001.*

Table 2. Distribution of dry- season employment, by household members over 15 years old, 1996-2000.

Year	Observations (no.)	Primary employment sector (% of observations)		
		On- farm	Off- farm	Nonfarm
Mainly corn-growing areas				
1996	120	60	20	20
1998	103	35	20	45
1999	113	27	21	51
2000	126	33	25	41
Mainly vegetable-growing areas				
1996	158	66	5	29
1998	121	52	17	30
1999	142	30	29	41
2000	117	42	14	44

Source: SANREM survey data (1996-2000).

Table 3. Average daily wages by occupation and location (PhP/day), Lantapan, Bukidnon, 1998-2000.

Type of employment	Upper watershed villages			Lower watershed villages		
	1998	1999	2000	1998	1999	2000
Nonfarm work						
Office employment	141	136	-	148	182	182
Small-scale enterprise	94	110	96	32	93	111
Construction work	150	60	40	175	69	-
Household help	55	50	53	62	45	74
Sales lady/helper	70	61	63	137	114	136
Nonfarm average	102	83	63	111	101	125
Off-farm average		128	148		128	148
Farm average	59	78	68	49	79	94

Source: SANREM survey data (1998-2000)

Table 4. Land use pattern, Lantapan, Bukidnon, 1994 and 2001.

Classification	1994	2001
	(%)	(%)
Agriculture	53.42	53.83
Forestal (pasture, grasslands and forest lands)	40.90	36.96
Built-up areas (commercial, residential, agro-industrial)	5.68	11.35
Others	-	3.53
Total	100	105.67
Total (ha)	31,820	32,971

Source: Municipal Annual Reports, Lantapan, Bukidnon, 1994, 2001.

Table 5. Distribution of respondents, by category, Lantapan survey, 2002.

Category	No.	%
By ethnicity		
Talaandig	58	53
Non-Talaandig	51	47
Total	109	100
By security of tenure[a]		
More secured	127	78
Less secured	35	22
Total	162	100
By age group		
Less than 60 years old	94	86
More than 60 years old	15	14
Total	109	100
By gender		
Male	99	91
Female	10	9
Total	109	100
By location		
Lower watershed	41	38
Upper watershed	68	62
Total	109	100
By soil conservation practice [b]		
Practicing soil conservation	89	66
Not practicing soil conservation	45	34
Total	134	100

[a] *Expressed in number of parcels. More secure tenure: private title, shared ownership, tax declared, CLT, stewardship. Less secure tenure: tenant, cash rental, mortgaged, leased.*
[b] *Expressed in number of parcels.*

Table 6. Distribution of respondent responses on assessment of their welfare, Lantapan, Bukidnon, 2002 (in %).

Category	More satisfied with life now than 5 years ago	Status of food insecurity [a]	More frequent Occurrence of hunger now [b]	More prevalent occurrence of Illnesses now
By ethnicity				
Talaandig	64	22	85	57
Non-Talaandig	37	27	64	59
By security of tenure				
More secured	52	19	83	52
Less secured	51	23	63	69
By age group				
Less than 60 years old	50	28	73	62
More than 60 years old	60	7	100	40
By gender				
Male	53	25	76	58
Female	40	20	50	70
By location				
Lower watershed	34	17	86	59
Upper watershed	62	29	70	59

[a] Responses to whether respondents experienced hunger during the last 5 years. [b] For those who experienced hunger, responses of whether they experienced hunger more frequently now than 5 years ago.

Table 7. Mean number of animals raised and their imputed value, by various categories, Lantapan survey, 2002.

Category	Mean number of head [a]	Value (2002 PhP)
By ethnicity		
Talaandig	10	13,866
Non-Talaandig	16	14,272
By security of tenure		
More secured	13	18,444
Less secured	12	11,997
By age group		
Less than 60 years old	14	15,049
More than 60 years old	9	7,830
By gender		
Male	12	14,008
Female	25	14,530
By location		
Lower watershed	20	16,957
Upper watershed	9	12,307

[a] *Animals included cows, carabaos, horses, goats, poultry, and pigs.*

Table 8. Proportion of sample respondents owning television and motorcycles, Lantapan survey, 2002.

Category	Television owner (%)	Motorcycle owner (%)
By ethnicity		
Talaandig	15	3
Non-Talaandig	28	9
By security of tenure		
More secured	54	16
Less secured	18	6
By age group		
Less than 60 yrs old	39	12
More than 60 years old	4	
By gender		
Male	40	11
Female	3	1
By location		
Lower watershed	17	7
Upper watershed	26	5

Table 9. Distribution of respondents who had home improvements in the last 5 years and who currently own bank accounts, Lantapan survey, 2002.

Category	Had home improvement [a] done during last 5 years (%)	Currently maintaining bank account (%)
By ethnicity		
Talaandig	40	12
Non-Talaandig	25	14
By security of tenure		
More secured	34	10
Less secured	14	14
By age group		
Less than 60 years old	31	15
More than 60 years old	33	0
By gender		
Male	32	13
Female	20	10
By location		
Lower watershed	34	15
Upper watershed	29	12

[a] *Includes repair/construction of house, comfort room, veranda, roof, wall and kitchen.*

Table 10. Respondents' distribution of responses in assessing soil and water quality, Lantapan, Bukidnon, 2002 (in %).

Category	Decline in soil quality [a]	Decline in water quality [b]
By ethnicity		
Talaandig	69	60
Non-Talaandig	69	31
By security of tenure		
More secured	73	52
Less secured	69	37
By age group		
Less than 60 years old	66	47
More than 60 years old	87	47
By gender		
Male	68	46
Female	80	50
By location		
Lower watershed	66	44
Upper watershed	71	49
By soil conservation practice		
Practicing soil conservation	79	48
Not practicing soil conservation	69	44

[a] *Measured in terms of decrease in agricultural productivity.* [b] *Measured in terms of darker color of water.*

Table 11. Awareness of environmental conservation programs and respondents willingness to pay for these programs, Lantapan, Bukidnon, 2002.

Category	% of respondents who perceive that people are aware of water and soil conservation programs	% of respondents who are aware that government programs are supported by taxes	% of respondents who are willing to pay additional taxes for water and soil conservation programs
By ethnicity			
Talaandig	88	97	91
Non-Talaandig	73	86	76
By security of tenure			
More secured	85	94	89
Less secured	66	77	71
By age group			
Less than 60 yrs old	80	91	85
More than 60 years old	87	93	80
By gender			
Male	82	92	85
Female	70	90	80
By location			
Lower watershed	76	80	73
Upper watershed	84	99	91

Table 12. Mean incomes, by various categories, 1998 and 2002, Lantapan survey, 2002.

Category	1998 [a]		2002 [b]	
	Mean	% from mean	Mean	% from mean
By ethnicity				
Talaandig	3,242.80	-0.05	5,193.47	-30.20
Non-Talaandig	3,631.62	11.94	9,996.47	34.34
By age group				
Less than 60 years old	3,467.08	6.87	7,513.74	0.98
More than 60 years old	2,085.65	-35.71	6,983.29	-6.15
By security of tenure				
More secured	3,252.66	0.26	7,732.75	3.92
Less secured	5,252.36	61.90	13,789.62	85.32
By gender				
Male	3,622.86	11.67	7,671.44	3.10
Female	2,840.44	-12.45	5,156.87	-30.70
By location				
Lower watershed	3,302.08	1.78	11,715.81	57.45
Upper watershed	3,196.66	-1.47	4,863.13	-34.64
By soil conservation practice				
Practicing soil conservation	3,735.10	15.13	8,249.35	10.86
Not practicing soil conservation	4,172.46	28.61	11,401.81	53.23

[a] *Mean income for 1998: PhP3,244.27.* [b] *Mean income for 2002: PhP7,441.*

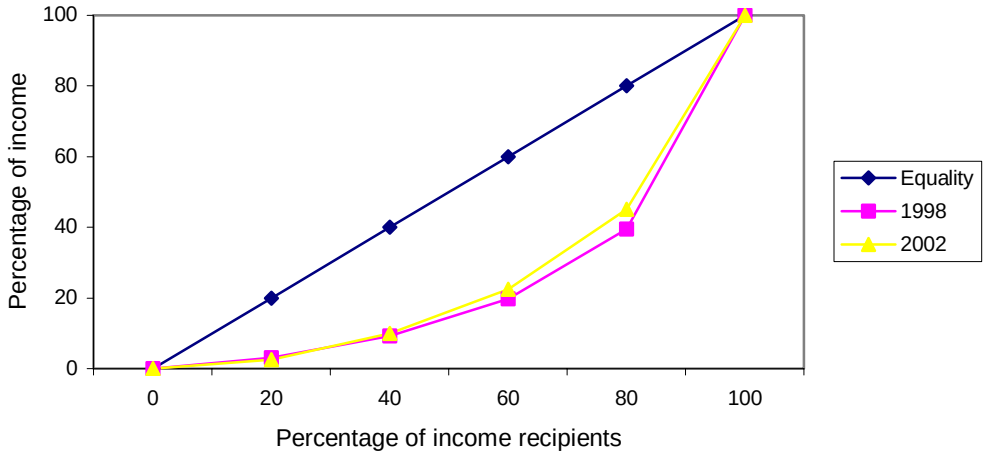

Fig.1. Lorenz curve for Talaandigs.

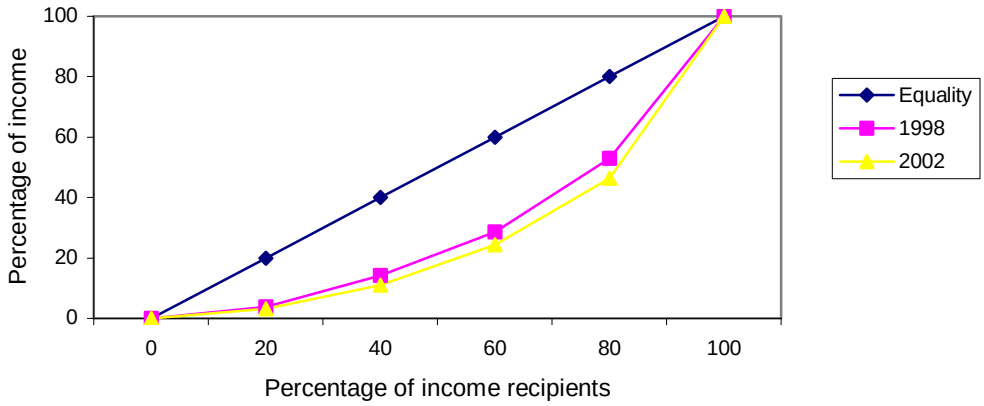

Fig.2. Lorenz curve for Non-Talaandigs.

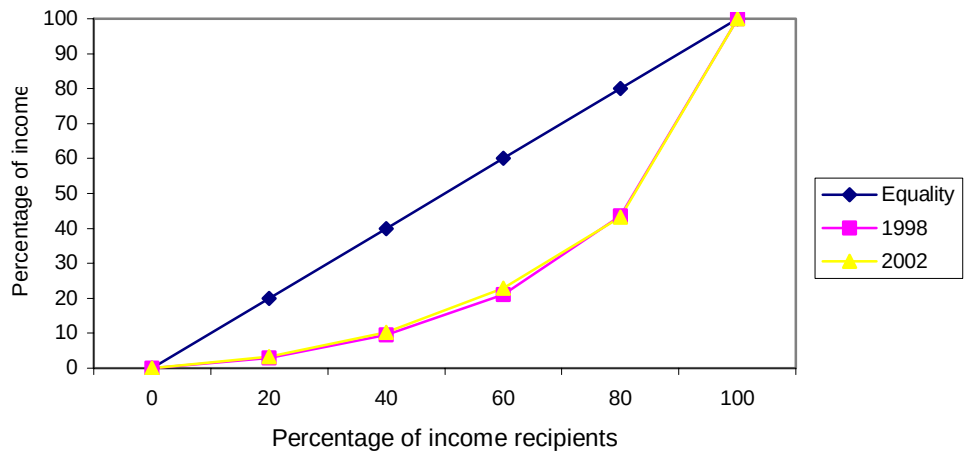

Fig.3. Lorenz curve for less than 60 age group.

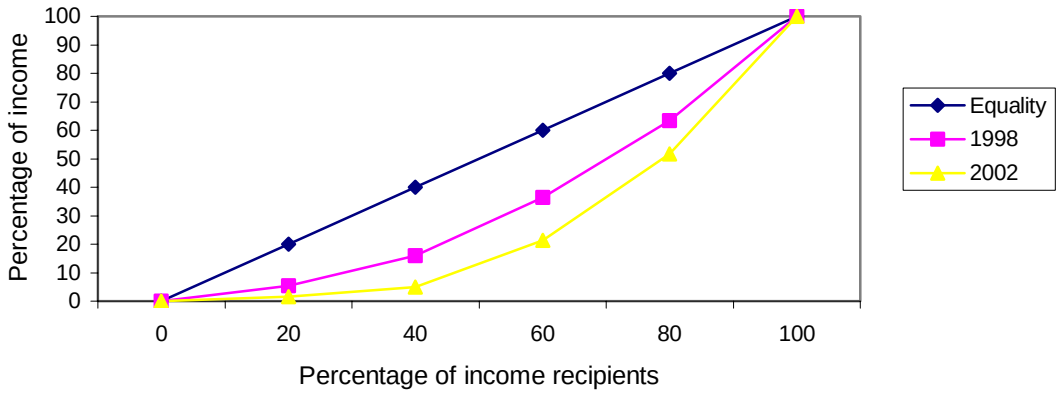

Fig. 4. Lorenz curve for greater than 60 age group.

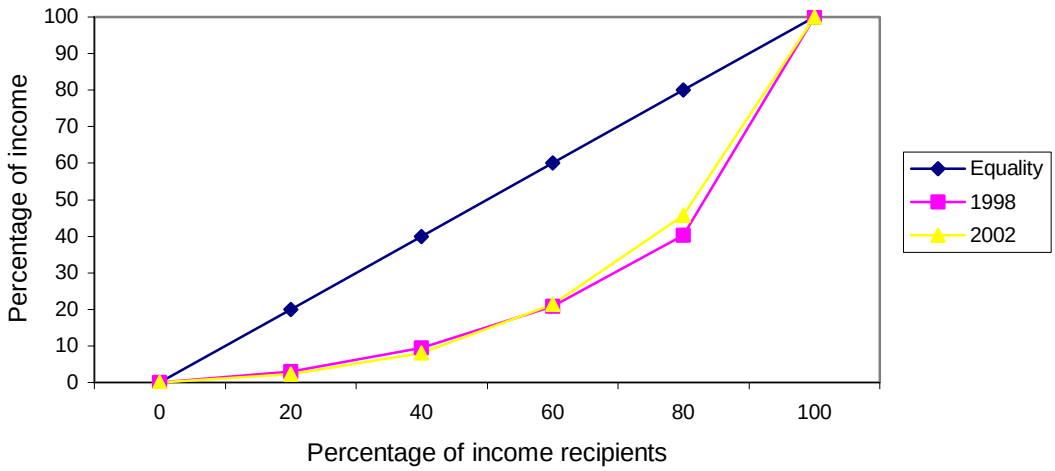

Fig. 5. Lorenz curve for group with more secured tenure.

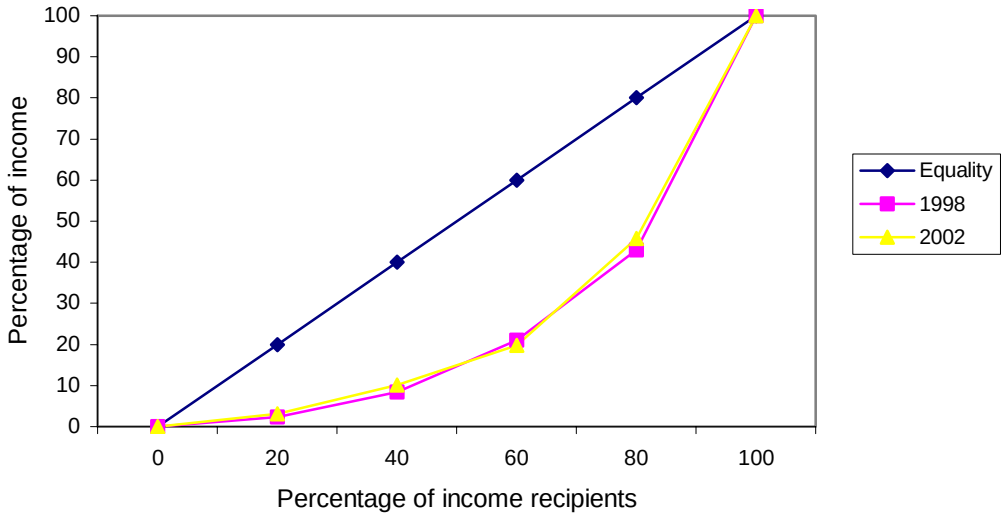

Fig. 6. Lorenz curve for group with less secured tenure.

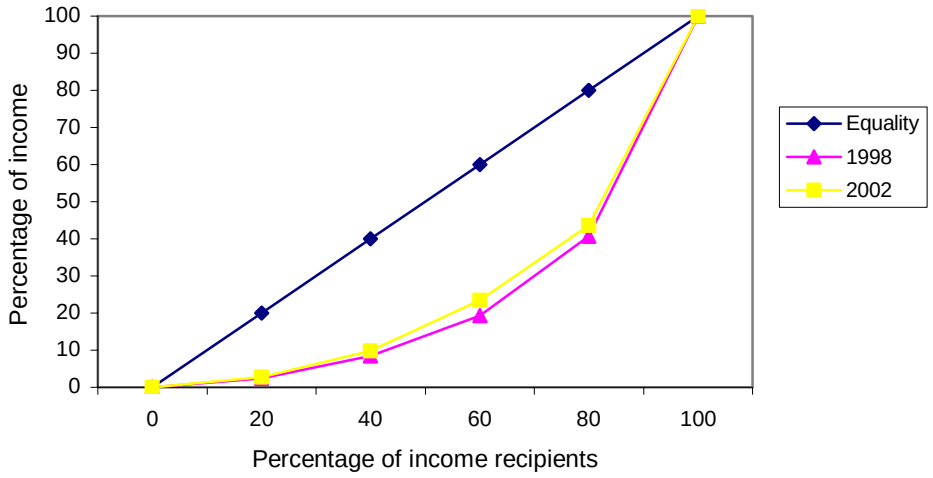

Fig. 7. Lorenz curve for male respondents.

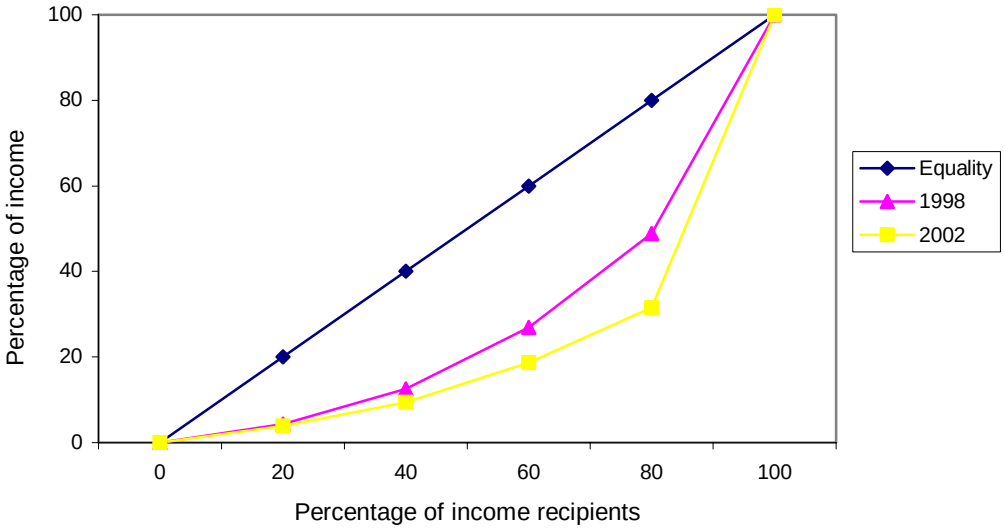

Fig. 8. Lorenz curve for female respondents.

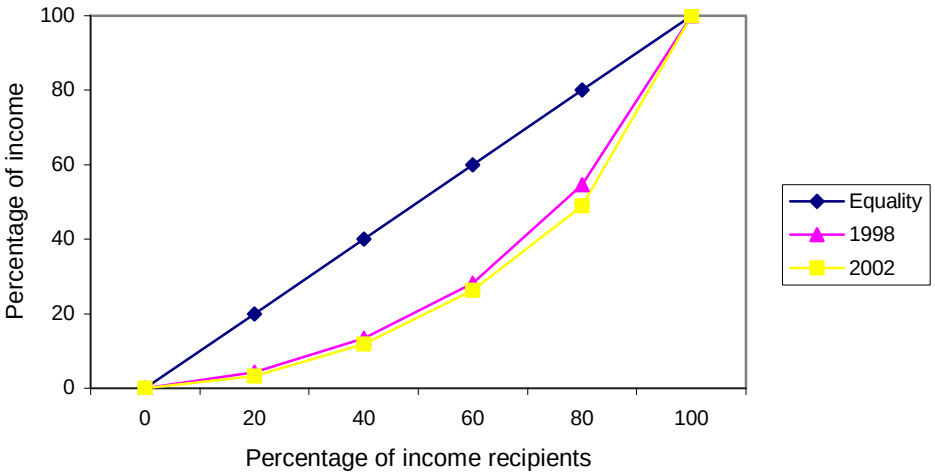

Fig. 9. Lorenz curve for respondents in the lower watershed.

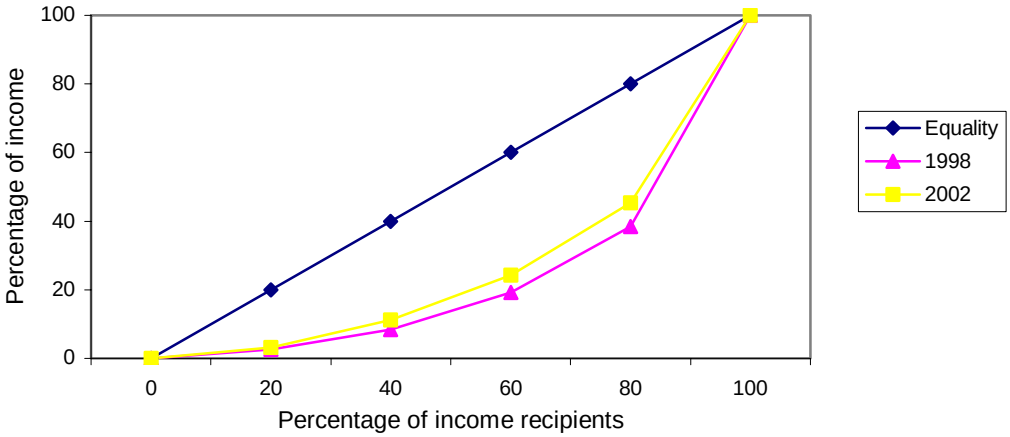

Fig. 10. Lorenz curve for respondents in the upper watershed.

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Topic 4	Closing Program

Topic 4.1 Integration, Evaluation, and Closing Ceremonies

Objective : Integrate the concepts, methods, and learnings in Policy Analysis for Watershed Management

Time : 120 minutes

Methods : Discussion and filling-up of evaluation questionnaire

Aids : Overhead projector/Computer and Liquid Crystal Display (LCD), brown paper (one per group), marker (one per group)

Handout : Handout 1 “Evaluation Form”

Session Guide :

1. Highlight the major points of the training program. Start from the objectives to the expectations of the participants. Were the objectives of the training achieved? Were the expectations of the participants met? Invite participants to add more to what have been said.

2. Distribute the evaluation form and ask the participants to fill-up. Submit the filled-up questionnaire to the training staff.

3. Start the Closing Ceremonies.

   In addition to the Message of the invited speaker/s during the Closing Program, a participant or two may be requested to represent all the participants and comment on the whole training -- whether their expectations were met, what have they learned and how these will be utilized upon return to their respective offices, the design of the training, the resource persons, venue, accommodation, food, support from the training staff, and other comments/suggestions to further improve the conduct of future training on watershed management.

EVALUATION FORM

Name: (OPTIONAL)_____

1. Did the training session meet your expectation(s)?

❒ Yes ❒ No

Why or why not? _____

_____.

2. As a whole, did you find the training useful to your work?

❒ Yes ❒ No

If yes, in what way?

_____

If no, how can this be useful to you?

_____.

_____

3. What session(s) did you find most useful/less useful?

Most useful	Less useful

4. On a scale of 1-5 (with 5 as the highest), please the rate the following:

a. Resource Persons:

_____	1 ❒	2 ❒	3 ❒	4 ❒	5 ❒
_____	1 ❒	2 ❒	3 ❒	4 ❒	5 ❒
_____	1 ❒	2 ❒	3 ❒	4 ❒	5 ❒
_____	1 ❒	2 ❒	3 ❒	4 ❒	5 ❒
_____	1 ❒	2 ❒	3 ❒	4 ❒	5 ❒
b. Training Manual	1 ❒	2 ❒	3 ❒	4 ❒	5 ❒
c. Food	1 ❒	2 ❒	3 ❒	4 ❒	5 ❒
d. Accommodation	1 ❒	2 ❒	3 ❒	4 ❒	5 ❒
e. Training Duration	1 ❒	2 ❒	3 ❒	4 ❒	5 ❒
f. Logistic Support	1 ❒	2 ❒	3 ❒	4 ❒	5 ❒

5. On a scale of 1-5 (with 5 as the highest), please rate the training.

1 ❒	2 ❒	3 ❒	4 ❒	5 ❒
very poor	poor	average	very good	excellent

6. Other comments/suggestions.

_____

_____

_____

THANK YOU!