

A GUIDE FOR ANALYZING LIVELIHOODS AND ECONOMIC ACTIVITIES IN THE CONTEXT OF A NEGOTIATED APPROACH TO INTEGRATED WATER RESOURCES MANAGEMENT

RITA MUSTIKASARI



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WATER RESOURCES MANAGEMENT**

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This publication is under project title: Telapak's Capacity Development Project on a Negotiated Approach to Integrated Water Resources Management in Indonesia (CDP IWRM NA).

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Both ENDS, which has received funding from PSO – the association of Dutch development organisation for strengthening CSO on development of the Negotiated Approach (NA), an approach to design policy processes, aiming at the empowerment of local actors as fully-fledged participants in all phases of the policy process.

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Foreword

Experiences in many countries demonstrate that people living in communities and villages all over the world are able to manage or co-manage their rivers, lakes and groundwater. Increasingly, governments recognize the need to include these people in day-to-day water management and in the development of policies related to the use of water resources.

Both ENDS and Telapak work closely together to promote successful community participation in natural resources management. Our cooperation is based on the conviction that successful and effective resources management is only possible if communities have the capacity and opportunity to develop and negotiate their own visions and solutions to challenges related to resources management.

Communities willing to take the lead in resources management need to understand the functioning of ecosystems, such as rivers and lakes. Given this need, we welcome the Livelihood Analysis and Analysis Activities (LA & AA) Guide and series¹. The series helps communities and civil society organisations to gain insight in the economic activities and the variety of stakeholders in their basin, and to place problems of local communities into broader geopolitical and geo-economic context. By doing so, the series will increase their abilities to effectively lead water management processes in their own river basins.

Both ENDS and Telapak aspire that rivers continue to flow freely, for the benefit of the many communities that depend on them. I trust that Telapak's work will be useful to many civil society organisations, and will contribute to the realisation of this aspiration in Indonesia.

Danielle Hirsch
Director Both ENDS

I These series consist of the following documents:

1. Getting a Water User's Perspectives, A Guide for Analyzing Livelihoods and Economic Activities in the Context of a Negotiated Approach to Integrated Water Resources Management.
2. Field Report on Testing the Livelihood and Activity Analyses in the Lamasi River Basin.
3. Problem Analyses of the Lamasi River Basin
4. Case Description of the Air Bengkulu River Basin



Foreword

Communities as right holder is stated in the Constitution of Indonesia 1945; the state will then has to ensure that their everyday need for water will be met. For this, Law no. 7/2004 on Water Resource was produced with a provision of involving community participation in water resource management. The participation of communities and civil organizations become very important throughout the whole management of water resource management in Indonesia..

In daily life we often find communities who are actively and wisely protecting and utilizing water resource for their needs. This is a fact that should encourage the government to recognize this community way of water resource and following on that to provide rooms for communities' involvement in water resource related policy making as these policies are directly linked to conserving the life of these communities.

For this community involvement to become effective, what crucially needed is the capacity and capability of community to develop and provide constructive argument in negotiation processes with those of policy makers. Given this need, we welcome the Livelihood Analysis and Analysis Activities (LA & AA) Guide and series¹.

Telapak and Both END hope that the government will make sure this room available for the communities to contribute and to take a role in policy making processes and interventions related to water resource management. I hope this serial of book publications from the Telapak CDP IWRM NA will be useful as a guidelines for all stakeholders, especially for civil society groups, in promoting community involvement in the planning and management of water resource in Indonesia for the better and the more just. Because water is the right of every citizen in Indonesia.

Christian Purba

Board of Telapak

Member of National Water Council

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A Guide For Analyzing Livelihoods And Economic Activities In The Context Of
A Negotiated Approach To Integrated Water Resources Management



Acknowledgment

This Capacity Development Project has been a good training exercise and opportunity to increase our knowledge about water and expand Telapak, Perkumpulan Bumi Sawerigading (PBS) and Yayasan Ulayat Bengkulu (YUB) network and credibility. The authors wish to see more and more members of the public to take interest and get involved in water issues, and perhaps even further than just involvement on a participatory project, trying on full-fledged actions throughout all phases of policy processes.

Thank you to Rob Koudstaal, our project advisor, for his passionate assistance for the last 2.5 years, since his first visit to Kedai Telapak on December 2007. Will Burghorn helped sharpen our antropology and social perspectives, which we have been able to develop on this book series. Christa Nooy has been supporting our project activities and keeping us updated with the next project of developing Negotiated Approach, and linking it to the international fora.

Thank you to our peers at Telapak, PBS and YUB. Let's use this series to help ourselves know better about our river basins and support water users to be able to negotiate their interest of having a balanced approach between poverty reduction, sustainable use of water, and economic development.

Authors



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Acronyms

AMAN:	Aliansi Masyarakat Adat Nasional; Indigenous People Alliance
APBD:	Anggaran Pembangunan dan Belanja Daerah; Provincial Budget for Development
APBN:	Anggaran Pembangunan dan Belanja Nasional; National Budget for Development
BAPPEDA:	Badan Perencana Pembangunan Daerah; Regional Planning and Development Agency
BPDAS:	Badan Pengelola Daerah Aliran Sungai; River Basin Management Board
CDP IWRM NA:	Telapak's Capacity Development Project with a mission to apply the Negotiated Approach to IWRM
DAS:	Daerah Aliran Sungai; River Basin
Fordas	Walmas: Forum DAS Walendrang - Lamasi; Walendrang - Lamasi River Basin Forum
Gol:	Government of Indonesia
GP3A:	Gabungan Perkumpulan Petani Pemakai Air; Association of Water User Farmer Groups
IWRM:	Integrated Water Resource Management
ITB:	Institut Teknologi Bandung; Bandung Technology Institute
IUP:	Izin Usaha Pertambangan; Mining Operation Licency
KDL:	Komite DAS Lamasi; Lamasi River Basin Council
NA:	Negotiated Approach
PSDA:	Water Resources Management Agency
TKPSDA:	Tim Koordinasi Pengelolaan Sumber Daya Air; Water Management Coordination Team
TGHK:	Tata Guna Hutan Kesepakatan; Forest Governance for Utilizing Agreement
TPLD:	Tata Pemerintahan Lokal Demokratis; Local Democratic Governance Rule
UPTD:	Unit Pelaksana Teknis Daerah; Local Technical Implementation Unit under one Department in Province

Forum DAS Walmas: Walendrang-Lamasi River Basin Forum

O&M: Operation and Maintenance

PBS: Perkumpulan Bumi Sawerigading; Bumi Sawerigading Foundation

Perda: Peraturan Daerah; Local Regulation

P3A: Perkumpulan Petani Pemakai Air; Water User Farmer Group

WS: Wilayah Sungai; Watershed

YBS: Yayasan Bumi Sawerigading; Bumi Sawerigading Foundation



Introduction

1.1. Purpose and Context

Livelihood Analysis and Activity Analysis (LA&AA) are important tools in the Negotiated Approach (NA) to Integrated Water Resources Management (IWRM). They collect and analyze information on water users in terms of people (households) and economic activities. The results of LA&AA aim to reflect the perceptions of water users about their water resources and their management. Through the LA&AA we can also understand what people's hope, considerations and alternatives are for what the government has done.

This perception of the local water users is needed for a NA that aims to involve all users in a realistic and sustainable IWRM (preferably on the level of river basins). Well documented perceptions will contribute to a discussion in which all stakeholders either from government, private or other water users have an equal position. Different stakeholders will have their own perception of the available water resources in a given basin and the way they should be used. If all parties tightly hold to their own problem analysis, this would lead to traditional negotiations in which partners fight for an optimal share of water resources and strong and well informed partners use to have a competitive advantage. A NA aims to facilitate a dialogue that is based on an equal sharing of available information and on a common understanding of problems among different stakeholders that use water resources in the same basin or other agencies that have interests in the basin's resources.



The LA&AA would result in reports that properly document and summarize the field information collected and make a first analysis. Such reports are considered an important contribution to a problem analysis that is jointly made among all partners in water management and that recognizes the perceptions of water users. Such a joint problem analysis is a first step in any NA as it provides a crucial base to negotiate alternative options for IWRM that should find a balanced approach that considers between:

- a reduction of poverty following basically the perception of local people;
- a sustainable use of the related natural resources; and
- national/regional economic development.

Sources for LA&AA are interviews with water users, consultations of experts and the collection of secondary information. This guide concentrates on interviews and fieldwork needed to analyse the position of farmers and farming activities. Other water users are only briefly considered because the scope of this exercise is limited; farming is an important activity in the social, economic and water management sense, and farmers are a priority group for NGOs:-

This guide is one of the outputs of Telapak's Capacity Development Project on Integrated Water Resources Management applying the Negotiated Approach (CDP IWRM NA). This project, which was executed between August 2008 and April 2011, aims to encourage NGO partners and Telapak to develop their capacity to play a role in the management of water resources in Indonesia.

The guide was made through several meetings during the project running for 32 months and 13 meetings. A questionnaire was developed, based on Telapak's experience in other projects on natural resources management by local people (including forest, marine environment and water). Under the CDP the guide has been tried out in two basins: the Lamasi River Basin (Luwu Regency, South Sulawesi) and the Air Bengkulu River Basin (Bengkulu Regency, Bengkulu), while the methodology has already been applied by Telapak in five other basins: the Serayu River Basin (Central Java), the Kampar River Basin (Riau), the Way Seputih River Basin (Lampung), the Brantas River Basin (East Java) and the Cisadane River Basin (West Java). In the Lamasi River Basin the LA&AA (Kahman H., R. Mustikasari, 2011a) and subsequent tentative problem analysis (Kahman H., R. Mustikasari, 2011b) supported the functioning of the newly installed Lamasi River Basin Committee (KDL) on July 2010 with Perkumpulan Bumi Sawerigading (PBS). In

the Air Bengkulu River Basin, the LA&AA (Andriansyah O., R. Mustikasari, 2011b) and subsequent case description (Andriansyah O., R. Mustikasari, 2011a) have encouraged the birth of Bengkulu Provincial Water Council through active advocacy by Yayasan Ulayat Bengkulu (YUB) and Forum DAS Air Bengkulu.

The English version of this document is the result of the training and discussions with the CDP foreign advisor that have been held in English and it is based on the translations contributed by the Indonesian CDP team members. As such, the main function of this version is to be translated into an Indonesian version that is considered the final output of Telapak's CDP and is directed to the Indonesian NGOs that are involved or want to become involved in water resources management in Indonesia. This English version can be used in an international context and may be useful for non-Indonesian NGOs but should not be considered as a guide for LA&AA for an international audience.

Chapter II of this report comprises the detailed concepts of LA and AA, while the guidelines and steps to doing the field work for LA and AA are explained in chapters III and IV, respectively. How to do a reporting is explained in Chapter V; some key issues are listed in Chapter VI. All through the text examples are taken from the exercise that has been done in the Lamasi River Basin and in the Air Bengkulu River Basin.

1.2 Justification and use for Telapak

There is a strong intention and growing demand from NGOs to take part in water management in Indonesia. This is driven by the desire to stimulate and support civil society to take part in the decision making and management of water resources and break the government's and private sector's dominance in this arena. The main demand is to strengthen civil society to be able to express their interests and needs and enable them to negotiate with higher levels of government and other stakeholders on water management issues. The role of government agencies and the private sector is still felt to be too dominant, restricting the engagement of farmers and other water users in the planning, implementation and monitoring of water resources in their areas.

Local people are not very much involved in river development planning and management in their respective areas. For example, most of the physical development such as building a dam or irrigation infrastructure is decided upon without their involvement.

Also licensing for extractions and waste water discharges and privatization of the management of resources, which result in local people losing access to their own water resources, is often done without involvement of the affected local people.

Interventions in the water sector often are made without proper understanding of their impacts on local people and other water users which might really hamper a socially justified and efficient use of the water resources. For example farmers might be constrained by the access to seeds, fertilizers or markets and not by the available amount of water, where simply supplying more water does not solve their problems and does not increase their well-being. The LA and AA aim to fill this gap, thus contributing to a more optimal use of the water resources.

The guide is prepared to fulfill the need of Telapak and partner NGOs to identify problems in a given river basin and capture a more complete picture of water use and water users in the basin. To this end it is important to understand the economic and livelihood aspects of water users within a basin. This refers both to economic activities such as a rubber factory or coal mining and to poor farmers and fishers whose livelihoods depend on the availability and access to water resources. This understanding is needed to support NGOs in making interventions and getting engaged in the basin/ water management in their working area.

NGOs will play a role bridging the gap between local water users and the rest of the water management world. This guide will help Telapak's NGO-partners to get into the arena by getting people's perception about their rights and uses of water. This can be used to argue for a more equitable use of water resources with the government and other stakeholders. Results can also be used to influence policy makers and to support campaigns to educate a wider public and increase its awareness.

It is important that NGOs help local water users to formulate their perception in a well structured way that can be understood by other people and the guide can be used to achieve that goal. The guide, however, is not a tool for NGOs to empower people or give direct benefits to farmers; it is meant to understand water user activities from which farmers benefit in the long run. Results can be used to advocate and channel people's interest, which is also a proper role for NGOs.

An important aspect of these analyses is to bring up local knowledge and account for the existing social network structures. Local knowledge can contribute to finding

sustainable solutions for water resources management and, as such, is an important input into dialogues with other stakeholders. Social networks should be considered an important component in the quality of life of local people and should be acknowledged and supported when aiming to find socially sustainable solutions to water resources management problems. Most importantly, for example, these networks contribute to survival strategies of households in case of catastrophic events.

There are challenges for Telapak to run ecologically viable projects and to develop social-economic models of people's participation in water resources planning and management that are institutionally feasible in Indonesia. To this end, it will need detailed analyses of basin-related problems, specifically describing the situations and potentials of the area concerned as well as of the actors, organisations and existing management patterns. So in the end Telapak will be better equipped for the three potential areas where it aims to intervene: campaigning; influencing public policy; and strengthening NGOs partners and local water users.



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Concepts

A **Livelihood Analysis** (LA) in general would focus on the well-being of people, their ability to cope with changes (vulnerability), the strategies they have to survive and their income and the way they spent it. For our purposes we also want to be aware of the relation people have with water (or natural resources in general): how important is water for their well-being; what happens when water is scarcely available or contaminated; and what suggestions do they have to improve the situation? Priority will be given to those people that have an intensive relation with water, such as farmers and fishers.

An **Activity Analysis** (AA) would focus on production activities instead of individuals. Such activities in general refer to human activities that produce goods and services in demand by other people or the society in general. Table I gives a few examples of product and non-product outputs from industrial activities as well as of the natural resources used to produce them. For many activities, such as industrial activities, the objective is to make profits dominates, but for other water users such as for public water supply companies or farming, objectives may be less clear and may include both economic and social goals.

The main distinction between LA and AA is that in an activity analysis production processes are considered that are characterized by inputs and outputs and the corresponding costs to produce these outputs, while in a livelihood analysis focus is on the well-being of individual households.

Table I. Examples of goods and services and non-product outputs from industrial activities and of natural resources used

Activity	Goods and services produced (outputs)	Non-product outputs	Natural resources used
Mining	Iron ore Coal Galena Bauxite gold	Deforestation Solid waste and waste water	Land Forest Water
Palm oil plantation	CPO and Palm Kernel from Fresh Fruit Bunches; and Empty Fruit Bunches	Deforestation, solid waste.	Land Forest Water
Sand and gravel mining river bed	Sand, gravel	Turbidity Erosion	Sediments
Rubber factory	Crumb (SIR I-10), synthetic rubber	Waste water Air pollution	Water

In the case of farming the differentiation between a livelihood analysis of a farmer's household and an activity analysis of farming practices might seem confusing but is considered important and should be well understood. Farming is important because farming activities cover more than 50% of the rural areas in Indonesia and are the main water user, while farmers belong to a priority group for many NGOs' attention. The confusion between activity and livelihood analyses might partly be because the products from farming activities are often not brought to the market (as an output of an economic activity) but used for direct consumption (subsistence, and almost as a "family asset"). In such cases the own input of farmers is not felt or considered as a cost and the produced output is not considered to be income.

Another confusion might arise when selecting the critical activities and vulnerable groups (Chapter III) the analyses will be focused on. Irrigated paddy cultivation may be a critical activity as it consumes too much water and pollutes the river, while the involved paddy farmers may be well-off and are not to be considered vulnerable. Or the other way around, seaweed farmers may form a vulnerable group, while the activity itself is not considered critical in the sense of water resources management

The two types of analysis aim to avoid these confusions by sticking to the following approach.

- ◆ An activity analysis of farming activities would focus on crops. Information to be collected refers to the amounts and costs of inputs (such as seed, water, fertilizers) and the crop yield and the corresponding profits from a unit area of 1 ha. The input of labour of the farm owner should be accounted for as a production cost. Such an analysis would show differences in crop production in different areas and under different conditions of, for example, water availability.
- ◆ A livelihood analysis of a farmer's household would – among other things – analyse the income of a farmer's household, which might come from cultivation of different crops on different areas or from other sources outside agricultural activities. Income in kind of agricultural produce from own farms or homestead gardens should be considered income. Such an analysis would show the dependence (and thus vulnerability) of the farmer on farming activities and thus on the access to water.

II.1 Livelihood Analysis Concept in Detail

A LA is an effort to acknowledge the reality of life or **sustainability** of a given community group. The analysis is done at household level, on which people share a common interest and economic resources¹.

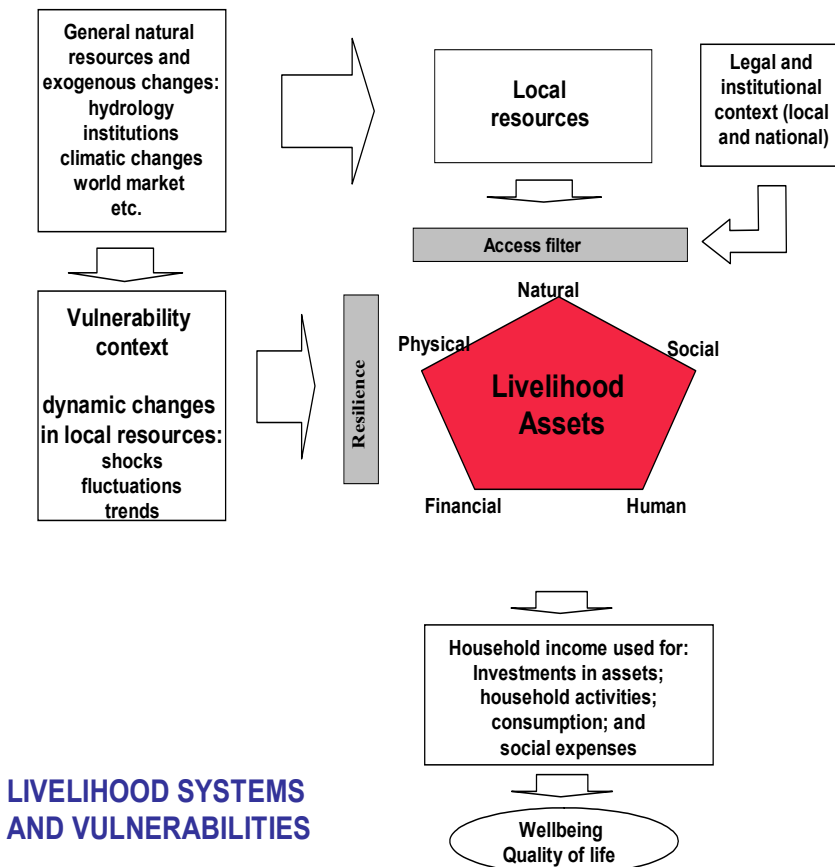
The concept of **sustainable livelihoods** (Figure 1) is based on the following definition. “A *livelihood* comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A *livelihood* is sustainable when it can

¹ The formal definition of a household according to the Central Bureau of Statistics is as follows (BPS, 2010): Households are classified into two types: ordinary and special households.

- a. Ordinary households refer to individuals or a group of individuals living in a part/parts of a physical building/ census or in the whole physical building/census, and share the kitchen. Sharing the kitchen here means that the people take care of their daily needs together. Ordinary households are of several types, among others:
 - Individuals living with their wives and children;
 - Individuals renting a room or parts of a census building and take care of their own meals;
 - Families living in two semi-detached census buildings sharing the kitchen;
 - Those providing board and lodging (for fewer than 10 people);
 - Caretakers of dorms, orphanages, correctional facilities and the like that live alone or live with their children, wife and other family members and take care of their needs separate from the institutions they take care of;
 - Individuals that share a room or parts of a census building but take care of their own meals .
- b. Special households refer to people living in dorms, barracks, orphanages, correctional facilities, who are taken care of by a foundation or institution, as well as groups of 10 people or more paying for board and lodging. Special households are not covered by the National Socioeconomic Census (Susenas).

cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base” (Carney 1998).

Figure 1. Livelihood Systems and Vulnerabilities



This concept recognizes 5 different assets for any household based on which households take their decisions and generate their income: human, natural, financial, physical and social assets (also referred to as “capital”).

- ◆ Human assets refer to the composition of the household and the “software” of its members. Important is their ability to contribute to the work in the household and its income, in particular their education, specific skills and training.
- ◆ Natural assets refer to the natural resources such as land, water, forest, available to the owner, both on his properties and in his immediate environment. Access can be limited, for example, because of local or government regulations, in particular when the resource is not owned.
- ◆ Financial assets relate to savings and access to loans from money lenders or banks. Savings often are not only done in money but also in jewelry.
- ◆ Physical assets refer to not only houses, equipment such as tractors and vehicles, but also to trees or animals suitable for the production of marketable goods (fruit trees, livestock, kerbaus, etc).
- ◆ Social assets or social capital relates to the social network on which households can fall back in case of emergencies or catastrophes. Religious networks and *kumpulans* (gatherings) are good examples.

The outside (exogenous) world of resources (natural, institutional, economic, etc) is characterized by: (i) their dynamics and changes (shocks, variations and trends – see below) that put stress on the household; and (ii) its accessibility as controlled through all kind of institutional or normative arrangements (For example in the case of common resources to which poor people often have no or limited access).

An important concept in this model is the concept of **vulnerability**. This is an important point to be noted when analyzing livelihoods. It relates to people’s capacity to stand strong and/or recover when changes or unexpected events happen. This includes three kind of phenomena: (i) shocks, for example a disaster or death of a family member; (ii) variations such as a hike in the price of basic needs, periodical changes in rainfall and river discharges; and (iii) trends such as gradually progressing deforestation in surrounding forests and climate changes.

Based on this model, a livelihood analysis is an approach to understand how local people perceive their living conditions in terms of well-being and vulnerabilities. This can be approached by trying to find out how secure - insecure poor people feel about the most important aspects of their well-being: their assets (such as health, housing, access to land and water), their income, and their consumption pattern (such as food,



education, and clothing. People should be able to indicate: (i) which insecurity is most important to them; (ii) what are the reasons behind that feeling; (iii) how does this relate to the availability and access to water resources; and (iv) what are possible solutions.

We will thus focus on family level households to get a complete picture of the household's socio-economic conditions and of how they understand the nature of their assets, activities and income and how it is spent or they would like to spend it. The LA should also explicitly pay attention to the problems being faced and how the household expects to improve their economic condition. Their dependency of water is also an important topic to observe and it is of particular interest to understand the household's exit strategy when the water as their main input is missing.

Such a livelihood analysis would enable the development of concrete measures of how the livelihood conditions of poor people can be improved by enabling them to cope with exogenous changes, for example by increasing their assets, by reducing the exogenous vulnerability factors, and/or by increasing the access to the resource base.

II.2 Analysis Activities Concept in Detail

As mentioned, an AA analyses activities that produce goods and services in demand by other people or the society in general. AA refers to many different types of activities, including, farming, fishing, industrial activities, mining and tourism. All these activities have in common that they require inputs in terms of capital, labor, equipment and finances to produce an output while discharging some kind of residuals into the environment. The main purpose of this type of analysis is to identify courses of action that aim to improve both the efficiency and the equity of water allocation. In other words, the information obtained through this kind of analysis would support finding a balance as mentioned in Chapter I among: poverty reduction; a sustainable ecosystem; and economic development.

To this end an activity analysis would focus on: production functions; alternative options for the production of the goods and services; and damage functions that explain the impact on the production functions due to, e.g., shortage of water or poor water quality

- ◆ *Production functions* would focus on the production processes and in particular on the inputs needed (e.g., water, seeds, raw materials) to produce the required output (e.g., rubber, coal, paddy). This would also identify possible residuals produced (e.g., waste water, solid wastes) or unwanted effects of the production (e.g., scouring of river beds, contamination of groundwater aquifers). The last category is usually called: non-product outputs. (See also Table 1).
- ◆ *Alternative options for production*, i.e., identification of possibilities to obtain the same output with a different mix of inputs (including water). This mostly has to do with production technology and practices. For example, old technologies to produce beer might use 25 liters of water for 1 liter of beer, while new technologies only use 6 liter of water. Or farmers might be able to use less water when shifting to different farm management practices. Obviously, focus would be on water or water related inputs.
- ◆ *Damage function*. In this part, we look into the “elasticity” of water users when the input requirements are not met. In terms of water we would try to find out what happens when water supply falls short of the demand (drought), is too abundant (flood) or is of poor quality (contaminated). In the case of farmers, questions may for example refer to what they would do if water supply to their agricultural land/ farms decreases.

Two categories are discussed in more detail: farming and industrial activities.

II.2.1. Farming

There are many activities that are considered as farming such as paddy field in *sawahs*, paddy field on dry land, vegetables gardens, agroforestry for different types of products (durian, *cempedak*, *pete*, *kemiri*, sago, coconuts). In many situations an analysis of farming activities is most relevant. Data to be collected for an activity analysis include at least:

- a description of farm practices: e.g., when to seed, when to transplant, how often fertilizer are used, marketing procedures, etc;
- land ownership and tenure (those of particular interest are sharecropping rules);
- inputs into the crop production process: water, seeds, fertilizers, water buffalos, labour, (quantities and prices);
- yields and prices (farm gate prices);

- non-product outputs (residuals and unwanted effects), such as hay and river bed erosion; and
- marketing and cost (e.g., middlemen).

This information should be collected through interviews with farmers and - most importantly – with governmental extension officers, who in general have well structured actual information on crops and their production technology as well as information on expected changes in the future.

Table 2 below is an example of general structure of a crop production function. This table only includes costs. Information on inputs and outputs of farming activities are conveniently summarized in tables in Appendix 4. More extensive tables will also include quantities and unit prices as shown on Appendix 5.

Table 2. General structure of a crop production function [all per hectare ha]

Crop	Cost per hectare									Total cost per ha	Yield in kg per ha	Gross return per ha	Net benefit farmer per ha
	Seed	Fertilizer	Herbicide/ insecticide	Water Buffalos	Hired labour	Own labour	Equipment	Water	Land				
Crop 1													
Crop 2													
Crop 3													

II.2.2. Industrial Processes

Analyzing industrial activities is difficult, in particular because industries are not very communicative about their production processes. However, through consultation of experts and literature surveys, it is often possible to obtain insight in the essential steps in the production processes, the amount of water they use and the residuals they produce. Appendix 3 gives an example of such a limited AA of a rubber factory in the Air Bengkulu River Basin.

Relevant would also be information on the number of employees and the economic outputs of factories. This would answer the question whether a given factory is of national and/or regional importance.

Another important issue are the licenses. Factories use to function under a set of licenses with different ministries. Getting hold of these licenses is difficult but might be an important step in even more difficult actions towards changing the license conditions (e.g., compensation to local people) or evaluating their implementation.





Fieldwork for Livelihood Analysis

This chapter describes the special character of the field work for LA in Section III.1 and the stages of the field work in Section III.2.

III.1 Special character of the LA field work

Following the concept explained in Chapter II, the field work aims to understand people and to collect quantitative but above all qualitative data. This special character of the field work needs special attention.

Fieldwork is a time to interact with targeted people (respondents) in vulnerable groups through interviews. The questionnaire form consists of a list of questions. It helps the enumerator to keep track on what information needs to be collected. The methodology of the LA uses a **qualitative approach** to collect data and information on social aspects and people's perceptions. It is not a census and statistical analysis including a representative sample selection and fully developed questionnaires, but an approach of rapid appraisals through a series of selective interviews with respondents and sometimes focal group discussions.

As mentioned a LA would focus on rural households while an AA focuses on farming/fishing activities. For reasons of clarity, it is recommended to approach these two separately. Households, for example, can be involved in several income generating activities, which will make it difficult to analyze one activity independent from the family conditions.

LA and AA thus need different approaches. A livelihood analysis digs into the daily life of one family with such questions as: what is their strategy to survive when there is a catastrophe? The enumerators can just choose one, two or whatever number of families as long as they can provide enough data. The selected family(ies) become(s) representative for one specific vulnerable group that the enumerators and team are interested in.

The most common mistakes made during a survey are collecting wrong data and misinterpretation of the data, possibly due to mistakes in choosing the respondents or in setting the number of respondents so the answers do not represent the whole vulnerable group.

Each vulnerable group has a **different way of living**. It is related to the daily activities they do and what perception they have and how they use to make decisions. Rice farmers have a specific relationship with water that distinguishes them from agroforestry groups. Knowledge of a local-specific culture and traditions also make their practices and relationship with water resource different.

There are things that can only be better understood if we make **closer approaches** to the life of the respondents. During a field visit, we must build emotional closeness with the people: to have their trust in us. This will give enumerators the base to collect quality data. In addition, such trust can contribute greatly to the successful implementation of the fieldwork.

The above becomes important as we are outsiders. Not all the members of the community welcome us. Community's characteristics vary with places so does the way they see outsiders. Some community groups are even closed to outsiders. Without their trust and closeness, data collection will be very difficult and the possibility to get wrong data is thus bigger as the respondents might give incorrect information. The respondents may be suspicious about the questions so they give incorrect information or even lie.

In addition to LA as an RRA of several households, more in-depth information on livelihoods could be obtained for a limited number of carefully selected households. Such in-depth information would try to build up a "closeness" that is essential to get insight in households' considerations, concerns and, in particular, "dreams". Such closeness can be built up through participation in their daily life. One possible way is to stay for

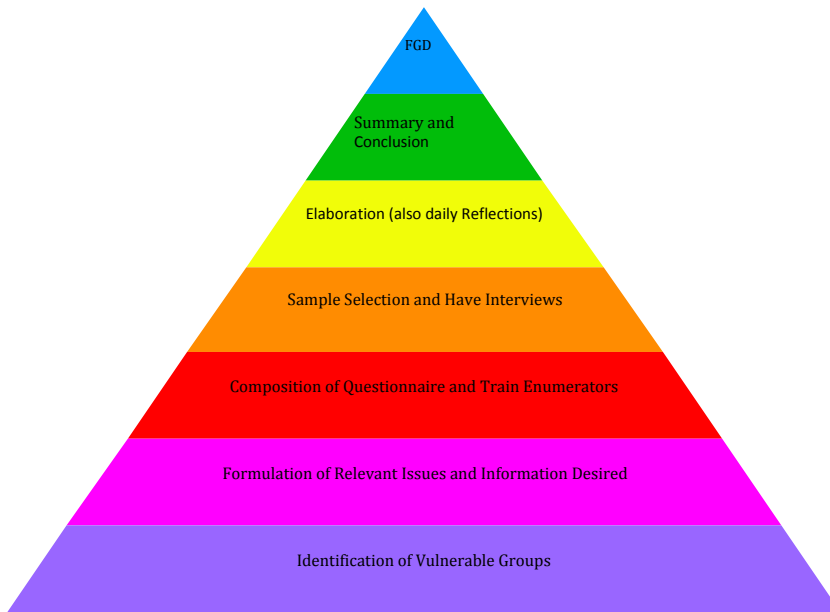
a couple of days with one of the households of the vulnerable group. By doing so, the enumerator can see the real life and feel being part of it. Intensive communication must be built during the stay to grow their trust. With good communication, the enumerator can know each other better. Another way to build up closeness is to participate in the activities of a select respondent for a whole day to see and get a sense of feeling of the production activities, such as participating in a farmer's daily work.

The latter method was once used during the field visit to Srowot Village, Banyumas. Data were collected through participation in a farmer's work during the day and live-in with one of the farmers at night. Communication was built with the family and with the surrounding neighbors. Such communication produced closeness and intimacy among the family members and the enumerators. Further, such closeness and intimacy spread to the surrounding neighbors through the family. This contributed greatly to the data collection as the community then did not feel reluctant to provide the information needed. In addition, participation in the field work helped synchronize the information obtained with the real practices.

III.2. Steps

There are seven steps in a LA survey: identification of vulnerable groups; formulation of relevant issues and information desired; training of enumerator; selecting and interviewing respondents; data collection and processing; drawing conclusions; and possible continuation: check results and then conclude, for example,, through Focal Group Discussions. Figure 2 shows the steps on LA.

Figure 2. Steps Taken On La Fieldwork



III.2.1 Identification of Vulnerable groups

Obviously, LA should not consider all kind of households in a river basin but focus on the so-called vulnerable groups. Vulnerable groups consist of households whose livelihoods are vulnerable because changes in the availability and their access to water will seriously affect their well-being. For example, people may be cut off from their source of water for their agricultural practices which make them vulnerable if there are no alternative sources. Or: people will not be able to cope with changes in the availability of water such as the gradual drying out of streams due to deforestation, the increasing pollution due to upstream mining or annual floods that destroy their harvest.

This section focuses on how we can identify vulnerable groups to be interviewed. The vulnerable groups are usually classified by the majority's livelihoods, such as farmers and fishermen and preferably located in a basin unit representing the upstream, midstream and downstream areas, for example: paddy farmers in the middle basin on the left bank;

fishers in the downstream area; dry land farmers in the upstream part of the basin. In this way livelihoods can be easily related to the typical ecological and hydrological conditions of different parts of a river basin.

In general, the closer to the upstream, the simpler (the more homogeneous) the vulnerable groups are; the farther from the upstream, the more diverse the vulnerable groups are. Upstream communities generally have the relatively same livelihood: farming. Water greatly influences the farming system. Mid- and downstream communities have more complex livelihoods and dependency on water resources, for example agriculture, fishery, industry, households and other uses.

The selection of vulnerable groups requires knowledge of the socio-economic conditions of the people and their interrelation with different sources of water. It also requires knowledge of the availability of water and the possible limitations to have access to different sources of water for different social groups. In general, such knowledge is available with NGOs with experience in a certain area. Based on their experience, a first selection should be made that should be considered flexible and, if needed, can be adapted after receiving more information through the interviews.

The vulnerable groups in Karya Sari Village and Tapos Village (upstream Cisadane Basin, West Java), Melung Village (upstream Serayu Basin, Central Java), and Srowot Village (middle of Serayu Basin, Central Java) were determined by the kind of species planted and the planting activities. They are paddy farmers, vegetable farmers, ornamental plant cultivators, mixed garden farmers/ agroforestry farmers, fish breeders, and villa owners. In Srowot Village (middle of Serayu Basin, Central Java), the livelihoods and lifestyle are relatively homogeneous. Together, they cultivate paddy and palawija in specific seasons. On the wet season everybody grows paddy on their *sawah* while on the dry season they shift to *palawija/intercropping* (mostly peanuts)².

III.2.2. Formulation of relevant issues and information required

After the vulnerable group is selected, the required information/data is identified. The information requirements must be adjusted to the issues that arise. The information will become material for the subsequent problem analyses. Issues that arises in an area could vary, depending on the area itself. For example, there is a drought issue in one

2 Srowot Village and some other villages in Kali Bagor District, are among the main sources of peanuts in Central Java.

area, a flood issue in another and a groundwater issue in still another. But all these issues basically deal with the interaction between the vulnerable group and the water resources.

In addition to the data on the assets, income, expenses, etc of the household of a vulnerable group, we need information on the sources of water they use and how they are affected by floods and droughts. Of special interest is the availability and access to these sources and factors that affect the availability and the access, such as government regulations, other water users, droughts, contamination, etc

III.2.3. Composition of Questionnaires and Training of enumerators

Questionnaires are used to guide the interviews. They contain a set of questions that aim to make sure that no information is missed. Questionnaires are certainly not meant to structure rigid interrogations but are meant to lead to open discussions. When important information is missed while in the field, it tends to be more difficult to be completed later.

The set of questions in a questionnaire must lead to the issues that are chosen. The questions are mainly open questions with free answers. Questions that are not included in a questionnaire can also be asked to complete the information as long as they are relevant.

An example of a questionnaire that has been developed and used during the CDP is included in Appendix I. This questionnaire is not a recipe but could be considered as a guide to compose specific questionnaires for special purposes.

An interview can be done by several people at one time in a defined area. People that have a task to interview (enumerator) must have the ability to collect data correctly. To make sure of that, the enumerators must have some training. LA training should emphasize open approaches.

There are three steps of training: first, office training where all aspects of the guide is presented and discussed; second, field training where project leaders as the mentor of 3 – 5 enumerators conduct interviews while enumerators listen and make notes; and third, field training where project leaders observe enumerators conducting interviews. After these are discussions and comments.

The office training for beginner enumerators can be done by interview simulation under guidance of the mentor. This training is to make sure that enumerators really understand and comprehend what has to be done and what must be obtained from the survey they will be conducting. Besides, it will also train the skill of enumerator to use the questionnaire's guideline.

Enumerators can be trained to develop a live discussion based on the questionnaire. The qualitative data cover most aspects of people's life and it is not so easy to separate one topic from another. It is important that enumerators understand the LA concept comprehensively.

This ability must also be supported by the skill to mingle with local people. As it has been explained before, an important factor in the success of a field activity is the trust of the community. Enumerators must give a good impression and should be accepted by the target people. It can start by introduce yourself and explain the purpose of the interview, then always ask whether the respondent also has questions.

Enumerators that conduct interviews could come from local people, in compliance with the conditions that have been mentioned before. For example, several young local people can be asked to participate in this activity. Such enumerators have advantage of getting information without much barrier in communication and also better understanding people's characteristics.

III.2.4. Sample Selections and Interviews

Within the selected vulnerable group, a selection has to be made on the number of and which households will be interviewed. This depends: on the time and other resources available. It also depends on enumerators and the team's knowledge of the composition of the community. It might be interesting, for example, to interview people that have recently sunk into poverty or got out of poverty.

Interviews must be done to the chosen respondent that represents the vulnerable group that has been selected. The number of respondents must be carefully calculated so that they really represent the group. Selection is usually done randomly but, where possible use should be made of local knowledge of the vulnerable groups, e.g., by consulting the village head or village elderly people. In a LA in the Air Bengkulu Basin, YUB's team visited *Ketua RT* (head of a neighborhood unit) or *Tokoh Masyarakat* (community figures) to get an overview of a selected vulnerable group.

Interviews are conducted by trained enumerators first, while juniors may follow-up. Some enumerators can be dispersed in several locations at the same time; this is more time-and cost-effective and efficient in a relatively large area with a high number of respondents.

It is important to explain the purpose of the interviews and introduce ourselves in the beginning of the process.

Questionnaires serve as a guide to data collection. Some drawbacks make the interview stiffer than desired because attention has to be divided between talking and writing. Besides, it often happens that the questions are already answered before being asked. Respondents usually prefer talking freely above being asked one by one.

Besides questionnaires, notes containing some key points can be used to help the interview process. The notes can be freely developed during the interview.

It is suggested that two enumerators conduct an interview. One asks questions while the other takes notes. Recorders are not recommended as they will give a different impression to the farmers.

For cross check the result, it can be done by talk with the spouse and children or the other members of the household. It is better to have separate interviews between woman and man. Wives usually have different perspectives, making data collection more rich. Children or relatives that stay in different cities could also add more information. When there are conflicting opinions, we can dig more information from literature study or discuss them with an expert.

Earnings and income are sensitive issues in most interviews. It usually has to be avoided to ask details about respondent's income. A better way is often to ask about expenses and costs of living and ask how respondents cover those costs. In this way an income picture may slowly emerge.

III.2.5. Elaboration (also daily reflections)

After the interview, data are collected and explanations of the collected data are made. The explanations must be as detailed as possible so they can cover all the data expected as ideally on the concept of chapter II. All the data collected are gathered systematically. This is important because untidy and unsystematic data can only be confusing and are often meaningless because they are not understood. For example, we make data on five

assets of household as detailed as possible. The point is putting the collected data in order so they can be analyzed further when needed.

It is better to collect data, clean up data and write a report in one day. Collecting data in the morning and elaborating them in the afternoon will help if the data are explained to a third person. Going back to the people for verification should be done immediately and not at the end of the field work.

Misinterpretation of the data is due to inappropriate analysis of the data, commonly due to lack of knowledge of the conditions of the respondents. One example is data on farmers' income; we may think that a farmer's income is very low, leading to a conclusion that the farmer's life must be very difficult due to lack of cash. After re-checking, we soon find out that the farmer's life is OK, and even more than enough as they do not need cash to fulfill all of the basic needs, which are fulfilled from his agricultural land.

To help the completeness of the data, daily reflections look into everything that has happened, felt and seen by each enumerator. The use of daily reflections is to help complete important information that can not be included in the questionnaires but that can help when writing the report.

III.2.6. Summary and Interpretation

After data are collected and elaborated, a summary is made. The summary contains all the things that are considered important in relation to the chosen issue. The summary must include an overview of the interviews, with the dates, names of the respondents, the enumerators, etc. A summary must be prepared carefully and be clever in seeing problems. The summary must briefly but clearly give the general description of the data that have been collected. The summary must be able to help to draw conclusions.

Many times we do not need to do complex analysis. Just by providing clear tables, readers can self-analyze in their own interest.

Conclusions are drawn based on the pre-determined objective and the results of the survey in the field. For example, our objective is to find out how much the farmer's income is, so the summary must cover the amount of the income.

III.2.7. FGD; Possible continuation (check results and conclude)

After gathering data from the field, the activity should not just end. Data collection must be continued and carried on. We can cross check those household interviews by having a Focus Group Discussion (FGD)³. FGDs serve mainly to check representativeness. Conclusions (without names) are presented before the group as a whole.

3 FGD is a discussion conducted in one group to discuss something that has been defined with a help from a facilitator to direct the discussion.

IV

Fieldwork for Analysis Activities

As can be understood from the concepts in Chapter II, AA fieldwork needs an approach that is different from that of an LA, which -- as presented in the previous chapter -- can be considered a standard approach for different types of households. In contrast, an AA will differ substantially for the many different kinds of activities that use water such as: farming; open water fishing; fish cultivation; palm oil plantations; rubber factories; coal mining; water treatment for public water supply; shipping; and ecotourism. Partly because of this reason (and partly because of lack of time and resources), this chapter on AA fieldwork will mainly focus on farming in its description of steps in Section IV.2. As an illustration of different AAs, an example will be given of a limited AA of a rubber factory in the Air Bengkulu River Basin.

Other important differences between LA and AA are that an AA deals more with quantitative data (see under IV.1) than a LA and that sources of information generally differ substantially. For example, instead of talking to individual farmers, an AA could obtain its main field information from FGDs while important information may also be available through governmental extension offices and as secondary information.

IV.1. Special characterS of AA field work

As mentioned, AA is a more quantitative approach than LA as it refers to concrete production processes with concrete numbers for inputs, outputs and costs. This requires

special attention and analytical capacities of enumerators as quantitative data should be thoroughly checked in terms of accuracy and consistency. Reports with erroneous and/or inconsistent data tend to be quickly disregarded and forgotten.

Another important aspect of quantitative information is that it has to be properly referenced, i.e., that the source of the information is known and the original information can be retrieved when needed.

Data from different sources often are inconsistent and it is an important task of an AA to find out which data are most reliable. This requires, for example, a continuous awareness of the meaning of numbers and an early detection of inconsistencies. When inconsistencies cannot be solved, they should be properly documented to be solved later or by others.

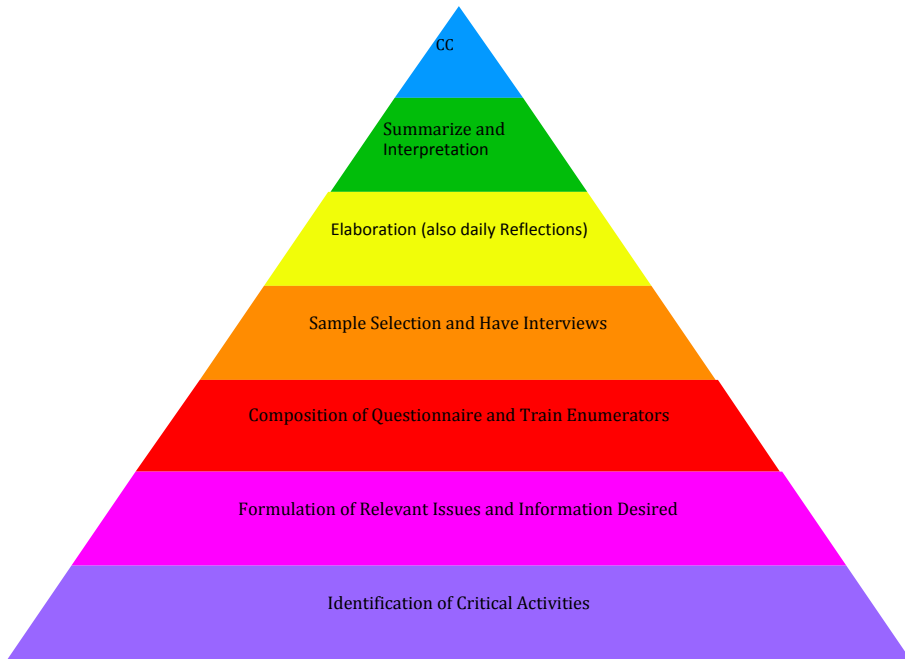
As mentioned, there are basically three sources of information:

- ◆ primary information obtained through field interviews;
- ◆ information from experts such as agricultural extension officers ; and
- ◆ secondary information from publications (e.g., statistical yearbooks) and other reports and literature.

IV.2. Steps

There are several steps in AA surveys that are similar to those in LAs. These steps are: identification of critical activities; formulation of relevant issues and information desired; composition of questionnaire and train enumerators; sample selection and have interviews; elaboration (also daily reflections); summarize and interpretation conclude; and cross check.

Figure 3. Steps Taken on AA Fieldwork.



IV.2. 1. Identification of Critical Activities

There are two reasons to consider an activity as critical. First is (i) its impact on the water resources in terms of quantity (for example when an extraction takes most of the water in the river during the dry season) and quality (for example when waste discharge make the river unsuitable for other users). The other things is (ii) the impact from the water resource on the production process, also in terms of quantity (e.g., floods and droughts) and quality (e.g., salinization of the river and contaminated waters). Both in the Lamasi and Bengkulu Basins we considered both reasons by identifying industries and mining as well as paddy and sea weed farming as critical activities.

The information of many critical activities can find easily on local newspapers, governmental offices reports, experts and university research centers, and social and environmental observers. The enumerators can also check websites of many industries

that allocate along the river. The web could be a place to see what is going on in a given basin, such as the main products from the area (e.g., mining, rubber, palm oil) and what factories may pollute the river.

IV.2.2. relevant issues Formulation and Requirement information

In AA studies, the data needed are all the production aspects of a certain activity, including physical or non-physical capital, production process, results (whether a product or waste), marketing/uses and other aspects that are related to producing a product. As mentioned, these aspects mean different things for different activities and lead to different issues for different kinds of activities. Two categories of activities are discussed on this guide: farming and industrial activities (See II.2. Analysis Activities Concept in Detail). The example is available on Appendix 4 and 5.

IV.2.3. Composition of Questionnaires and Training of enumerators

On the training season there are some points that need attention, regarding the questionnaire and the way interviews are conducted. There are many terms in this guide that enumerators should be able to translate in the language that is understood by farmers, industrial companies, etc.

Composing a questionnaire is an important part of AA. It is different from LA, whose questionnaires are quite standardized – we can use the standard questionnaire on Appendix 1 to collect data, and the emphasize is to train enumerators to command the questionnaire. In the case of AA, the questionnaire relates to the type of activities that we choose: the production processes in farming and a rubber factory are different. We should be able to develop questionnaires with additional data from experts and desk studies. In this guide we attach in Appendix 2 an example of a questionnaire for farming activities.

The table in the questionnaire (Appendix 2) is important for enumerators to collect data in the field. This relates to the type of data that has to be collected, which are mostly numbers. The table can help to arrange the data neatly for easier collection.

IV.2.4. Sample Selections and interviews

Choosing samples is a bit different from the one in LA. It is true that the enumerator and team have to choose one factory from the three mining factories operating on

the basin. The decision depends on the interest of the NGOs who will run the AA. But usually it depends on the most environmentally destructive practices or social activities that harm the local people or the water resources.

For farming the purpose of the interview is to get general data on farming rather than on farmer's performance. This can be obtained through a discussion with a group of farmers. It can be done in small FGDs when they are working on the fields. Informal situations could help the farmers to tell about their production processes. From our experiences, the farmer loves to tell all the details of their activities. Many times they tell a process not in a structured way. But it can always be crosschecked later.

Interviewing industrial companies is a bit different. They are usually closed for outsiders and reluctant to open themselves and tell about their production. This relates to the fear that interviewers might give the information to tax offices or competitors.

IV.2.5. Elaboration (also daily reflections)

It is important to write down the result of an interview on a new clean sheet right after the interview. There is always a danger that the information is unclear and questions cannot be answered anymore when we do not follow-up the data collection immediately. The enumerator forget details or miss some cross check. The golden rule should be: ***interview in the morning and elaborate in the afternoon.***

All the data that have been collected should be arranged systematically. This is important because untidy and unsystematic data can only be confusing and are often considered meaningless because they are not understood.

To help the completeness of the data, daily reflections look into important information that can not be included in the questionnaire but that can help when writing the report.

IV.2.6. Summary and interpretation

After data are collected, a summary is made. The summary contains all the things that are considered important in relation to the chosen issue. The summary must be made carefully and be clever in seeing problems. The summary must be brief but should clearly give the general description of the data that have been collected.

IV.2.7. Possible continuation (check results through Cross Checks and then conclude)

This AA focus on **farming activities**. The activity analysis preferably does not end after summarizing and interpreting the collected data. There are several ways to improve the representativeness of the summary and the interpretations.

In the case of a farming activity analysis, the results can be checked in a FGD among farmers from, for example, the same irrigation area. Such an FGD can be conducted in small group of 5 to 10 people or in bigger groups that present most of the society member. This FGD could also discuss relevant issues related to the development of the activity such as new technology or changing cropping patterns.

A FGD can be useful to maintain the communication with society and also to correct the results from the interviews. This correction can be done by discussing the results that have been obtained before and crosschecking them with the opinion of the focus group. It is possible that the results of the interviews and the conclusions drawn do not really match with the perceptions of the focus group. In this way FGDs can become an important input in drawing final conclusions. Having several FGDs will produce more accurate conclusions and develop better closeness to the farming activities.

Also in the case of farming, the results can be crosschecked with agricultural extension offices. These offices maintain information (including statistical information) related to, for example, cropping patterns, yields, and farm management practices within a specific area.

As for the data and information on industries, we can crosscheck them with experts. Many lecturers in universities have access to different types of research, for example related to rubber factories or oil palm plantations. Further elaboration is always welcome to complete the report.

V

Reporting field work

The enumerators write a field report that contains the results of a LA or an AA right after the field work. Postponing writing the report will damage the results since a lot of detailed information could be forgotten. This field report is not meant to be a report with conclusions and recommendations but above all is a documentation of field data that we can use for other purposes. This report is also important to become materials for making further intervention. What kind of NA activities that we could conduct will get a great help from this report.

Such reports should at least include:

- context and purpose of the interviews;
- when done and by whom;
- used questionnaires;
- people interviewed;
- findings of the interviews and recommendations for possible improvements; and
- summary of the results, for example, table of inputs in agricultural activities.

We aim to provide the reader with the complete picture that the enumerator felt and saw in the field. It is important to write the real facts without making exaggerations or lessening the discussion.

The data must be accurate and consistent. The report writing must be systematic and should use clear and formal language and also avoid ambiguity to avoid wrong impression or misunderstanding. This should of course really be avoided because it could give a bad impact, especially when it is used as a base for making important decisions concerning a lot of people.

The outline of LA and AA reports is simple. There is no need to write complicated report but just to present the result as it is. A typical outline is given in the box.

BOX with example of an outline of a field report

I INTRODUCTION

2 LIVELIHOOD ANALYSIS

- a. Selection of critical social groups
- b. Data collection methods
- c. Livelihood analysis results
 - i. Upstream agroforestry farmers
 - ii. Fresh water shrimp fishermen in the downstream region
 - iii. Downstream seaweed farmers
 - iv. Etc

3 ACTIVITY ANALYSIS

- a. Selection of critical activities
- b. Data collection methods
- c. Activity analysis results
 - i. Agroforestry in the upstream region
 - ii. Government irrigated paddy farming in the middle region
 - iii. Etc
 1. Production processes
 2. Obstacles and threats
 3. Potentials

4 DISCUSSION OF RESULTS

5 FINDINGS AND SUGGESTIONS

REFERENCES

Appendix 1: Questionnaire and data Collection Guidelines for Livelihood Analysis

Appendix 2: Questionnaire and data Collection Guidelines for Activity Analysis

Appendix 3 Table of overview of interviews held

The introduction in Chapter I contains the background and objectives of the project. The objective must be clear and refer to the local problems. After the objective, general description of the project is given and its location is explained. The introduction should also explain when the fieldwork was done, by whom and when. General description that has been explained is especially the one related to water resources and their uses in the area.

After the introduction, two subsequent chapters may refer to LA and AA separately. These chapters describe in detail: the selection of vulnerable groups or critical activities and their location; the methodology adopted in the data collection and processing; and the results of the data processing for each of the vulnerable groups or critical activities interviewed.

In two additional chapters, the fieldwork is discussed and the findings and possible findings and recommendations are given. The discussion, for example, could refer to the first interpretation of the results and observations on their validity and representativeness. A tentative analysis can be done on the data collection effort itself, for example: (i) summarizing the field data (overview tables, concluding on, e.g., yields and prices); and (ii) reflecting the interview and data collection methods. The findings and the recommendations finally should be limited to experiences with the fieldwork and should NOT enter into a kind of problem analysis for water resources management in the basin.

Two more things are essential for the reporting:

- ◆ maps that show the location of the interviews and all the other locations referred to in the report; and
- ◆ references of all the external sources used in the field work, and their interpretation.

Photographs of activities and household conditions are of course most welcome as illustration of the report.

While V.1. and V.2. give an example of the outlines of LA and AA field reports of the Air Bengkulu Basin and the Lamasi Basin. Each begins with selection of critical activities (chapter I); Data collection methods (chapter II); and Results (chapter III). More detail explanation is given in the sub-chapter below.

V.1. Livelihood Analysis Report

As mentioned earlier, the outline of LA reports is simply: the selection of vulnerable groups; the data collection method; and the livelihood analysis results.

The discussion on how we select vulnerable groups and how we choose samples should be written clearly. Each basin, which of course has different problems, will require different approaches on identifying the groups.

It takes ability of imagination and creativity to form the complete picture of livelihood conditions and perceptions from the targeted vulnerable group. Data that have been collected are pieces of information must be put in order carefully to make the story intact and interesting and easy to be understood by readers.

It is important to write down how the interviews are done. Even though there is a general guide the real situation might be different and needs creativity to use opportunity and maneuvering. A description of the methods will provide the justification of the results. This relates, for example to the time of interviews. Having interview of farmer at the night after praying time is better than on a day when they are busy on the field. Having separately interview between woman and man can be expected to have better information.

Interviews are conducted by giving open questions based on the LA guideline. For each critical group, several families that are chosen as sample are interviewed. The field data from the interviews are then written as materials for the field report. Each household reports differently in separate sub-chapters, but we can write the summary of the living conditions at the end as conclusions.

V.2. Activity Analysis Report

As mentioned earlier the outline of an AA report is simply: the selection of critical activities; the data collection method; and the activity analysis results.

Analysis on the data must be made as accurate as possible. For example, counting production costs and the income of a farmer in harvest time must be as accurate as possible. The skill to convert many data is needed so that we could get value in comparable amounts (rupiah). Mistakes in conversion will lead to wrong calculations, which is very risky because it can lead to wrong conclusions.

The results of an AA are presented for each critical activity. Each sub-chapter that contains one economic activity elaborates points of production aspects, barriers/damages, and alternative steps differently from other activities.

Sufficient time should be allocated to write the report, including cleaning up the first data from the field, crosschecking with other sources and writing a summary.



VI

Key Issues

This chapter gives a brief overview of the results of LA and AA try-outs that have been done in the context of the CDP in the Lamasi Basin (Kahman H., R. Mustikasari, 2011a) and the Air Bengkulu River Basin (Andriansyah O. dan Mustikasari R., 2011a).

There has been a lack of understanding and proper handling of the differences between LA and AA: the questionnaires used for the the vulnerable group and for the critical activities were confusing for the enumerators. The LA and AA are well understood but got mixed up because the same farmers were interviewed for the LA and AA at the same time. *Recommendation:* the LA and AA shall be conducted by different enumerators interviewing different respondents.

No training is conducted to improve interview techniques (experienced interviewers). It is critical step for field working to clean up field questionnaire and making it accessible for project leader. *Recommendation:* If an interview is conducted in the morning, conduct writing/verification/ presentation/discussion in the afternoon. Never put data on the shelves. The project leader must give more instruction to the enumerator before and after interview and during data writing. The second is, training for enumerators.

Recommendation on training is preferably done in three steps;

- Office training, introducing the questionnaire, understanding the concept and the guide comprehensively, the background of the cultural aspects of local people (LA), news value of critical activities (AA).
- Field Training conducted in two stages. First, instructor in an active role while enumerators observe and make notes, followed by discussions on the exercise.

The project leader / instructor conducts interview, enumerator listens and makes notes. Second, project leader is the observer, enumerators conducts the interview and discussion about the process. A discussion is conducted and comments are made after each stage.

LA and AA on farming or fishing are be done by different teams and with different respondents. It is suggested to collect data in the morning elaborate in the afternoon. It helps if explained to a third person. It is better two people to have interviews. One asks questions while the other takes notes. No recorder used in the interviews.

Using open questionnaires shall help interviewers to better interact with the people, who sometimes do not want to give information. Interviewers sometimes have difficulty taking notes during the interview and different stories would emerge from the same interview. *Recommendations:* use two interviewers during each of the interviews; elaborate interviews on the same day involving two people and submit and discuss the results with the leader; and devise group discussions in which the results of the interviews conducted in one community are presented and discussed.

References

Andriansyah O. dan Mustikasari R., 2011a. Case Description of the Air Bengkulu River Basin. Telapak. Bogor.

Andriansyah O. dan Mustikasari R., 2011b. Potret Masyarakat dan Aktivasnya di DAS Air Bengkulu. YUB. Bengkulu.

BPS, 2010. Statistik Indonesia 2010. Badan Pusat Statistik Republik Indonesia. Jakarta.

Carney D., 1998. Sustainable Rural Livelihoods DFID, London.

PT Bukit Angkasa Makmur, 1997. Laporan Produksi PT Bukit Angkasa Makmur. Bengkulu. (not published)

Kahman H., R. Mustikasari, 2011a. Field Report on Testing the Livelihood and Activity Analyses in the Lamasi River Basin. Telapak. Bogor.

Kahman H., R. Mustikasari, 2011b. Problem Analyses of the Lamasi River Basin. Telapak. Bogor.

Appendices

Appendix I. Livelihood Analysis' (LA) questionnaire

Livelihood analysis is the analysis to identify realities of a certain community. This analysis is conducted at the family level, to obtain a comprehensive description of the social economic condition as well as perspectives of families, on the income, economic assets, current problems, as well as hopes and alternative ways that families can take to improve their economic condition.

Virtual but definite. Livelihood strategy is a matter that may seem out there (virtual), but is actually able to be defined. To do so, a little imagination is needed to collect the necessary information.

We want to describe how the local community evaluates themselves in various principles. For example, do they believe that they are wealthy or prosperous enough, or poor and needy; and how do they feel of their current lives in their own views; do they feel that they are making enough for a living; or do they feel like their home is suitable to inhabit.

Write the name of the family or respondent. For example: Ibu Siti's family, of Ilan Batu Village, interviewed on 7/5/09.

There are five aspects that create the basis of livelihood strategy. The following explains each of the five aspects, with sub-chapters to further describe them.

I. Assets/Capital: Inventory/Description Of Assets

Assets⁴ or capital owned by a family. There are five types of assets that support the function of a family (household).

The five aspects below must be taken into consideration along with available external resources. For example, does the family have access to increase their living conditions through trainings or formal education, or financial access for housing (physical access). In addition, does the family receive help from their extended family or acquaintances (social safety belt) during hardships?

4 Asset: Does not always refer to goods that are sold. Generally refers to aspects needed by a family to survive. The information that we can collect on assets will provide a description of a family's livelihood. The presence of all five types of assets/capital is crucial.

Human assets

(Composition, education, training, capability to migrate)

Humans are seen as assets to a family. Record the number of members to a household. Record as comprehensively as possible, including the sex and age of the persons.

Educational background, whether formal or informal that is currently taken or have been completed. How many people have graduated from elementary, middle, or high school, etc. Who has completed PKK (Family Welfare Program), Posyandu (Community Service Center), or agricultural trainings, etc. Tables can be useful to record the data.

Is there a possibility of families or family members to migrate to another area? For example, because they have a relative living in Malaysia, one may want to find work abroad after graduating from school. Or, one may move to another village because of recurring floods.

The following is an example of data on human assets collected during a training session in the Lamasi River Basin. There is a family which consists of five members (a mother living with her four daughters). Two of her daughters have completed high school while the other two work in a textile factory in Bandung.

Natural resources owned

(Land, ponds, trees; access to water)

Every family owns a form of natural resource, including rice field, garden, or rubber trees. The access to water is also included as a natural resource asset. For example, the location of a home from a river so that the family can obtain river water for bathing and cooking/drinking.

The following is an example of data on natural resources collected during a training session in the Lamasi River Basin. There is no additional land other than that covered by the house of $\frac{1}{4}$ hectares. The garden is planted with corn. Corn is harvested three times a year. Water for daily needs is obtained from a well owned by the family. The well is located in the backyard, and access is easy. The quality of the river water is good, so that the family does not need to buy drinking water.

Financial Asset

(Employment and income, savings, access to the bank, cost of living, seasonality)

The following is an example of data on financial asset that collected during a training session in the Lamasi River Basin. Family obtain livelihood as a vegetable vendor (vegetable is sometimes bought from farmers and some harvested from own garden). Weekly transport is three times which costs IDR 14,000 for a round trip. When there is a flooding and there is nothing to harvest, they will loan some money from the middleman. The payment cuts off from their next harvest.

Physical assets/equipment

(Tools, animals)

Every home has a physical asset. This may be a house, livestock, tractor, car or motorcycle, etc. The physical equipment may be used by the family for production purposes and to obtain their livelihood. Who uses the motorcycle/tractor, and how are those equipments maintained? Are any of the equipments rented out for additional income?

Record whether the house is owned or rented by the family, and if the parents still live with the family.

Social assets

(Networks (formal/informal), safety nets; access to government institutions and public utilities)

Social assets refer to a family's network. This network may formal as well as informal. For example, in the possibility of a disaster, or death of the head of household, does the family have life insurance? Can relatives or neighbors help out so that this family is able to survive? Explain if the family has access to a bank or other economic agencies such as coop or credit union.

The following is an example of data on social assets collected during a training session

in the Lamasi River Basin. The house originally belonged to the husband. After he passed away, the house was inherited by the wife. The back part of the house is given to one of the children, and the mother lives in the front part of the home.

One of the children of the family works and lives in Bandung, and that child invited a sibling to come work in Bandung. Another child is works as a teacher and lives in Palopo.

2. Activities/Strategies

Every family has a strategy or choice of activities to be able to make a living that is different from other families.

The following is an example of a family's strategy to make a living that was collected during a training session in the Lamasi River Basin. 'Those that do not own land to farm work outside the village (in Kalimantan, Irian, or Java). Previously, the family had a cocoa plantation in their yard, but became unproductive since 2000 (due to frequent floods and pests). After the cocoa became unproductive, the family plants corn to increase their income'.

3. Income And Utilization

Income is amount of money that a family makes to live, pay bills such as electricity, children's school, and to buy food/drinks, etc. Income can be money or products, such as corn, rice, or cocoa. Patterns of income may be different, such as monthly for bank employees, or every six months after harvest for rice farmers.

Priority. Record the main form of income. For example, if the main income is from rice harvest, followed by corn and other crops. Is there a main expenditure of the family, such as for food or other spending? How much is the percentage?

The following is an example of a family's strategy to make a living that was collected during a training session in the Lamasi River Basin. The main income is through planting corn and selling vegetables. The income obtained from selling corn and vegetables is used to buy food as well as transportation to the market.

4. Security

(Related to the main components of wellbeing: income, food, health, water, and housing)

Aspect of security refers to the threats that are perceived to be able to disturb a family's life. This is closely related to factors such as income, food sources, health, access to clean water, and housing.

Perceived importance/vulnerability and resilience

Vulnerability and resilience. What is the vulnerable point of someone's life, and is there a part of that life that is important and must be defended? What are the threats? What are the vulnerabilities of that important factor? If security has been disturbed, this factor may become fragile and in turn vulnerable to other threats.

Resilience is a family's ability to survive. For example, in a case of flood that destroys their home, is the family able to recover and eventually return to their normal activities? How much time is needed, and what are the actions and methods taken to recover? How strong is the family in surviving natural disasters?

Dependence on water resources

Every person needs water to live. Record the relationship of the respondent with water resources. If he is a farmer, his dependence on water will be different than that of a banker. Does the farmer need the water strictly for a tool of his trade, or is he dependent on the water for his daily needs? A rice farmer utilizes water differently compared to a rubber/cocoa farmer.

Dependence on water is largely quantitative information. Questions include, how much water does a person use, and how often? A farmer needs more water than a banker does. Record how much water a respondent needs, as well as additional information to illustrate the respondent's dependence on water.

Causes/reasons behind perceived vulnerability, obstacles to pass

For every problem, there is a solution. Every person sees a problem in a different light compared to the next person. This also happens for the way one perceives the problem's solution. Record the factors that cause a problem for the respondents, and the solutions according to the respective respondent. Note whether the solutions are possible or unlikely to be carried out, and the reasons why.

5. Hopes And Obstacles, Including Those Of Institutional Issues.

Every human has hopes as well as obstacles, regardless whether those hopes are achievable or not. The information that we want to collect is the perception of the respondent. For example, there is nothing wrong if a respondent wants to be a successful businessman like Bob Sadino. However, we need to clarify the respondent's reasons for having such hopes, including the respondent's doubts, fears, and concerns when achieving that goal (obstacles).

Obstacles can be grouped based on its sources. Obstacles may be internal, or those that come from within the respondent, or obstacles may be external. In general, it is easier to identify external obstacles. For example, a farmer who wants to be a successful businessman may say that his setback includes lack of capital. Enquire more as to how he cannot obtain the necessary capital. If he perceives that it is due to lack of access to banks or other financial institutions, find out why that is the case. What was the bank's reason to refuse the farmer's request?

Does the farmer perceive that he can overcome the obstacles? Record the respondent's views of the solutions and the possibilities of that solution.

The following are examples of hopes and goals. This data was collected from a family who regularly experience flooding. The family hopes for electricity, financial aid from the government to start a business, as well as drainage and dam repairs.

6. Tables Livelihood Analysis

Name of Respondents :

Adress :

Tabel I. Compilation of LA Aspects

Assets					Activities/ Capabilities/ Resilience	Strategies Of Livelihood		
Natural	Physical	Human	Financial	Social		Obstacles	Strategies	Hopes

Tabel 2. Asset Natural

No	Description	Unit	Note
I	Palm oil	1000 plants	400 plants is on 5 month 600 plants has produced for 5 years

Tabel 3. Asset Physical

No	Description	Unit	Note

Tabel 4. Asset Human

No	Name	Type of relative	Age	Background education/ occupation	Note

Tabel 5. Asset Financial

No	Description	Unit	Note

Tabel 6. Asset Social

No	Description	Unit	Note

Tabel 7. Activities/Capabilities/Resilience

No	Uraian	Note

Table 8. Strategies Of Livelihood

Obstacles	Strategy	Hope

Appendix 2. Activity Analysis Questionnaire for Farming

Activity Analysis of the farming is the study of the production processes occurring in a certain area. This analysis is conducted to collect a description of the production activities starting from preparing land, seed, maintenance the land from pest, harvesting and marketing the yield. It is also important to see how the magnitude of each step to the water.

The questionnaire below focuses on farming as it is our main interest as NGOs which try to implement the Negotiated Approach in the local water users. Farming is often considered a critical activity since it is a main water user and has major social implications. Its dependency on water, notably the amount of water used, depends on the type of farming. There are many different farming activities, such as: lowland paddy/irrigated farming, non-irrigated farming, vegetable/secondary crops/intercropping, garden.

Data collection is collected from several farmers/fishermen/other respondents that has been identified as vulnerable groups, other respondents in each identified site such as head of village, extension officer (PPL), university research center, etc. Information from the farmers should be collected in an informal manner, such as an informal discussion in a paddy field. For crosschecking, we can hold an FGD after completing the questionnaire or visit an extension office to collect secondary data.

The questionnaire below are grouped under the three main points as issues in the AA, i.e. production function, damage function, and alternative actions. The last part focus on the water and its relevance.

I. Production Function

Production function covers data on the input and output from farmers to run their agricultural processes; the agricultural products produced (outputs); the necessary input to produce that outputs and the applied agricultural practices. The questions that we need to answer include land, capital and other input needs, and step activities from preparing seeds to harvest and marketing.

Farm Production Process:

- ◆ What is the main farming product?
- ◆ Explain each step of the farming activities that covers from seedling, planting,

harvesting to marketing. Production process cycles vary with location and farmer as well.

- ◆ Explore the production processes; such as how farmers plow rice fields, prepare seeds, plant, and do other processes to post-harvest.
- ◆ Write down the month and season.

Land ownership and tenure:

Especially in agricultural production, land is the main capital for production. Inquire about the area, land ownership, and other things. Several key questions that may help to collect land information include the following.

- ◆ **Land area:** What is the area of the land cultivated for agriculture?
- ◆ **Land ownership:** Who owns the land? Is it privately owned, or does it belong to someone else? If it is not privately owned, what is the tenure system like: is it rented, loaned, or share cropped? How is the shared cropped payment system like? Is it paid with money or profit-sharing? How much land do you own
- ◆ **Land tenure:** What is the land's status? For example, is it located in a state forest, in a heritage land (*tanah adat*), or a private property? There are several locations where farmers cultivate in a heritage land under an inheritance or profit-sharing scheme.

Required input and Output on the crop production process

The production aspect describes things related to the production activities.

- ◆ **Product:** What is the type of product? In agriculture, there are several patterns to cultivate several products in one area, such as keeping fish alternatively with planting rice in rice field, or *tumpang sari* (intercropping) in plantations.
- ◆ **Production process:** The production process in a cycle that is varied in every location and each farmer sometimes differs as well. Explore the production processes; such as the way farmers plow the rice field, prepare the seeds, planting, and other processes leading up to post-harvest.

- ◆ **Required input:** What are the requirements for each process (quantities and prices)? For example, farmers need seeds, fertilizer, tractor or animal to plow (water buffalos), workers, water, and others.
- ◆ **More detail questions:** How much money do you invest in the business? How much manpower do you use for each step of production process? How long do you (and additional man power if any) work on your land for each step of production process? How many seeds (or tractors or other inputs) do you use? How much do you pay for them? If you have to rent a tractor, how much do you pay for it? How long does the rent last? Is it difficult or easy to rent a tractor? Why?
- ◆ **Questions relating to water:** What are your water requirements during the different stages of the production process. How do you get access to this water, do you pay for it and what happens if the quantity and quality do not meet your requirements. Ask about existing and possible conflicts related to the use of water.
- ◆ List the difficulty, if any, you encounter in getting the input. What helps you get the input? For example, is it difficult or easy for you to get paddy seeds? List any difficulty or ease. Do you need another effort to get the input (for example: bribing)? If yes, how much do you pay?

The information can be collected with the aid of a table such as the following:

Table I. Example of required inputs for farming activities

Name of the farmer:

Address:

Name of product:

No	Input	Amount		Notes
1.	Land	1 ha		Rented under a profit-sharing scheme where 2/3 goes to landowner and 1/3 goes to smallholders (related to costs or profits)
2.	Seed	IDR	500,000	10 kg/ha at IDR 50,000/kg
3.	Fertilizers			
	ZA	IDR	325,000	5 sacks at IDR 65,000/sack
	Urea	IDR	500,000	5 sacks at IDR 100,000/sack

No	Input	Amount		Notes
4.	Pesticides	IDR	350,000	Farmer only buy this when he has money.
4.	Workers' fee	IDR	650,000	
5.	Tractor rent	IDR	750,000	Rate ranges from IDR 750,000 to IDR 900,000. Rented tractors are those given by the government to farmers' groups and are rented.
6.	Water	IDR	150,000	This is fee to P3A and some conversion from the farmer's work when he has to fix the canal.
	TOTAL	IDR 3,225,000		

- ◆ **Output:** There may be different types of outputs, and many goods can produce various outputs. For example, a rice farmer can produce unhulled paddy, rice grains, dedak.

Table 2. Different Type of Output per ha of Farmer in Lake Dendam Tak Sudah, Air Bengkulu River Basin.

Output per ha			
Unhulled Paddy (IDR)	Rice Grains (IDR)	Dedak	Total output per ha (IDR)
1,840,000	6,784,000	424,000	9,048,000

Economy:

- ◆ This first heading will ask how much the yield is and what the farmer does with it; self consumption or sale at the market.
- ◆ The economic aspect of production. How much is it sold for, what is the marketing process like, and how is the market access? Marketing methods vary with area; for example, some sell directly to the market, while others sell their goods under an *ijon* scheme (sold right before harvest) to middlemen.
- ◆ Yields and prices (farm gate prices⁵). How much of the production is for sale? What is the selling price? Where do you usually market the products?

5 Government support programs that guarantee a certain price but not always works effectively.

Table 3. Economic data of farming activities⁶

No	Production or Service type	Quantity	Quantity for sale	Selling price	Market flow (where the goods are sold)

Farmer Groups/Other Organizations

This information is collected to understand the roles of the organizations in increasing productivity and improving the welfare of the community/farmers.

- ◆ What is the organization's name that the farmers join?
- ◆ What are the organization's activities?
- ◆ What is the benefit of joining this organization?

Government And Other Interventions

This section explains the role of the government and other external agencies. This includes government's aid in providing seeds or institutional assistance from NGOs.

- ◆ Is there any price guarantee from the government?
- ◆ **What** are the government programs available in the area that are related to the production processes?
- ◆ **What are the impacts** on the area's productivity and continuation?

2. Damage function

Obstacles and damages: For this aspect, we are looking for possible and unforeseen outcomes. For example, what would farmers do if the amount of water supply to their rice field/plantation was decreased? Would they die of hunger, or would they build another irrigation channel? It is not uncommon for farmers not to be too concerned if their water supply was decreased by a little.

For this aspect, we are looking for possible and unforeseen outcomes. For example,

⁶ For different farmers, use different tables.

what will farmers do if the amount of water supplied to their paddy field/plantation is decreased? will they die of hunger or build another irrigation channel? It is not uncommon for farmers not to be too concerned if their water supply is a little decreased .

- ◆ **Types of problems:** This section explains the events that may disrupt the production processes; such as infestation of pests, floods, or other disasters.
- ◆ **Magnitude:** How often do the events take place and what is the scale? How great is the impact of the damage? How many farmers suffer losses? How much is the economic loss caused by the problem/disaster?
- ◆ **Questions relating to the water:** If there is water deficit, what do you think will happen? What are the reasons? If water supply to the rubber facility declines, what do you think will happen? What are the reasons?
- ◆ **Predictions:** Can the potential damage(s) be addressed? How?

3. Alternative actions

Alternative measures include possible ways to conduct an economic activity with a different approach. The key is the issue whether the same output can be obtained with a different combination of inputs, for example with different seeds in combination with less water or less pesticides. Related to this issue however are questions about the expectations for improvements. The following sub-sections give more information about possible questions.

Information on all these issues can be collected from books and references, magazines, or internet articles. The enumerator can also talk to an expert. For example, talk to an agriculture extension agent (PPL) about more efficient rice cultivation practices; directly ask for farmers' opinions. Write it down every opinion, even if the respondents feel that these alternative measures are unlikely to be taken due to obstacles. Record the perceived obstacles as well.

For example, a farmer might feel that he would produce more rice, if only he could obtain a more regular water supply. Record the possible economic activities that the respondents may do , although they may seem unconventional.

3.1. Initiatives to improve

- ◆ Ask the farmers, have their agricultural practices been good enough or are they possible to be improved? How?
- ◆ In relation to the internet search for data, is the current farming process appropriate or is there anything to improve?
- ◆ According to agricultural experts, has the practice been good already or is it possible to be improved? How?
- ◆ What difficulty may arise if the alternative action is done?
- ◆ Are they optimistic they can make changes? What are the reasons?

3.2. Hopes For Improvement

This section explains the hopes and efforts of the community/farmers to increase agricultural productivity and improve their welfare. These hopes may vary .

- ◆ **Land increase:** Do farmers hope to increase their land for more agricultural products? Do smallholders hope to have their own land, so that they make a greater profit from harvest?
- ◆ **Other products:** Do farmers want to diversify the products/shift to another type of product?
- ◆ **Agricultural techniques:** Do farmers hope to increase their knowledge of agricultural techniques? Do they want to develop a more modern technology?
- ◆ **Marketing:** What are their hopes related to improving their market share? Are they for better access to greater markets, more export, or stable prices?

3.3. Challenges For Improvement

According to the farmers, what are the challenges they face to improve the existing conditions that may limit them to improve their farming quality? For example, farmers want to increase the planting seasons from two to three times a year, but they have limited water supply or it is difficult to suggest such an idea to GP3A or P3A. These may be limiting factors that need to be addressed if the farmers want to increase the number of planting cycles.

4. Dependence on water.

In this analysis, we assist respondent farmers to rank their perception of their needs: income, water, food and house. The aspects analyzed include how important a need is, why it is important and how it is linked to water.

- ◆ What is the most important need? In the example on the table below, water is ranked 1 as it is the thing ensuring the operation of all the agricultural production processes and thus ensuring the survival of the family. Food is ranked 2, and so on.
- ◆ How is the relevance to the water; high, middle, low? The next row is how the daily needs are linked to water access and availability. Is the income generated highly dependent on water availability? Is the food needed highly dependent on access to water? Are there health problems due to the quality and quantity of water used? Farmers, who are highly dependent on water, will give very high scores compared with employees, who are dependent on their salaries, for example.

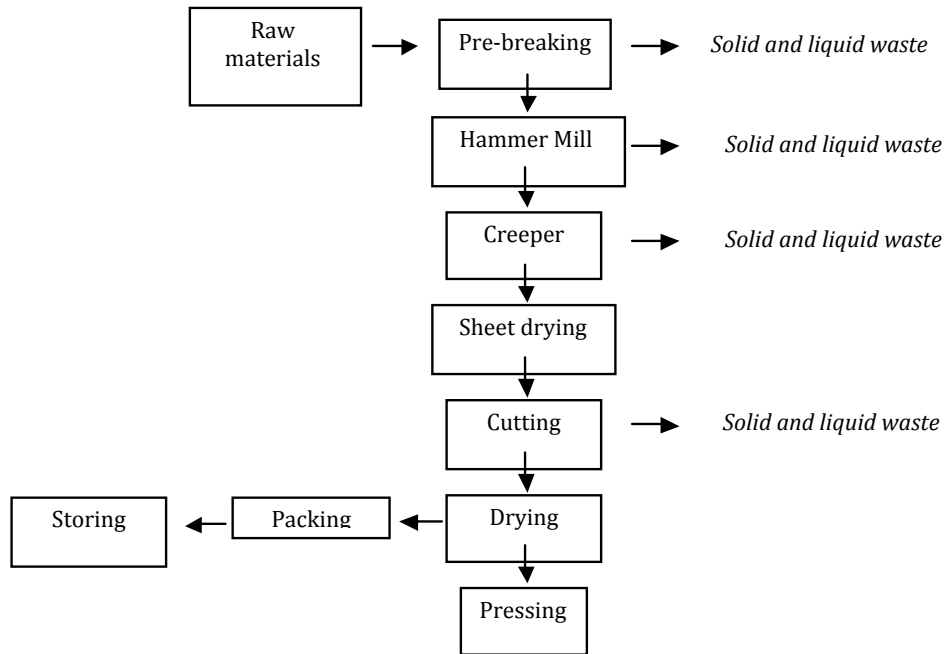
The example below is the answers of a farmer in the downstream of the Lamasi Basin. Do not forget to write down the reasons of the scoring.

Table 4. Rank Table of Farmer's Relevance to Water in Lamasi River Basin.

	Income	Food	Water	Health	House	Notes
Importance	5	2	1	3	4	The farmer lives in the flooding plain
Link to water	High	High	High	High	High	
Reasons	Cocoa trees do not bear fruits if flooded	The vegetables grown are highly dependent on water	Water determines the success of the harvest	Floods cause widespread diarrhoea and skin diseases	The Lamasi River regularly floods our village	

Appendix 3. Steps in the Production of Crumb Rubber

Figure 1. The Steps taken in the Production of Crumb Rubber.



Source: PT Bukit Angkasa Makmur, 1997.

Appendix 4. Calculation Of Production Cost And Income Of Farmers Of Non-Irrigated And Irrigated Paddy

Crops	Input per ha										
	Amount of Land (ha)	Seed (IDR)	Tractor (IDR)	Equipments	Water (IDR)	Land (IDR)	Fertilizer			Labor (days)	
							Urea (IDR)	Foska / Adika (IDR)	Chemical / Postik (IDR)	Planting (IDR)	Harvest (IDR)
Bapak Yangsen ¹	0.5	130,000	750,000	Hoe, Arit ^a	400,000	NA	390,000	130,000	30,000	500,000	240,000
Bapak Jardin ²	1.25	64,000	36,000	Hoe, Arit ^a	160,000	NA	416,000	320,000	12,000	384,000	1,632,000
Bapak Pong Labba ³	2.25	177,778	800,000	Hoe, Arit ^a	44,444	NA	133,333	57,778	6,667	444,444	868,889

Crops	Total Input in Rp per ha (IDR)		Output per ha		Income per ha (IDR)	Productivity per ha	
	Doros (IDR)		Paddy in Sack (each 115 kg)	IDR		Paddy (kg)	IDR (Rp.2100/kg)
Bapak Yangsen ¹	1,600,000	4,170,000	25	6,037,500	3,952,500	5,750	12,075,000
Bapak Jardin ²	3,072,000	6,096,000	120	28,980,000 ^b	3,466,250	11,040	23,184,000
Bapak Pong Labba ³	1,635,556	4,168,889	195	47,092,500	37,712,500	9,890	20,769,000

1. Bapak Yangsen lives in To'lemo Village, Lamasi Timur District, in the center of the Lamasi River Basin, which borders the downstream villages. Yangsen depends on rainfall and water from the discharge of irrigation canal for his rice field. He owns 0.5 ha paddy field. In this report, Yangsen is categorized as a non-irrigated farmer.
2. Bapak Jardin lives in To'lemo Village, Lamasi Timur District. This village is located in the middle of the Lamasi River Basin and borders the upstream villages. Most of this area is irrigated by the weir (Bendung Lamasi). Unfortunately, Jardin does not have access to the irrigation system so he is categorised as a non-irrigated farmer. He works as a paid worker in somebody's 1.25 ha paddy field.
3. Bapak Pong Labba lives in Padang Kalua Village, Lamasi District. The village is located in the middle of the Lamasi Basin, bordering the villages in the upstream area. It gets water from the weir, from which Pak Pong Labba gets water for his 2.25 ha paddy field.

A: Every farmer has hoe as one of their basic equipments. It takes years for farmer to buy new hoe

B: See the calculation on the Bapak Jardin's below

Appendix 5. Tables of Inputs and Outputs of Farming Activities in Lamasi Basin

On this Appendix 5 is a list of table detail for Bapak Yangsen, Bapak Jardin and Bapak Pong Labba in Lamasi River Basin. These tables are compiled from the questionnaire.

Tabel 1. List of Required Inputs for Bapak Yangsen (0.5 ha)

No	Needs	Quantity needed		Price		Total (IDR)	Note
		Q	unit	IDR	Per Unit		
1.	Seeds	13	kg	5,000	kg	65,000	Purchase
2.	Tractor	-	-	750,000	ha	375,000	Rent
3.	Water	5	day	40,000	day	200,000	On average, it takes 5 days to fix the canals.
Fertilizers							
	<i>Urea</i>	3	sack	65.000	sack	195,000	1 sack is 150 kg
	<i>Phoska</i>	1	sack	Rp. 65.000	sack	65,000	-
	Chemical (postik)	1	kg	150,000	kg	15,000	Used for 10 planting seasons
5.	Planting Costs	-	-	500	ha	250,000	Lump sum
	Harvest (labor)	3	day	40,000	day	120,000	Done by Bapak Yangsen, assisted by his children
	Husking	25	sack	32,000	Sack	800,000	Rent
						2,085,000	

Table 2. Calculation of Bapak Yangsen's Income (per harvest = 6 months).

Source			Cost incurred (IDR)	Sale		Difference	
Item	Quantity	unit		calculation	Result (IDR)	calculation	Result (IDR)
Rice	25	sack	2,085,000	25 sacks x 115 kg x IDR 2100	6,037,500	IDR 6.037.500 - 2.085.000	3,952,500

Tabel 3. List of Required Inputs for Bapak Jardin (1.25 ha)

No	Needs	Quantity needed		Price		Total (Rp)		Note
		Q	Unit	(IDR)	Per unit	Paid by the land owner	Paid by the farmer	
1.	Seed (cost labor)	2	day	40,000	day	-	80,000	Self-produce
2.	Tractor (diesel fuel)	10	litre	4,500	litre	45,000	-	The tractor belongs to the employer, no rent; the farmer only buys diesel fuel.
3.	Water (cost labor)	5	day	40,000	day	-	200,000	On average, it takes 5 days to fix the canals.
4.	Fertilizers							
	<i>Urea</i>	8	sack	65,000	sack	520,000	-	2 x / month for 4 months
	<i>Adika</i>	8	sack	50,000	sack	400,000	-	2 x / month for 4 months
	Chemical (postik)	1	kg	150,000	kg	15,000	-	Used for 10 planting seasons
5.	Labor's cost							
	Planting (3 persons)	4	day	40,000	day	-	480,000	Done by self, assisted his wife and son.
	Cutting	120	sacks	17,000	sack	2,040,000	-	Individual (paid worker). Paid by the owner.
	Husking	120	sack	32,000	sack	3,840,000	-	Paid by the owner
						6,860,000	760,000	
Total production cost: IDR 7,620,000								

Note: during harvest, all the production cost having been spent by Bapak Jardin is reimbursed by his employer, except labor's costs (seed preparation, canal construction for irrigation, and the planting cost).

Table 4. Calculation of Bapak Jardin's income

Source			Costs incurred (IDR)	Sale		Difference (IDR)	
item	Q	unit		calculation	Result (IDR)	Calculation	Result
Total rice	120	sack	7,620,000	120 sacks x 115kg x IDR 2.100	28,980,000	28,980,000 - 7,620,000	21,360,000
Employer *	102.5	sack	6,860,000	102.5 sacks x 115 kg x IDR 2.100	24,753,750	24,753,750 - 6,860,000	17,893,750
Pak Jardin*	17.5	sack	760,000	17.5 sack x 115 kg x IDR 2.100	4,226,250	14,226,250 - 760,000	3,466,250

*The agreed work uses a 1:6 scheme, where Bapak Jardin gets 1 sack and the employer gets 6 sacks.

Table 5. List of Required Inputs for Bapak Pong Labba (2.25 ha)

No	Needs	Quantity needed		Price		Total (IDR)	Note
		Q	unit	IDR	Per unit		
1.	Seed	80	Kg	5,000	kg	400,000	Purchased from farmer's groups
2.	Tractor (for 2,5 ha)	± 3	day	750,000	ha	1,800,000	Lump sum ¹
3.	Water	-	-	-	-	100,000	-
4.	Fertilizers						
	Urea	4	sack	75,000	sack	300,000	The urea's basic price is IDR 65.000/kg, but as he has a debt, he has to pay 75.000/kg.
	Phoska	2	sack	65,000	sack	130,000	-
	Chemical (postik)	1	kg	150,000	kg	150,000	Used for 10 planting seasons
4.	Labor's costs						
	Planting (for 2,5 ha)	-	-	500,000	ha	1,000,000	Lump sum
	Cutting (115 sacks*)	-	-	17,000	sack	1,955,000	Individual (paid worker)
	Husking (115 sacks*)	-	-	32,000	sack	3,680,000	Lump sum
	Total Production Cost = IDR 9,380,000						

*One sack is 115 kg.

1. the number of labors is in the 5-10 people range

Table 6. Caculation of Bapak Pong's Income

Source		unit	Costs incurred (IDR)	Outputs		Difference (IDR)	
item	Q			calculation	Result (IDR)	Calculation	Result
Harvest. 195 sacks/harvest (115 sacks are sold, 80 are kept for self- consumption). Price/kg is Rp 2.100. One sack is 115 kg. The wife's income as an elementary school teacher Sales of garden harvest such as cempedak and durians*.	195	sack	9,380,000	195 sacks x 115 kg x IDR 2,100	47,092,500	47,092,500 – 9,380,000	37,712,500
		month	-	-	-	1,000,000	1,000,000
	500,000	Harvest/ year	Sales area done on site, no transportation cost is needed.	-	500,000	500,000	500,000

*The income from garden harvest is shared with his 6 brothers. Despite this, Bapak Pong can earn the average 500.000/year from either *durians* or *cempedak*.



Telapak is an association of NGO activists, business practitioners, academics, media affiliates and leaders of indigenous people, works with indigenous peoples, fishers and farmers of Indonesia towards sustainability, sovereignty, and integrity. The organization sustains its activities through cooperatives and community enterprises in printing, mass media, organic agriculture and sustainable fisheries and forestry. The mission is to influence public policy as it relates to conservation, to establish community-driven natural resource management, and to stop the unprecedented rate of ecosystem destruction while involving in the process the impoverished communities living in and around rich natural resources.

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Rita holds a Master in Rural Sociology from Bogor Agricultural University on 2005. She has undergraduate on Forestry Department and specialized on Conservation Area on 1994. Previous to working at Telapak she was a research assistant specializing in non-timber forest products in CIFOR (Center for International Forestry Research Organisation) 1995-2002. She has spent one year intership program as Indonesian Liason Officer in World Forest Institute in Portland, Oregon, USA on 1994-1995.

Rita recently got accepted as one of fellow at the Joke Waller Hunter Initiative (<http://www.bothends.info/JWH/EngJokeWallerHunter.html>) for Leadership Development of Environmental Leaders from the South since 2010. Actively member in Komunitas Peduli Tjiliwoeng (Tjiliwoeng Community) (<http://www.tjiliwoeng.co.cc/>) Bogor to have a clean river through voluntary community action.

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View on the Telapak CDP IWRM NA: The project has contributed a great deal to improve both personal and institutional capacity. The document produced by the project is beneficial to people and the Luwu Regency government in particular. We have been working in the Lamasi River Basin since 1999, but our problem analyses can only be told, not documented. We always have difficulty when outsiders ask for our work documentation. The CDP, on the other hand, prioritizes documentation of the work. In this regard, we are very much grateful for the presence of the project. Another interesting about the project is that any decision to be made by the team, no matter how small it is, is made through discussions.

Water Dream: Now and forever, water is and will still be a gift, not a disaster ruining human life. 5-10 years from now on no problems are expected to emerge as a result of bad management of water.

Rob Koudstaal

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Rob Koudstaal is by training a civil engineer. He retired after a live-long experience as a consultant in planning for integrated water and coastal resources management in many parts of the world. Since 2005 he has been involved in international projects to develop practical approaches to the Negotiated Approach for Integrated Water Resources Management. This includes the development of the capacities of NGOs in Indonesia and in several countries in Latin America to apply this approach in their efforts to involve local water users and communities in making and implementing decisions in water management.

Denny Boy Mochran



Denny Boy Mochran has been work since 1990 as a professional facilitator for environmental awareness education for youth, he then develops his facilitation expertise to developing organizational and human capacities through the use of participatory and adult learning approach. As experience in facilitating and training for human resources, he served as a consultant and facilitated various themes of consultancy, including Cornerstone Leadership Training, Building Community Leadership to Take Civic Action, Leadership, Problem Mapping, Participatory Monitoring & Evaluation, Mind Mapping, Strategic Planning, and Integrated Coastal Zone Management for Small Island Management.

By his education background in Industrial Engineering, specialisation on Human Resources Management and Industrial Planning from University Pasundan-Bandung, he developed his expertise on facilitating participatory community-based planning, community-based information system, and strategic planning through Puter Foundation in Bogor West Java, Institute for Public Private Partnership in Washington DC, and The World Fish Center in The Phillipines. And facilitating community leadership through Leadership Plenty Workshop Indonesian version as a part of his involvement in Cornerstone Program from Kenan Institute of Private Enterprise based in Washington DC.

Oka Andriansyah

Executive Director, Yayasan Ulayat Bengkulu, 2008 – current



Graduate, Forest Management Major, Agriculture Faculty, the University of Lampung, Bandar Lampung on 2004. A member of Perkumpulan Telapak, as Coordinator of West Indonesia territories for the Capacity Building on Integrated Water Resources Management (started from October 2009 until now). Active on WIN Development, Yayasan Wahana Indonesia Membangun (www.win-development.org).

Interest on leading and develop people self-reliance in multi-sector community developments such as water and environmental health, community health, education, micro finance, and any other related sectors through improving people potentials and local managerial capacity. Some projects that have been involved are: Good Governance in Water Resource Management Project (GGWRM-PMU Lampung) on 2005, Civil Society and Water Users Capacity Building on River Basin Management by LP3ES, Both ENDS and Telapak (funded by WASAP-World Bank) on 2008-2009, WIN Development, under sub-contract of CWSP NAD-NIAS on 2009.

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Student in IPB and Assistant in Water Program in Telapak.



Right now she is working on her thesis in Faculty of Forestry, Bogor Agricultural University. The topic is on local knowledge on natural resources and its change in the community of upstream village of Citarik River Basin, a village on the border of Halimun Salak National Park, West Java. I have a dream of clean water like used to so people can have a glass of water easily not just like now that you have to pay for it. Everybody should take action to take care of the water.

Nonet was a Leader of Lawalata IPB (Perkumpulan Pencinta Alam) on the periode of 2007. Take a lead on Woman Rinjani Expedition that consist of 7 woman of Lawalata. The expedition has succeed and as addition able to make a documentation on a local woman guide life, a job that dominance occupy by a man.