An assessment of people's livelihoods in Yogyakarta and Central Java Provinces pre and post disaster

Based on rapid livelihood assessments, case studies and questionnaire data gathered between July and November 2006

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An assessment of peoples' livelihoods in Yogyakarta and Central Java Provinces pre- and post-disaster, July-November 2006

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Emergency assistance to support the rehabilitation of the agricultural sector and poor household livelihoods in earthquake-affected areas of Yogyakarta and Central Java

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Rural Institutions and Participation Service (SDAR); Emergency Operations and Rehabilitation Division (TCE), FAO

FOREWORD

Following the Yogyakarta earthquake of May 2006, the Ministry of Agriculture (MoA) requested the Food and Agriculture Organization of the United Nations (FAO) to provide emergency assistance to carry out needs and damage assessment, support the most affected farming families with agriculture inputs, and finally, prepare an 18-month farming-related livelihood rehabilitation and recovery strategy in the earthquake-affected areas in Central Java and Yogyakarta Provinces. In order to achieve their mandate to assist the affected farming families, FAO used the Sustainable Livelihood Approach (SLA) – a more elaborate and holistic programme intervention within agriculture rehabilitation intervention, which focuses on the real needs of affected families. The approach is based on understanding people's assets, capacities and productive activities and risk coping mechanisms. Therefore, it goes beyond sectoral analyses; reflects people's realities and is useful for planning holistic rehabilitation programmes.

To complement the quantitative data on the destruction and damage of mainly physical assets and other potential losses in the agricultural sectors provided by FAO's Special Programme for Food Security (SPFS), FAO's Technical Cooperation Programme (TCP) Unit carried out the Java Earthquake Emergency Responses Project, a rapid livelihood assessment (I-RLA). RLA used an interactive and participatory method. FAO assessed 35 villages in collaboration with Agriculture Sector Group (ASG) assessors from various agencies, i.e. international and local NGOs and technical line departments of the government, as well in the assessment activities.

I-RLA covered 35 villages with 140 household representatives, of which 25 percent of the total respondents were women. The villages are located in the district of Bantul, Sleman, Klaten, Boyolali, Kulon Progo and Magelang. There were four categories of farming households interviewed during the RLA, namely, landless labour, land tenant, land owner and share cropper. As part of I-RLA, FAO also conducted livelihood case studies carried out by SPFS staff in July 2006 and November 2006 – one and six months after the Yogyakarta Earthquake. The case studies observe how the disasters disrupted people's livelihoods and assets and community coping mechanisms.

The integrated RLA and case studies revealed that six months after the earthquake, communities were still at risk of vulnerability and become more vulnerable to shock and stress than before. Home-based industries collapsed as machinery, tools and other facilities were destroyed. In responding to such circumstance, affected communities tried to livelihood strategies to survive by implementing different types of coping mechanism, such as selling remaining belongings such as cattle and jewellery to fulfil immediate family needs. Another popular coping mechanism was to earn money from non-farm activities, such as in non-agriculture labour, as pedicab drivers, carpenters or in migrant work. Wives also worked outside their home as servants/housekeeper and migrant workers.

The range of stakeholders (institution, international agency, individual) also delivered aid and support to affected community. However, most of support is for physical reconstruction housing and public buildings. As a consequence, the non-housing sector received less attention and support; including the agriculture sector where there's still insufficient support and programme intervention in place for rehabilitation. This contradicts the fact that agriculture remains one of important sources of income for communities in affected areas.

The RLA also flagged practical and longer-term needs of farming families which were considered a precondition to address long-term development activities. Practical needs to be fulfilled prior to longer development project activities. This includes replacing lost agricultural tools, food processing equipment, seeds and cattle as working capital and family savings, and facilitating access to finance and market. In the longer term, communities articulated their needs for better capabilities to manage their livelihoods, including economic farming and non-farming activities through improved management and organizational capacities as well as expanding networking.

We would like to express our sincere gratitude for those involved in the assessment, in particular voiceless farming families to whom this work is dedicated.

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Head of Agriculture Office, Yogyakarta Province

Dr. Ir. Kasiyani

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Summary

After the earthquake that struck Central Java and Yogyakarta Provinces on 27 May 2006, a number of damage assessments were undertaken. One assessment was carried out by FAOs' Special Programme for Food Security (SPFS), providing valuable quantitative data on the destruction and damage of mainly physical assets and other potential losses in the agricultural sectors. To complement this data, FAO's Technical Cooperation Programme (TCP) project titled Emergency Assistance to Support the Rehabilitation of the Agricultural Sector and Poor Households' Livelihoods in Earthquake-Affected Areas of Jakarta and Central Java carried out an integrated rapid livelihood assessment (RLA), i.e. qualitative, quantitative and case studies, in three phases between July and December 2006. These studies were conducted on the principles of a sustainable livelihoods perspective and therefore applied a people-centred approach, which ensured that all aspects of affected peoples' livelihoods were assessed. These included their assets – not just physical, financial and natural, but also social and human, as well as the vulnerability and policy contexts in which they were and are living. The overall objective of the integrated RLA was to complement the first assessments done in the immediately post-disaster situation, which focused on physical damages in the agricultural sectors. The qualitative part of the RLA provided additional data and understanding about the social, physical, financial, human, and natural and environmental impacts of the disasters on the agricultural sectors. The quantitative aspects of the RLA helped to obtain enhanced and updated data sets, while the case studies documented how the living conditions of most vulnerable households were changing throughout the intervening period.

The findings of this study have been presented and discussed in three consecutive workshops attended by a range of stakeholders, including government staff, academics, locally based non-governmental organizations (NGOs), international NGOs, farmers and the media. The data offered the basic source of information for the FAO/Government Task Force in preparing the Government of Indonesia (GOI) Farming-Related Livelihood Rehabilitation Strategy (submitted in 2007).

The report is structured as follows: An initial chapter outlines the study background, describes the objectives of the integrated RLA and introduces its conceptual backbone, the sustainable livelihood perspective. The second chapter provides the integrated RLA methodology. The study findings are then presented the third and fourth chapters, the former describing the pre-disaster situation and the latter, the post-disaster conditions.

Key findings from the integrated RLA on the pre-disaster conditions underlined that tthroughout the affected areas, farming is a significant livelihood activity, particularly for the most vulnerable groups, contributing approximately 50 percent of household income. Other income sources are: off-farm and non-farm activities, including wage labour; small businesses including trading; remittances; and pensions. The labour profile varies according to the agro-ecology of the area. The study showed that the agro-ecological zones (AEZs) worst hit by the earthquake were AEZ-2 and AEZ-3, within the overall areas affected by the earthquake, while AEZ-4 and AEZ5 were two agro-ecological zones most impacted by the Merapi eruption. A common pattern across the AEZs was that the more remote the areas are, the less alternatives they offer to farming. Some are irrigated areas, thus allowing more intensive paddy farming and production of vegetables as well as crops. Generally, however, land holdings are very small, on average less than 2 000 m^2. Integrated farming is a common practice, although it varies according to the agro-ecology. For example, in irrigated areas, paddy farmers may also have fish ponds and livestock. In the rainfed uplands, intercropping, agro-forestry and livestock keeping are managed in a well integrated manner. Among the social groups surveyed, the landless were the most vulnerable in the pre-disaster situation. Many of them work as labourers on richer people's land, and also mainly depend on goat/sheep and chicken

keeping. Sharecroppers were also vulnerable, whereas tenants and landowners had more livelihood options and were to some extent less vulnerable.

The findings from the post-disaster damage assessment are presented by this study according to asset types. The disasters caused significant damage to physical infrastructure managed by individual farmers and the government, including irrigation canals, warehouses, food-processing units, water pumps, farming and agriculture-related, home-based industry facilities, tools and equipment. The significantly damaged government offices and facilities have negatively affected the provision of government services to their clients.

Natural assets were reviewed in terms of crops, livestock and fisheries, and the damage found per agro-ecological zone. In the post disaster situation, food crops suffered long from neglect and in some cases lack of irrigation. Many livestock were killed or injured by the earthquake, or later sold due to lack of fodder and loss of shelter, or in order to provide the cash needed to fulfill the daily life expenses. Fish ponds were to some extent damaged by the earthquake.

Many people had lost most of their financial assets when homes collapsed in the earthquake, and the remainder had then to be invested for rebuilding. Income opportunities from farming or other activities were hampered as people had to prioritize their time on reconstruction work most of which they did themselves. Those who could get access often took loans from informal money lenders, but with high interest, relatives or friends, or banks that provided special credit sources to the farmers, who had no collateral.

Human assets and capacities were badly affected primarily by death, injury and trauma. Since most people were preoccupied with rebuilding their own homes, the working force was weakened.

Social cohesion in the affected areas, however, remained strong, with people helping others more seriously affected than themselves. Although the activities of some farmer, women and youth groups were initially disrupted, they began to pick-up their farming or non-farming again after some months.

In terms of post-disaster vulnerabilities, it is clear that landowners and renters who are better educated and tend to have a variety of livelihood assets and stronger social capital, were in a better position to restart their lives. But the poorer people and in particular, the landless and sharecroppers, appear in a very vulnerable position, often forced into debt to survive day by day. They are in need for assistance in form of inputs to re-start farming again (in the case of sharecroppers) and livestock even one year after the events. This is in spite of the fact that people have employed a range of coping measures, including choosing to live in just temporary shelter, taking loans, benefiting from emergency aid, being assisted by neighbours, friends and family.

Communities provided a number of recommendations to regain their livelihood basis including the need for provision of equipment, seed and ruminant (goat or cattle) as working capital, access to revolving and special credit schemes, and the need for assistance, perhaps through changes in Government policy, to ensure that farming is more profitable, as compared to the present situation in which the cost of inputs are very high thus keeping profits low.

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Acronyms and Abbreviations

ADB	Asian Development Bank
AEZ	Agro-ecological zones
BAPPEDA of	*Badan Perencanaan dan Pembangunan Daerah* (Regional Bureau Development and Planning)
BAPPENAS of	*Badan Perencanaan dan Pembangunan Nasional* (National Bureau Development and Planning)
BPD	*Bank Pembangunan Daerah* (Regional Development Bank)
BPTP	*Balai Pengkajian Teknologi Pertanian* (Agriculture Technology Research Institute)
BRI	Bank Rakyat Indonesia
DIY	*Daerah Istimewa Yogyakarta* (Special Region of Yogyakarta)
DM	Dry matter
FAO	United Nations Food and Agriculture Organization
FGD	Focus group discussion
GDP	Gross domestic product
IDR	Indonesian rupiah
MoA	Ministry of Agriculture
NGO	Non-governmental organization
NTB	*Nusa Tenggara Barat* (*Water Resources Management Programme*)
OCHA	United Nations Office for the Coordination of Human Affairs
QB	Questionnaire-based
RLA	Rapid Livelihoods Assessment
SLA	Sustainable Livelihoods Approach
SPFS	Special Programme for Food Security
SSI	Semi-structured interviews
TCP	Technical Cooperation Programme

I. INTRODUCTION

Background and objectives of the Rapid Livelihoods Assessment (RLA)

Merapi, the most active volcano in the world and located 24 km north of Yogyakarta, has been erupting since March 2006. The largest eruption of this volcano in May 2006 caused serious damage to the land and enclaves of the 30 000 peoples who live around the top and slopes of the volcano. While the Government of Indonesia raised the alert status of Merapi, ordering the evacuation of the residents, an earthquake measuring 6.3 on the Richter scale hit Yogyakarta Province on Saturday 27 May 2006 at 05:53:57 AM local time. The most affected districts were Bantul and Sleman to the south of Yogyakarta and Klaten of Central Java Provinces, although other districts such as Kulonprogo, Gunung Kidul and Yogyakarta City were also affected.

By 7 June 2006, approximately 6 000 people had been recorded dead, approximately 37 000, injured, approximately 85 000 homes completely destroyed or severely damaged, and approximately 280 000 homes slightly damaged in the Yogyakarta and Central Java Provinces. More than 133 000 people were reported internally displaced. Large buildings such as warehouses, government grain and seed storage buildings suffered major damage. While earthquakes are common in Java, the magnitude of this particular disaster has caused extraordinarily severe suffering and hardship among local communities, which now depend on external assistance to re-establish their livelihoods.

Shortly after the earthquake, three physical damage assessments were carried out by the government, the Faculty of Agriculture, University of Gadjah Mada, and by the United Nations Food and Agriculture Organization's (FAO's) Special Programme for Food Security (SPFS).

To a large extent, assessments focused on the quantitative aspects of the damages and provided a comprehensive inventory of the destruction of the physical assets. From these assessments it was clear that farm households' ability to resume normal agricultural activities was severely constrained. These farmers did not have access to capital to resume normal agricultural and other productive activities, and the government focused most of its emergency relief on sectors such as shelter, health and some temporary food aid. There was major damage to irrigation systems and much of the Agriculture Department infrastructure, thus crippling the services usually offered. Following the disaster, farmers and their families found themselves without enough money for essentials such as basic food commodities, health and education, and even agricultural inputs including seeds, fertilizers, basic livestock and tools. Many lost their agricultural tools, processing units, warehouses, among other valuable possessions.

To complement and strengthen the above-mentioned physical damages data, FAO carried out an integrated Rapid Livelihoods Assessment (RLA) in three phases between July and November 2006. The RLA applied a people-centred sustainable livelihoods perspective, which ensured that all aspects of the affected people's livelihood were assessed.

The overall objective of the integrated RLA is to: complement the data collected immediately post-disaster on physical impacts and damage; undertake a qualitative assessment of additional social, human, financial and environmental implications of the disasters within the agricultural sectors; obtain enhanced and updated quantitative data; and understand how the lives of the affected people have changed throughout the project period.

The specific objectives of the integrated RLA were:

- To better understand the main types of damage and losses across main agro-ecological zones (AEZs).

- To provide a more detailed picture of types and severity of asset depletion (beyond physical assets).
- To obtain information and collect both qualitative and quantitative data based on the livelihood characteristics of people living in the most affected AEZs.
- To identify and describe the characteristics of disaster impacts on farming systems in the main AEZs of the affected areas.
- To identify the most vulnerable affected groups and to understand and analyse how they began to deal with their losses and their coping strategies.
- To collect disaggregated information by sex and age in order to better understand disaster impacts on the most vulnerable affected groups.
- To identify high priority needs of the different affected groups within the agriculture sectors for emergency inputs as well as other short-term interventions,
- To identify opportunities for response measures to contribute to enhancing livelihoods in the medium term.
- To provide the basic information needed for developing a strategy for improved livelihoods in the agricultural sectors based on the principle of "build back better".

The integrated RLA combined three types of assessment approaches: a qualitative RLA, a quantitative questionnaire and case studies. The qualitative RLA provided a first perspective on social, human, financial and environmental issues; a number of in-depth case studies were also initiated. Thereafter, from 31 October to 5 November, FAO, supported by Agriculture Sector Group (ASG) members, conducted the quantitative RLA to obtain updated and more comprehensive quantitative data on the livelihoods situation in the field. Finally, from 21 to 28 November, follow-up case studies were undertaken to visit the previous case study households affected by the earthquake. This report documents key findings from this integrated RLA.

Sustainable livelihood perspective – the conceptual backbone of the integrated RLA

FAO has a broad mandate to assist people to achieve food security, which is facilitated by the use of an approach that focuses on the need to understand and promote sustainable livelihoods. The Sustainable Livelihoods Approach (SLA) is based on understanding people's assets, capacities and their livelihood activities. It goes beyond sectoral analyses and therefore better reflects people's realities. This makes it more useful for planning holistic programmes and actions that support rehabilitation and recovery after disasters.

> Livelihoods consist of the capabilities, assets – both material and social resources – and activities required for a means of living (FAO, 2005).
>
> A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, and provide net benefits to other livelihoods locally and more widely, both now and in the future, while not undermining the natural resource base (FAO, 2005).

Key concepts and principles of the Sustainable Livelihoods Approach (SLA)

The SLA builds on five crucial concepts linked and assessed by using a set of equally important working principles. The SLA framework is shown in Annex A

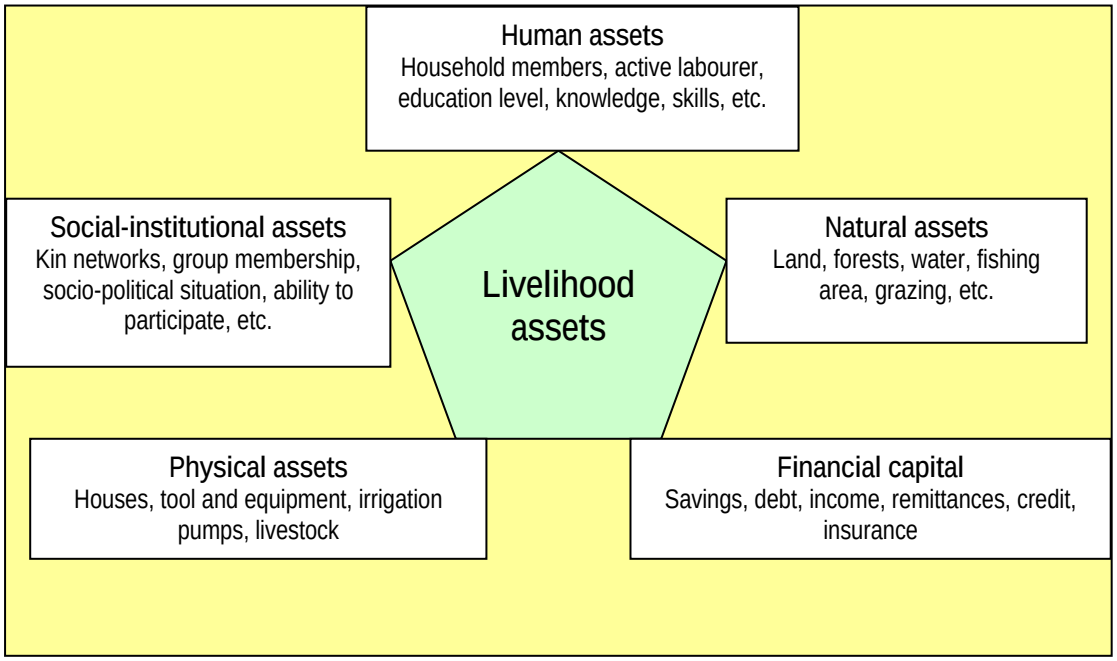
Key concepts	Key principles

- Livelihood assets
- Vulnerability context
- Institutional context
- Livelihood strategies
- Livelihood outcomes

- People-centred
- Sustainability-focused
- Holistic
- Partnership-based implementation
- Links the micro with the macro
- Dynamic
- Builds on strengths

Livelihood assets
Livelihood assets refer to the resource base of the community, and different categories of households, and are often represented as a pentagon in the SLA framework.

Figure 1. Livelihoods Framework Pentagon



The sum and specific combination of livelihood assets available or accessible to a specific household characterize its livelihood conditions.

Vulnerability context and coping strategies
Individuals, households and communities are often exposed to unpredictable events that can undermine livelihood conditions and can cause households to descend into poverty. Some of these events have a sudden onset (e.g. earthquakes), while others develop over a longer period (e.g. social conflict, soil erosion), but both can have negative effects on livelihoods. In a disaster, the entire population may be exposed to the same shock, but the vulnerability and resilience of different households to its impact may vary. A household's vulnerability depends on its former resource base prior to the crisis and its ability to engage in various coping strategies. The impact of a shock will be experienced in different ways depending on the socio-economic status of the household and its individual members.

Examples of shocks and stresses:

- Weather-related shocks and natural calamities
- Pest and disease epidemics
- Economic shocks
- Civil strife
- Seasonal stresses, such as food insecurity in the season of chronic hunger
- Environmental stresses, such as land degradation, soil erosion and pollution.

Households with many and/or highly diversified livelihood assets are generally better able to preserve their lives and property in the face of shocks than those with fewer and less diversified assets. In the face of disaster impacts (e.g. earthquake and volcanic eruption), many of the most vulnerable groups may have no other coping strategy but to sell their physical assets (e.g. livestock) at low prices in order to buy food, rehabilitate their homes and for other family expenses such as school fees. They may be forced to consume crops that were planted for marketing. Such coping strategies, however, further undermine their asset base.

A coping strategy is a measure to reduce impacts of or to respond to shocks. Coping strategies can be successful when they are able to preserve vital assets or unsuccessful when they are unable to do so, which may lead to downward spirals of impoverishment. An understanding of coping strategies – is the persons, consequences and costs involved – is important in analysing the severity of impact of an emergency. Any response should aim to support current positive coping strategies and reverse negative ones.

The institutional context
Policies and institutions represent an important set of man-made external factors that influence the livelihoods of different people. They can also influence access to assets and vulnerability to shocks.

An enabling policy and institutional environment makes it easier for both rich and poor to gain access to assets they need for their livelihoods. A disabling policy and institutional environment may discriminate against the poor, thus making it difficult for them to get access to land, livestock, capital and information.

There is evidence that many efforts to reduce poverty have failed or proved unsustainable for lack of a full understanding of local institutions and how they influence the poor. It is important to understand which institutions are enabling or disabling for medium-term livelihoods recovery, and which are the best institutional entry points for ensuring that the rural poor are reached.

Examples of institutions:

- Formal membership of organizations, such as cooperatives and registered groups.
- Informal organizations, such as exchange labour groups or rotating savings groups.
- Political institutions, such as parliament, legislation, rules and regulatory frameworks and political parties.
- Economic institutions, such as markets, private companies, banks, land rights or the tax system.
- Socio-cultural institutions, such as kinship, marriage, inheritance, religion or draught oxen-sharing.

Livelihood strategies and outcomes
Households tend to develop the most appropriate livelihood strategies possible. Depending on their livelihood assets, the vulnerability context in which they live, and the institutional and policies context, these strategies lead to relatively satisfactory livelihood outcomes. This conceptual cycle is represented in the SLA framework shown in Annex 1.

Poverty may be the result of several factors that often interact. Within a livelihoods framework, they could include, for example, insufficient livelihood assets, a high degree of vulnerability to external shocks, and insufficient livelihood support from surrounding institutions (e.g. local government, markets).

II. THE INTEGRATED RLA METHODOLOGY

FAO conducted an integrated RLA with three mutually reinforcing assessment approaches – a qualitative RLA, a quantitative RLA and case studies. Focus group discussions (FGDs) and semi-structured interviews (SSIs) using checklists were conducted for data collection in the qualitative RLA. The quantitative RLA applied FGD and questionnaire-based (QB) interviews, while a series of case studies used in-depth interviews. Each approach has its own sequence of activity**.**

The qualitative RLA

The qualitative RLA was done by a team using the FGD and SSI, with respondents across of the affected areas. The RLA team consisted of district and provincial government staff, local and international NGOs drawn from the Agriculture Sector Group, and national and international FAO staff and consultants. In total, 35 people contributed to this assessment work. The sequence of qualitative RLA activities was conducted as follows:

(i) Identification and reclassification of Agro-Ecological Zones (AEZs) of the affected areas

A main information source for identifying AEZ of the disaster-affected areas was an AEZ map from the Agriculture Technology Research Institute (BPTP, *Balai Pengkajian Teknologi Pertanian*) of Yogyakarta. The map was complemented with other maps, such as poverty maps from the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and relief, topography and altitude maps from various sources to define precise AEZ areas and their borders with agriculture base resources of the affected communities. The reclassified AEZs represent an agricultural land use area within which its inhabitants derive their livelihoods from broadly similar sources, and face approximately similar environments.

The outcome of the reclassification exercise led to five main AEZs of the affected areas – AEZ-1 upland forest area; AEZ-2a and 2b lowland technical and semi-irrigated area; AEZ-3a and 3b dryland with some basin area; AEZ-4 upland mixed farming at lower slopes areas of Mt. Merapi; and AEZ-5 forest highland at upper slopes areas of Mt. Merapi area. Of these five main AEZs, AEZ-1 and AEZ-3b were not seriously affected by the earthquake or volcanic eruption. In each AEZ, the target villages were chosen based on the housing damage level.

(ii) Development of checklists for data gathering, fin- tuning and field-testing of checklists

For gathering qualitative data, draft FGD and SSI checklists were prepared by FAO's national team supported by an International Livelihoods Consultant. These draft checklists were then pre-tested and fine-tuned based on feedback from the few respondents addressed in the pre-testing. The revised, final checklists were then used for the subsequent FGDs and SSIs conducted under the RLA. (The checklists used by interviewers are attached as Annex B)

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(iii) Determining participants of focus group discussions (FGDs) and individual household respondents of the semi-structured interviews(SSIs)

The qualitative RLA focused on the most severely hit AEZs, namely AEZ-2a, 2b, 3a, 4 and AEZ-5. A total of 35 villages were covered in this study, of which 25 had been affected by the earthquake and ten, by the volcanic eruption. In general, one FGD was initiated in each target village and usually attended by seven key informants from farmer groups, women groups, and other community group representatives. In each village, two individual household respondents were chosen and interviewed separately, one from a relatively poor household and one from a better-off household. The households were selected based on the suggestions from the key informants participating in FGDs.

(iv) Conducting focus group discussions (FGDs) and semi-structured interviews(SSIs)

The numbers of villages assessed and FGDs and SSIs conducted within each of the AEZ and sorted by the nature of the disaster are indicated in Table 1.

Table 1. Distribution of villages visited, focus group discussions (FGDs) and semi-structured interviews (SSIs), by AEZ and disaster

Types of disaster	AEZ and District	No. of villages and focus group discussions (FGDs)	No. of semi-structured interviews (SSIs)
Earthquake	AEZ-2a- Bantul, Sleman, Klaten, Boyolali	12	2
	AEZ-2b- Bantul, Kulon Progo	5	4
	AEZ-3a- Bantul, Gunung Kidul, Klaten	8	10
			16
Volcano eruption	AEZ-4- Sleman, Boyolali, Klaten	6	12
	AEZ-5-Magelang, Sleman	4	8
		35	70

The FGDs and SSIs were conducted over six days, including one day at the beginning for training the interviewers on the FGD and SSI methodologies and contents.

The quantitative RLA

The study involved both a second round of FGDs and a questionnaire-based (QB) survey. The FGDs were attended by farmer groups and women group representatives and delegations from vulnerable and poor people of the same target villages of the first FGD. The second round of data collection aimed to provide a more comprehensive picture and further updated information on the impacts of the earthquake felt by, in particular, women and vulnerable groups, and to obtain their suggestions on the most appropriate forms of intervention to rehabilitate agriculture in a gender-sensitive manner.

The QB survey was conducted with four respondents in each village: a landless worker, a sharecropper, a tenant farmer and a farmer who owns the land. There were a total of was 140 household head respondents, 75 percent men and 25 percent women. This enabled the team to obtain in-depth quantitative data and a nuanced understanding of the farming and vulnerable groups' situation both from women's and men's perspectives, adding to the qualitative first RLA assessment, in which only one poor and one better-off household could be interviewed per village.

The questionnaire and form for guiding and later recording outcomes of the FGDs are attached as Annex C.

To conduct this study, 18 evaluators were selected from six local organizations, all members of the FAO-led Agriculture Sector Group. Each organization surveyed six villages. The fieldwork itself was conducted over two days. The training of the interviewers for fine-tuning the quantitative questionnaire was held two days before the actual FGD and survey.

Case studies on affected households

The case studies were conducted in two phases after the earthquake: first, after three months and then, after six months, in which an FAO intern carried out in-depth interviews in the same target villages. The first round aimed at obtaining general information on: (i) the daily life of the most vulnerable family before and after the earthquake; (ii) the assets owned and depleted after the earthquake; (iii) aids received from any sources; and (iv) recovery strategies adopted by the most vulnerable families. The objective of the second round was to observe the degree to which conditions of the same most vulnerable families had changed six months after the earthquake. The sequence of case studies were as follows:

(i) Determining target villages

The first step conducting the case studies was to select the target villages according to specific criteria. The second step was to select the most vulnerable family in each target village. The criteria chosen for village selection were:

- the most damaged villages of each AEZ in Yogyakarta and Central Java;
- the most vulnerable villages (i.e. where 16–25 percent of the population lives below the poverty line based on OCHA's poverty map).

Vulnerability of the most vulnerable families of the agriculture sector in each target village was determined by local key informants –village heads, representatives of community groups (i.e. elderly farmers, female-headed households, landless rural workers and sharecroppers).

Table 2. Villages included in the case studies

AEZ	Village, Subdistrict, District	Interviews
AEZ-3	Selopamioro, Imogiri, Bantul	3
AEZ-2b	Sidomulyo, Bambang Lipuro, Bantul	1
AEZ-2a	Kerten, Gantiwarno, Klaten	2
AEZ-2a	Towangsan, Gantiwarno, Klaten	1
AEZ-2a	Kemudo, Prambanan, Klaten	1
AEZ-3	Semoyo, Patuk, Kunung Kidul	2
AEZ-3	Girimulyo, Panggang, Kunung Kidul	2

In total, the 12 interviewed farmer families consisted of eight very small land owners, two sharecroppers and two landless labourers.

(ii) Selection of interviewees

For the first round of case studies, after completing the village selection process, each village was visited for a brief conversation with village heads. The conversations aimed at: (i) explaining the purpose of the visit; (ii) gaining an overall description of village conditions; and (iii) developing a list of suitable farmers to interview according to the above-mentioned categories. The FAO intern then visited and interviewed the respondents individually.

For the second case studies, the same households interviewed during the initial assessment were revisited. The aim was to observe the degree to which conditions had changed after the first visit.

III. THE PRE-DISASTER SITUATION

Overall livelihood activities

Yogyakarta and Central Java are densely populated. The amount of land available per household in the rural areas of Java is very low compared to farming households in other islands of Indonesia. Only a very few households have access to more than 0.5 ha of agricultural land (Badan Perencanaan Daerah DIY, 2006). Consequently, if they have the resources, many households in the two affected provinces diversify livelihood activities, such as home-based agribusiness, services (food stalls, carpentry, transport, etc.), trading and manufacturing (leather, ceramics, wood carvings and furniture, silver work, etc.) in small- and medium-term enterprises. Still, most of the people (47.2 percent) (LAKIP APBN DIY, 2005) depend largely on agriculture for their main livelihoods. The livelihood activities of people in Yogyakarta and Central Java Provinces are summarized in detail in Table 3. The table only provides four major activities; the services category includes transportation, finance and construction.

Table 3. Livelihood activities in Yogyakarta and Central Java Province, 2005
(% of total activity)[1]

Sectors	Yogyakarta	Central Java
Agriculture	36.1	42.4
Trade	24.3	20.9
Industries	13.6	15.7
Services	26.0	11.0
Others	0	10.0

About 31 percent of land in Yogyakarta Province is classified as drylands (land with no irrigation system and used to grow rainfed paddy, cassava, maize, and annual crops, such as coconut, fruit, bananas), while land used for paddy field accounted for approximately 18.3 percent. In Central Java Province, however, more than 50 percent of lands are used for paddy fields both under technical and semi-technical irrigation. Land use in both Yogyakarta and Central Java Provinces is presented in Table 4.

Table 4. Land use in Yogyakarta and Central Java Province, 2004 (% of total activity)

Sectors	Yogyakarta	Central Java
Agriculture/paddy field	18.3	58.0
House compound and surroundings	26.9	17.8
Dry and fallow lands	31.0	-
Estate crop	0.5	-
Forest and woodlands	15.1	19.5
Others	8.1	4.7

In the agricultural sector, paddy is a staple food crop. In addition, maize, cassava, sweet potatoes, peanuts, soybeans and green peanuts are grown, particularly in the dry season. In 2005, the harvested area and production of paddy in Yogyakarta Province accounted for approximately 132 374 ha and 708 163 tonnes, respectively, with a yield rate of approximately 52.2 quintals/ha; in Central Java Province, harvested area and production of paddy accounts for approximately 1 672 315 ha and 8 729 291 tonnes, respectively, with a yield rate of 52.20 quintals/ha (Statistics Indonesia, 2006). The normal cropping system practised by farmers involves growing paddy as a staple food for either two or three planting seasons a year, depending on irrigation water availability, and growing secondary crops such as maize and soybeans for the dry season. Some also grow vegetables or industrial crops (e.g. tobacco, sugar cane) and others pursue agribusiness.

Regarding the land use of the affected areas, about 32 percent of the land was used in 2004 for paddy fields in Bantul District, which is the second largest use after house compounds (40 percent). In Klaten District, one half of the land (51 percent) was used for agriculture activities, primarily for paddy fields.

In order to optimize their land resources and to earn income, farmers in these two affected areas usually integrate crops and other components as a unit farming system. Together with crops, animal husbandry plays an important role in village society especially among farmers. Livestock keeping is inseparable from agricultural activities in all AEZs. A feed source is available in every area. Livestock act as a safety net for farmers (as was clearly shown after the disasters) and also produces organic fertilizer. They are kept both at the household scale (goats and cows) and at a larger scale, i.e. such as egg layer, broiler and quail production. Cows, goats and chicken are the main kinds of livestock.

There are two kinds of fishing activities in Yogyakarta: freshwater fish culture (97.5 percent) and marine fisheries in the coastal areas (2.5 percent). Aquaculture is mostly under pond culture (83.8 percent), followed by under paddy fish culture (l4.9 percent), and cage culture and floating net. Pond-culture contributes to 92.l percent of overall production. In Klaten District (Central Java), there is no coastal area; all fish culture is under fresh water culture and mostly under pond culture.

In Yogyakarta, forestry activities are carried out in the production and community forest areas. Production forest involves collaboration between the Forest Department and farmer groups, the former producing timber and the latter practising intercropping with tree shade within the Production Forest. Community forest consists in growing trees on farmers' private land through agro-forestry practices, rather than woodlots.

In Java, small- and medium-sized enterprises have historically been the main actors in domestic economic activities, in particular as large providers of employment opportunities for the rural poor (KADIN, 2006) hence generating a primary or secondary source of income for many households. The agriculture-related, home-based industries are usually operated by women either as primary or secondary income resources for their family. In general, most of these women have low education levels (primary school), limited skills and minimal information on and access to resources such as credit and the market. Although most banks nowadays emphasize the development of small- and medium-sized enterprises, agricultural-related home-based industry is not yet given high priority since most farmers are seen as having little capital and inadequate collateral. Furthermore, their prospective business units are considered too small in terms of income, working capital and number of workers (less than ten persons). They are often deemed a high-risk category by most banks. Some of the products of home-based agribusiness are banana chips, tomato sauce, fried red onion, tempe (soybean), crackers of various kinds (cassava, animal skins, peanut, chicken wings, etc.), cassava starch, cassava starch noodle, roasted and fried fish and meat, and food for sale on the street and in restaurants.

Nonetheless, agriculture and its related agribusiness (including food crops, estate crops, livestock, fishery, forestry and agriculture-related, home-based industry) is still the main livelihood source of income for people in Yogyakarta and Central Java Provinces. The composition of farm family livelihood sources of income is shown in Figure 2 (BPS-DIY, 2003).

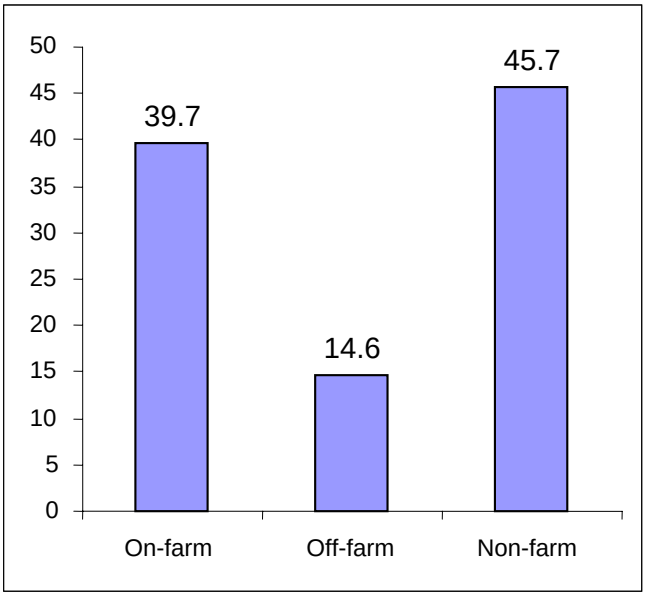

Figure 2. Sources of income for farm families in Yogyakarta and Central Java Provinces, 2003 (% of total activity)

Notes:
Non-farm *activity means that the farmers and/or their family members earn income purely from outside agriculture sectors, for example, construction, transportation, services, trade, and industrial worker.* ***Off-farm*** *activity means that the farmers and/or their family members earn income from agricultural products-processing, for example, leather cracker, cassava starch processing industries, etc.*

Agriculture in both Yogyakarta and Central Java Provinces significantly contribute to the regional gross domestic product (GDP). In general, the agriculture sector is the second largest contributor to GDP, as presented in Table 5.

Table 5. Contribution of economical sectors to the regional GDP (% of total), Yogyakarta and Central Java

Sectors	Yogyakarta	Central Java
Agriculture	19	20
Mining	1	1
Industry	15	32
Electricity, gas and water	1	1
Construction	8	6
Trade, hotels and restaurants	20	20
Transport and communication	10	6
Finance, rental and business services	10	4
Other services	17	10

Source: BPS, 2005

In the two most affected areas of earthquake disasters, namely Bantul District (Yogyakarta Province) and Klaten District (Central Java Province), the most important sector prior to the earthquake was agriculture, as shown in Table 6.

Table 6. Economic structure of Bantul and Klaten Districts (% of total)

Sectors	Bantul District	Klaten District
Agriculture	26	23
Mining	1	1
Industry	19	20
Electricity, gas and water	0.1	1
Construction	9	8
Trade, hotels and restaurants	22	18
Transport and communication	5	7
Finance, rental and business services	17	7
Other services	0	15

Source: BPS-Bantul, 2005; BPS-Klaten, 2004

Socio-economic context

Socio-cultural and economic context

Yogyakarta and its neighbouring province of Central Java share a similar culture. In both, the Javanese ethnic group makes up the majority of the population. Islam is the dominant religion, although Central Java Province in particular has been a great religious centre for Hindus and Buddhists. Under the Saylendra and Old Mataram kings, the Hindu–Javanese culture flourished from the 8th to the 10th century AD and when Java's most magnificent religious monuments were built.

Yogyakarta is the site that combines old ways of living and modernity that have swept across the island in recent decades. The Kingdom of Yogyakarta is still headed by the Sultan, with a Governor running the administration of the province.

Recently, households have typically consisted of parents and two children. Sometimes, grandparents may live in the same house. Male-headed households are dominant; female-headed households result from either divorce or the death of the husband.

Most inhabitants engage in three main sectors – agriculture, industry (which comprises construction, manufacturing, utilities and mining) and services (ADB *Tsunami and earthquake report, 2007,*). Yogyakarta in particular remains Java's premier tourist destination where tourism and services became the most important economic income sources for the population.

The population density in Yogyakarta Province is around 1 018.04 per km^2, with a growth rate of less than 1 percent, while in Central Java, it is around 959 per km^2 and 0.9 percent respectively.

Despite the diversity of livelihood activities, poverty levels in 2004 were high, at 19 percent in Yogyakarta and 21 percent in Central Java (*Biro Pusat statistik*, 2006). In Yogyakarta Province, the highest poverty incidence appears in Gunung Kidul and Kulon Progo.[2] Rural poverty is higher than urban poverty, recorded at 25 percent (in the same year across the two provinces).[3] Unemployment is also high, at approximately 30 percent in Yogyakarta Province and 6.14 percent in Central Java. These two factors are connected: rapid urban growth has induced rural to urban migration, with the relatively unskilled and uneducated people being least able to respond to new employment opportunities and thus remaining in the rural areas. These people are primarily women, the landless and the older farmers. Migration out of agriculture in Yogyakarta Province over the last ten years has led to a 9.3 percent decrease in numbers of people working in agriculture, especially in food and horticultural production (LAKIP APBN DIY, 2005), while the numbers in other areas such as labour, industry, services and casual work have increased. Urban growth in both provinces has involved changes in land use, with property and business development taking up increasing larger areas of fertile arable land.

Increase in land use from agricultural land to industry and housing complexes in Central Java Province, which is becoming an industrial centre, is around 2-3 percent annually, and 0.4 percent per year in Yogyakarta Province. These rapid changes particularly impact on the most vulnerable, including women, the elderly, and those with limited skills and education who rely either completely or to a very large extent on farming for their livelihoods. Reduced availability of land and employment impacts negatively on the livelihoods of these stakeholders and further increases their vulnerability.

Despite the above, since the last century, people of Yogyakarta in particular have been known for their high social capital, which is shown in the abundance of active farmers and other user groups, cooperatives and associations, and in the still strong tradition of self-help groups known as such as *gotong royong.*[4] The strong social cohesion played a significant role in accelerating the livelihood recovery process in many communities.

Policy context

The Government of Indonesia has implemented a decentralization process through two constitutional amendments, in 1999 and 2004. Decentralization came into effect in 2004, giving district-level governments the widest autonomy possible. Districts have been given the responsibility to pursue non-corrupt and authoritative government, free from collusion, corruption and nepotism. With regard to district-level decision-making, the central and provincial governments act as facilitators, motivators and catalysts of district-level planning and activities. At the same time, the Government of Indonesia placed more emphasis on the active participation of the private sector and civil society in planning, organizing and control, as well as in financing development. Under these two amendments, the central government has the authority to formulate standards, policies and norms for development programmes. The district government has followed up by creating implementation guidelines (*Petunjuk Pelaksanaan, JUKLAK*). The district government conducts all development programmes necessary for their own district's needs, with the support of central and provincial government facilities.

At the provincial and district levels, BAPPEDA (*Badan Perencanaan dan Pembangunan Daerah*, Regional Bureau of Development and Planning) is responsible for planning and coordinating activities of different sectors, with the provincial level holding regular meetings

[2] Bappeda Provinsi DIY, Pengkajian Program Penanggulangan Kemiskinan di Provinsi DIY, 2004

[3] *Regional development and the poverty reduction programme in Yogyakarta Special Region,* Bambang S.Priyohadi –DIY Regional Secretary, 2004

[4] Working together within and by the community themselves in order to achieve a common interest.

to this end. BAPPEDA reports the outcomes of these regular meetings to the Government of Indonesia's National Bureau of Development and Planning (BAPPENAS, *Badan Perencanaan dan Pembangunan Nasional*), and every sector conveys the information to their sub-offices for implementing programmes. At the district level, BAPPEDA is responsible for communicating with the head of the district (*Bupati*), other government institutions and district-level legislative bodies.

All planned programmes refer to Constitutional Amendment No. 25, 2005 on National Development Planning. This policy regulates the Government's Long-term Development Planning (20–25 years); the Medium-Term Development Planning of Government (five years); as well as the Government Work Planning (one year). The policy includes the vision, mission, and proposes programmes and activities.

The Agriculture Department is actively pursuing key policies relating to poverty alleviation: lowering the unemployment rate by expanding job opportunities in the farming sector; giving special attention to relatively remote rural areas, e.g. Kulon Progo and Gunung Kidul; and anticipating strategic issues such as gender and *zoonocist* disease growth, e.g. anthrax and the Avian Flu. In addition, it is recognized that one of the farming problems is migration out of farming to other sectors, particularly of the youth, due to increasing difficulties in generating sufficient profit from agriculture. Most farmers have only a small piece of land and many others are landless. The Agriculture Department thus specifically promotes the production of potentially high-value commodities such as onions; aim at creating added value for farmers by encouraging agribusinesses, diversification and agricultural product processing; promotes integrated farming systems; and strengthens farmers' capacities building to assist in their move from subsistence to commercial farming.

Box 1. Integrated Livestock keeping for biogas and manure production

Within the context of National Development Planning, in December 2006, the Provincial Agriculture Office of Yogyakarta introduced integrated livestock-keeping pilot projects to 50 farmers and young farmer groups in Bantul and Gunungkidul Districts. The main goals of the projects are to obtain added value from selling livestock manure and using biogas for cooking and to replenish the degraded soil fertility by using the manure. Soft credit is provided in kind and cash to the farmer group beneficiaries for purchasing livestock and biodigesters. Through the biodigester, the beneficiaries produce biogas from the dung for their daily cooking or other purposes, and use sludge for manure. To obtain added value, they introduce 10-kg packages of manure. The beneficiaries sell it to other farmer groups, thus forming a new branch of agribusiness. Since biodigester processing technology is new, young farmer groups with higher educations are encouraged to handle it

With regard to the rehabilitation of farming-related livelihood activities, the Government of Indonesia, in particular, the Agriculture Department, is responsible for all policies related to cooperatives and microfinance. The Agriculture Department is currently pursuing the following programmes:

1. DPM-LUEP (*Dana Penguatan Modal melalui Lembaga Usaha Ekonomi Produktif*, Institution for Strengthening Capital Funds through Productive Economy): In this programme, the government provides funds to supplement the purchase price of farmers' unhulled paddy/rice, since it is lower than the government's purchase price, mainly at harvest time.
2. PMUK (*Penguatan Modal Usaha Kelompok,* Strengthening the Capital of Group Businesses): In this programme, the government provides funding directly to bank accounts of farmer groups. The amount transferred depends on the proposals submitted by the groups, consisting of both women and men. Groups are assisted in preparing these proposals by extension workers, NGOs, and universities. The funds are provided as a revolving fund. Once the fund is transferred to a farmer group's bank account, the group then manages the revolving system through a microfinance institution that they themselves have formed.
3. *Farming Financing Service Scheme* (SP3). The Farming Division of the Directorate General of Food Crops in the Ministry of Agriculture has a section that handles farming financing, the Pusat Pembiayaan Pertanian (Farming Financing Centre). It provides a *Farming Financing Service Scheme* (SP3), a collaborative programme between five government banks (Bank Mandiri, Bank Syariah Mandiri, BPD, NTB, and BPD Jatim) as executor banks. The special advantage of this programme is the interest rate, which is 2-3 percent lower than the commercial interest rate for credit. In addition, there is no charge for provision and administrative costs, and there is flexibility in payment method, based on farmers' capabilities. This scheme is mainly directed to provide agricultural micro-businesses with investment and working capital.

Box 2. Integrated livestock keeping for processing of red sugar

Another type of added-value pilot project is integrated livestock keeping for red sugar producers. The Agriculture Office in Kulonprogo District introduces soft credits for five cattle and one unit bio-digester to each red-sugar producer. Beneficiaries obtain biogas through the biodigester and use it as bio-fuel for processing the red sugar. Instead of wood, biogas can be used as fuel in sugar processing. The beneficiaries can also produce manure as a by-product of the biodigester and sell it to the other users, or obtain the added value from alternative bio-fuel, selling manure, and selling livestock.

The AEZs and farming systems in the disaster-affected areas

The earthquake-affected area covers different agro-ecological zones,[5]each with approximately similar environments and livelihood strategies (Figure 3). A common feature of AEZs is that farm sizes are generally small, with farming representing the primary but not sole source of income. The AEZs of the area are as presented in Table 7.

[5] As described in the methodology section, a number of different sources were used to identify the AEZs for the RLA within the context of post earthquake actions (Annex D map). These sources were: the AEZ map from the Agriculture Technology Research Institute (BPTP, *Balai Pengkajian Teknologi Pertanian*); the Poverty Map (United Nations) and relief, topography and altitude maps.

Table 7. The agro-ecological zones and farming systems

AEZs	Farming system and specific features
AEZ-1	Represents upland forest, with seasonal crops of upland rice, maize, and tree crops such as wood, bamboo, coffee, coconut, cacao, traditional medicines, fruit, and root crops such as yams, ginger and various rhizome crops. The cropping systems are: • rainfed/upland paddy-maize-groundnut/cassava; • vegetables irrigated from wells; • livestock systems: cattle, goats, poultry; • family forests with medicinal plants under shade; • home gardens. Some households practise integrated livestock keeping for processing red sugar.
AEZ-2	Irrigated lowland agriculture on basically flat lands with mostly fertile clay-textured soils. Paddy rice is the dominant crop, but with a multiple cropping pattern in three growing seasons. The cropping systems are: • paddy-paddy-paddy, paddy-paddy-groundnut/soybean/maize; • increasing year-round vegetables near city; • livestock systems: mainly goats and cattle and poultry (also used for biogas and manure production) • home gardens.
AEZ-3	Basically rainfed and upland areas with infertile soils. Cropping is characterized by rainfed farming mainly on terraces with the following cropping systems: • rainfed rice – cassava, ground nuts and sweet potatoes; • rainfed rice-groundnuts/soybean/maize; • short planting period of vegetables or vegetables irrigated from wells; • livestock systems: cattle, goats for meat production and poultry; • home gardens.
AEZ-4	On the lower slopes of Mt. Merapi, with well-irrigated agriculture. Paddy rice is a dominant crop. The cropping systems are: • paddy-vegetables-vegetables. • paddy-tobacco. • year-round vegetables. • fruit and plantation crops. • livestock systems: cows for dairy products, goats, poultry. • home gardens with various fruit trees, especially snake fruit.
AEZ-5	The forest highlands constituting the upper slopes of Mt. Merapi, commonly with horticulture and high altitude vegetables, including. • plantation crops and firewood; • higher altitude vegetable crops; • livestock systems: cows (including dairy), goats, poultry; • home gardens under agro-forestry system.

Source: Qualitative RLA (2006)

Due to the climatic and topographic features, all AEZs are regularly exposed to dry spells and sometimes drought periods during the dry season; AEZ-4 and -5 also face large-scale erosion and landslides in the rainy season. Across all AEZs, landless men and women are the most vulnerable.

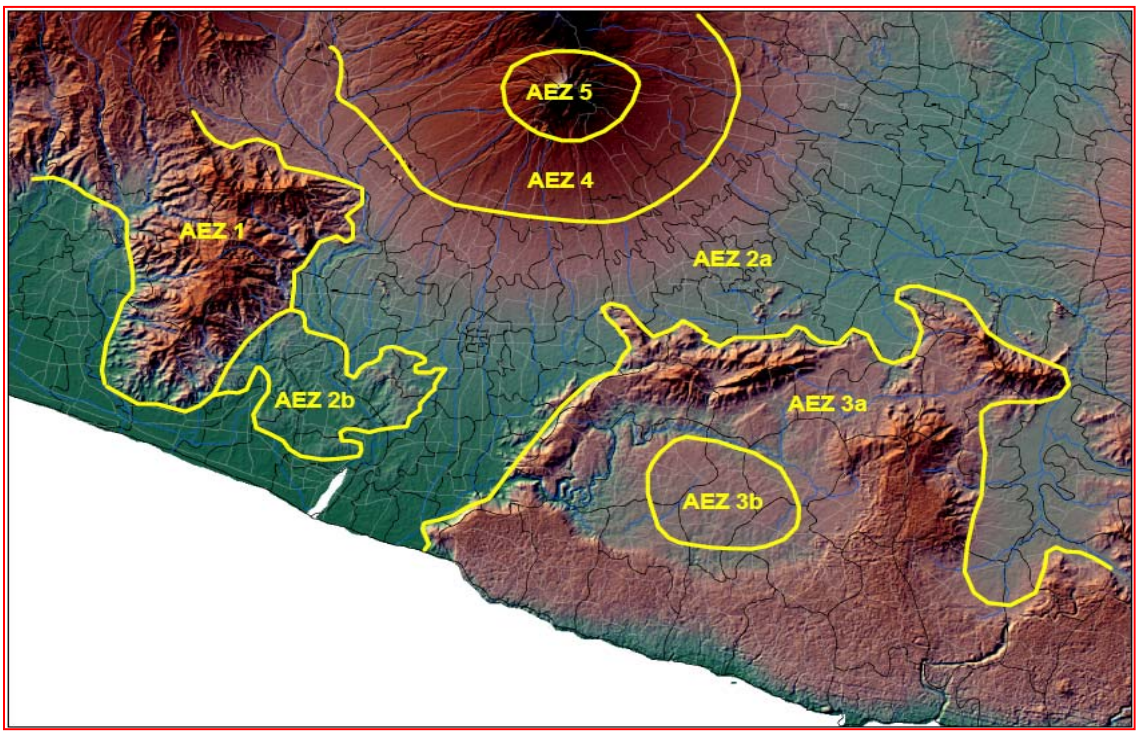

Figure 3. Map of agro-ecological zones (AEZ)

Agriculture-related livelihood activities in the agro-ecological zones (AEZs)[6]

Data from the quantitative RLA concerning cropping activities in each AEZ confirm earlier definition of the AEZs. Indicative data are taken from a limited sample size. The total sample size is 144 farm households, as explained in the methodology section.

Each AEZ has its special natural characteristics that influence farmers' choices of commodities to cultivate, as indicated in Figure 4. Generally, there are three planting seasons per year:. the rainy season from October/November to January/February; the first dry season from March to June/July; and the second dry season from July to August/September.

[6] These data were consolidated and partly reconstructed on the basis of secondary sources and findings of the RLA conducted after the earthquake.

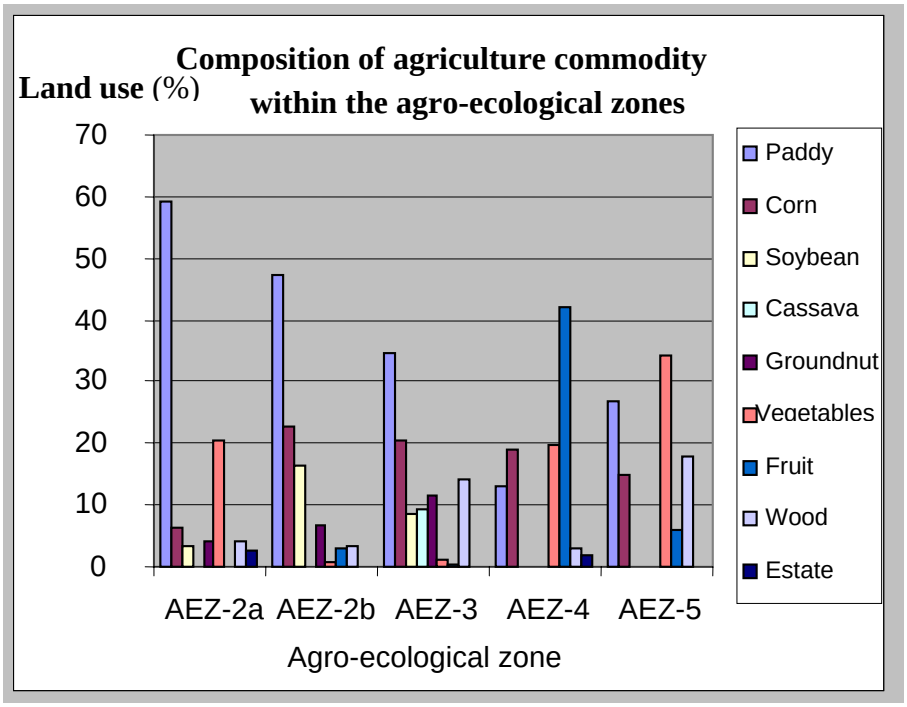

Figure 4. Composition of agricultural commodity production, by AEZ

According to the Figure 4, the dominant crop in AEZ–2a and 2b is paddy, followed by vegetables (commonly chili or onion) and estate crop (i.e. tobacco), as AEZ-2 has better irrigation systems than other AEZs. Here paddy was planted either twice or three times a year in most areas, while areas of AEZ-2b that are not fully irrigated were planted with secondary crops (corn, soybean, groundnut, etc.) in the second dry season. Trees tend to be grown in home yards.

In AEZ-3, the dominant crop is also upland paddy in the rainy season, followed by groundnut and some vegetables, although all are produced only in the first dry season. In this zone, food crops are combined with timber (commonly teak), fruit, and grass as livestock feed, all in the terrace system. Food plants give short-term results; livestock and fruit give medium-term results; and timber gives long-term results.

Since AEZ-4 receives abundant water and is fully irrigated, fruits, vegetables and paddy are mainly produced there. There are many kinds of vegetable cultivated in this area unlike in AEZ-2a, where chili and onion production are predominant. Forest plants differ from those in AEZ-3 (teak). In AEZ-4 and AEZ 5, farmers commonly plant “Sengon” (*Albizzia falcataria*) or Mahogany (*Switenia sp.*) in their forest, and in some areas, farmers cultivate tobacco.

In AEZ-5, the dominant crops are vegetables followed by wood/forest products, although in some fields, there are areas where farmers plant paddy and corn. Grass produced within the forest stands is a significant product in this area too, used as dairy fodder. Fruit trees productivity in this zone is lower than in AEZ-4, because the low temperature causes problems in pollination. Table 8 provides information on the average cultivated land sizes per AEZ.

Table 8. Average cultivated land size, per year, by category of farmer and AEZ (N=144)

AEZ	Average cultivated land size	
	Land owner (m^2)	**Sharecropper or renter (m^2)**
2a	1 442.5	2 331.3
2b	2 213.7	1 570.0
3	2 001.5	1 612.5
4	1 687.5	1 716.7
5	837.5	1 250.0

Source: Analysed data from the household survey of quantitative RLA (2006)

The data from the quantitative RLA indicated the importance of agricultural activities for the livelihoods of rural people. But the small areas of available cultivated land (both owned and rented), on average less than 2 000 m^2 (0.2 ha), constrain farmers from attaining optimum benefits. In some villages, the land owners and tenants common work as government or private enterprise workers as well as on their own plots. Thus, land owners and tenants experience more income diversification than do share croppers and the landless.

Table 9 indicates gross margins gained for a variety of crop production across the AEZ before the earthquake.[7] The input and output data of other commodities such as livestock, fruits and forestry are not completely available.

Table 9. Gross margin of various commodities planted by AEZ (N=144)

	Paddy (IDR/ha)	**Secondary crop (IDR/ha)**	**Vegetables (IDR/ha)**	**Estate (IDR/ha)**
2a	6 251 736	3 493 754	n.a.	7 505 000
2b	4 208 016	2 452 709	1 170 000	0
3	3 960 867	4 194 575	2 066 666	4 440 000
4	2 600 000	4 650 277	7 298 611	2 000 000
5	2 583 333	n.a.	3 541 666	0

Source: Analysed data from the household survey of quantitative RLA (2006).

As Table 10 indicates, farmers in AEZ-2 obtained the highest margins for their paddy and estate crops due to their more fertile soil and good irrigation facilities. Common crops in AEZ-3 are secondary crops (non-paddy), such as corn, groundnut and cassava. Cassava contributes greatly to agricultural output in AEZ-3, since it is an appropriate crop with low input. Farmers in AEZ-3 usually use local seeds and organic fertilizer from their livestock manure. Farmers also commonly use the local seed for upland and rainfed paddy. Crop planting in this area is only done in the rainy season, and the farmers have plenty of time for planting preparation at the beginning of the next rainy season, thus reducing additional costs for hired labour. They focus on keeping and raising cattle as an income source and asset.

Farmers in AEZ-4 obtained the highest margin for vegetables of all the AEZs, due to its having the most fertile soil, due to the benefits of ash from past Merapi eruptions.

[7] It should be noted that, while figures indicate the agriculture gives a very high margin to farmers' livelihoods, there are factors that may not have fully been taken into account by respondents, such as the fact that the land cultivated by farming households is very small. External labour may not be needed for cultivation in these cases, and farmers may have excluded their own or their family members' labour costs in their input estimates.

In terms of livestock holdings before the earthquake and Merapi disasters, farmers on average kept around two heads of beef cattle per family, while there were more than 50 heads for chicken, as shown in Table 10.

Table 10. No. of livestock by farmers before the disaster, by AEZ (head) (N=144)

Type of livestock	AEZ-2a	AEZ-2b	AEZ-3	AEZ-4	AEZ-5
Beef cattle	2.4	2.4	1.9	1.8	1.5
Dairy cattle	0	0	0	0	0
Sheep	0	4.0	3.0	0	6.0
Goat	4.9	2.3	7.5	4.0	2.7
Chicken	49.1	27.7	252.3	12.0	37.3
Quail	2 500	0	2 500	0	0
Duck	14.7	0	103	0	0

Source: Analysed data from the household survey of quantitative RLA (2006)

Table 11 shows the number of numbers of ponds and the pond-size by the farmers before the earthquake and Merapi disasters. In AEZ-2a and AEZ-3, however, the quantitative RLA did not reach the farmers who kept fish. There are three main fish types, namely catfish, tilapia and nila.

Table 11. No. of fish ponds and pond size, by fish type and AEZ, before the disasters (N=144)

Type of fish	Agro-ecological zones (AEZs)									
	AEZ-2a		AEZ-2b		AEZ-3		AEZ-4		AEZ-5	
	No.	***Pond size (m^3)***	***No.***	***Pond size (m^3)***	***No.***	***Pond size (m^3)***	***No.***	***Pond size (m^3)***	***No.***	***Pond size (m^3)***
Catfish	0	0	5 100	38.0	0	0	9	8	37.5	5
Tilapia	0	0	1 599	80.0	0	0	100	16	0	0
Nila	0	0	0	0	0	0	22.5	50	100	6
Shrimp	0	0	500	15	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0	10	9

Source: Analysed data from the household survey of the quantitative RLA (2006).

Farm- and non-farm-related income in the disaster-affected areas

Agriculture is the main source of income in the earthquake-affected areas. This is particularly obvious in AEZ-5, AEZ-2a, AEZ-2b and AEZ-3. Information on the labour workforce in the households was composed of the main and secondary jobs of their family members.

Table 12. Source of family income, by AEZ (% of total) (N=144)

Source of family income	AEZ-2a	AEZ-2b	AEZ-3	AEZ-4	AEZ-5
1. Farm	*53*	*55*	*53*	*45*	*84*
2. Off and non-farm *	47	45	47	55	16

Note: Off-farm activity means that the farmers and/or their family members earn income from processing agricultural products, for example, leather cracker, cassava starch processing industries, etc.
Non-farm activity means that the farmers and/or their family members earn income purely from outside agriculture sectors, for example, construction, transportation, services, trade and industrial work.
Source: Analysed data from the household survey of quantitative RLA

Table 12 indicates that farming plays a significant role in all AEZs. This is particularly so within AEZ-5, which, due to its remote and isolated location, has few alternative income sources, unlike the other AEZs, which have a range of job opportunities in non-farm labour, the private sector, government offices and others.

In AEZ-4, since agriculture is very labour-intensive, the rate of non-farm income is high. At the same time, since this zone has a very good environment (porous land, good weather and good quality and supply of water), many enterprises/factories have been established here, such as electronics, garment manufacturing and plastics production. Many public services such as universities, bank and research institutions have been established in this zone, providing large opportunities for regular jobs.

The environment in AEZ-2b is not appropriate for establishing enterprises, factories or public services, and is located close to the coastal area. The dry season is often so severe in this zone that there are water shortages. Further, it is located far from the capital city of the district, so there are not many opportunities for people to get jobs. There is some variation between the sources of income per AEZ and gender, as indicated in Table 13.

Table 13. Composition of non-farm income source and percentage of contribution by gender and AEZ (N=144)

AEZ	Average income (IDR/month)		Total (IDR/month)	Percentage	
	Men	Women		Men	Women
2a	523 125	392 663	915 788	57	43
2b	269 940	277 500	547 440	49	51
3	762 020	412 500	1 174 520	65	35
4	402 817	310 416	713 233	56	44
5	-	-	-	-	-

Source: Analysed data from the household survey of the quantitative RLA (2006).

Overall, women contribute to more than 30 percent of the total household income. In addition, remittances play an important role: in the rural areas of Yogyakarta and Central Java, it is common for some household members to work in the cities as migrant workers and send money home.

IV. THE POST-DISASTER SITUATION

Damage assessment in terms of assets type

The results of the Integrated RLA indicated that most community livelihood assets were still depleted six months after the earthquake. Despite aid given, livelihood restoration was progressing extremely slowly. The detailed findings on the impact of the disasters on local peoples' livelihoods are presented here together with the five key assets distinguished in the analytical framework of the SLA: natural, physical, financial, human and social. The qualitative findings from the integrated RLA is supplemented by the quantitative findings of later studies and provided an update on the situation six months after the disasters.

Natural and agricultural assets

The earthquake and Merapi eruption affected farming-related livelihoods. The most seriously earthquake-damaged areas were AEZ-2a, AEZ-2b, and AEZ-3, while the Merapi eruption caused damage in the agricultural sectors in AEZ-4 and AEZ-5. In the food crops subsector, the affected farm households harvested their crops late or sometimes left crops in the fields while focusing on house reconstruction. Livestock that were not killed or injured when their shelters collapsed were in many cases sold prematurely to cover rebuilding and daily living costs. Aquaculture was affected, both due to direct damage to fish ponds and to the drying up of ponds fed by damaged canals. All types of forest (production, protected and community) were damaged and disturbed. There was also some degree of terrace destruction and therefore a reduction of food crops area in the community forests. Specific information on the damage caused by both the earthquake and Merapi eruption is discussed below.

Crops: The earthquake and Merapi eruption caused damage to crops in all AEZs, as shown in Table 14. Damages to crops were caused by lack of water (where irrigation had collapsed), the collapse of terraces, or lack of time, since farmers were too busy concentrating on shelter renovation to manage the crops. In AEZ-2a, more than 50 percent of paddy and groundnut were damaged or remained unharvested. The most impacted area was AEZ-3, where all types of crops were damaged, with an average total loss of 57.3 percent. With regard to the types of crops, vegetables, paddy and corn were the most affected, with losses of 62.5 percent; 48 percent and 45 percent, respectively.

Table 14. The average percentage of damage and losses by crops and AEZ (N=144)

Commodity	Caused by earthquake			Caused by eruption	
	AEZ-2a	AEZ-2b	AEZ-3	AEZ-4	AEZ-5
Paddy	58.0	21.4	39.0	44.0	77.5
Corn	15.0	0	53.8	69.4	86.7
Soybean	30.0	0	25.0	0	0
Cassava	0	0	57.0	70.0	0
Groundnut	51.0	0	46.0	10.0	0
Vegetables	45.0	75.0	100.0	55.6	37.1
Fruits	0	0	80.0	56.0	0

Source: Analysed data from the household survey of the quantitative RLA (2006).

***Fisheries*:** The immediate losses in the fisheries sector due to the earthquake and the Merapi eruption were comparatively lower than in the other sectors. However, despite low immediate damage, further damage to fish ponds led to subsequent losses by the death or emergency selling of fish, as shown in Table 15. In November 2006, in AEZ–2b, 98.2 percent of the catfish were recorded as lost, as well as 100 percent of tilapia (gouramy), due to the damages caused by collapsed ponds. In AEZ-4, although there was no damage to fish ponds, 44 percent of catfish died, most likely due to stress and/or feed shortage. In other AEZs, however, there were no damages recorded.

Table 15. The average percentage (%) of fish sold or killed by AEZ (N=144)

Type of fish	Caused by earthquake						Caused by eruption			
	AEZ-2a		AEZ-2b		AEZ-3		AEZ-4		AEZ-5	
	Sold	*Dead*	*Sold*	*Dead*	*Sold*	*Dead*	*Sold*	*Dead*	*Sold*	*Dead*
Catfish	0	0	40	60	0	0	0	44	0	0
Tilapia	0	0	100	0	0	0	0	100	0	0
Nila	0	0	0	0	0	0	0	100	0	0
Shrimp	0	0	0	100	0	0	0	0	0	0

Source: Analysed data from the household survey of the quantitative RLA (2006)

Livestock: Large numbers of livestock were injured and killed during the earthquake; others died later due to stress, disease and lack of care. Data on losses are shown in Table 16.

Table 16. The average percentage (%) of livestock sold and dead by AEZ (N=144)

Type of livestock	Caused by earthquake						Caused by eruption			
	AEZ-2a		AEZ-2b		AEZ-3		AEZ-4		AEZ-5	
	Sold	*Dead*	*Sold*	*Dead*	*Sold*	*Dead*	*Sold*	*Dead*	*Sold*	*Dead*
Cattle	34.1	0	45.8	0.0	28.9	0	21.4	0	35.3	0
Sheep	0	0	25.0	25.0	66.7	0	0	0	33.3	0
Goat	44.1	0	50.0	0.0	14.5	0	45.0	5.0	25.0	0
Chicken	9.6	81.3	35.4	15.4	20.4	37.0	0	75.0	28.6	40.2
Duck	44.0	46.0	0	0	0	100.0	0	0	0	0
Quail	61.4	18.2	0	0	24.3	75.7	0	0	0	0

Source: Analysed data from the household survey of the quantitative RLA (2006).

The post-emergency conditions forced many farmers to sell their livestock (Table 17) for day-to-day survival (42 percent respondents) or due to livestock feed shortages (46 percent of respondents). Livestock feed shortages were caused by several factors, primarily hot ashes from the Merapi eruption, and destroyed fodder stores and lost feed. Approximately 64 percent of all affected farmers sold livestock after the earthquake; about 30 percent of the total owned was sold (Annex E).

A secondary impact of this mass selling was a drop in livestock prices in the disaster-affected area. Fodder prices, on the other hand, rose due to increased costs of transportation and lack of supply. Farmers did not have time to collect fodder due to having to respond to the most urgent need – house repairs.

Farmers rely on crop residues or crop by-products as major sources of feed for their livestock. The damages/losses in the cropping sector have therefore had indirect impacts on the livestock sector, such as depleted feed and fodder resources for livestock (crop residues and by-product), including rice straw, corn straw, groundnut leaf, cassava leaf or cassava peelings and rice bran. The main deficits were recorded in AEZ-2a and 2b (lowlands irrigated and semi-irrigated), where livestock mostly depends on crop residues and by-products as feed. In Central Java, especially in Klaten District where more than 943 ha of agricultural land (paddy fields) were damaged or remained unused, the loss of feed resources (crop residues) was calculated at around 5 000 tonnes of rice straw, 4 200 tonnes of groundnut straw and 3 700 tonnes of corn straw per harvesting period (based on dry matter). In Yogyakarta Province, the losses of crop residues/by-product for livestock feed due to damages of agriculture land (2 080 ha) were calculated at 11 000 tonnes of rice straw, 9 360 tonnes of groundnut straw and 8 300 tonnes of corn straw per harvesting period. The overall potential losses in livestock production in Yogyakarta and Central Java Provinces are shown in Table 17.

Table 17. Production losses in livestock production due to shelter damages, death of animals and temporary abandonment of agricultural land

Potential production losses	Yogyakarta Province		Central Java Province	
	Amount	Loss (million IDR)	Amount	Loss (million IDR)
Livestock production				
Chicken eggs (kg/day)	2 720	17.68	13 520	87.88
Duck eggs (kg/day	0	0	0	0
Quail eggs (kg/day)	0	0	60 160	902.40
Broiler meat (kg)	27 200	204.00	8 450	63.38
Cattle gain (kg)	41 194	659.10	1 498	23.97
Sheep/goat gain (kg)	7 126	114.02	57	0.91
Calves born (head)	3 500	7 000.00	1 250	2 500.00
Lamb (head)	13 000	2 600.00	1 300	260.00
Feed resources				
Rice straw (tonnes of DM)	11 440		5 187	
Groundnut straw (tonnes of DM)	9 360		4 244	
Corn straw (tonnes of DM)	8 320		3 772	

Source: Analysed data based on SPFS Damages Assessment, June 2006, FAO

***Forestry and estate crop*:** Damages to the forestry and estate crop were mainly caused by the Merapi eruption and affected the higher altitude AEZ (AEZ-3 and 4 in protected and community forests), as shown in Table 18. The Merapi eruption had a huge effect on forests around the top of Merapi, where it caused severe damage on land and an enclave of 30 000 peoples who live in more than 20 villages surrounding its top and slope. The Merapi outburst of lava and ashes from mid-May until June 2006 damaged and burned several protected forest areas. In Yogyakarta Province, approximately150 ha of the forest areas were burned as a result of the Merapi eruption.[8] In Central Java, about 1 246 ha from a total of 2 307[9] ha of protected forests were burned, particularly in Klaten and Boyolali. In Girimulyo and Panggang Subdistricts, Gunung Kidul, several terraces stabilizing about 3 400 ha community forest areas were destroyed by the impact of the earthquake.

Table 18. Type of forest, size of damage (ha) and loss (billion IDR), by type of forest and AEZ

Forest type	Caused by earthquake						Caused by eruption			
	AEZ-2a		AEZ-2b		AEZ-3		AEZ-4		AEZ-5	
	Size	*Loss*	*Size*	*Loss*	*Size*	*Loss*	*Size*	*Loss*	*Size*	*Loss*
Protected	0		0		0		0		1 396	6.0
Community	0		0		3 386.4		150	2.6	0	
Production	0		0		0	13.6	0		0	

Sources: Analysed secondary data from the Department of Estate Crops and Forestry of Yogyakarta and Central Java Provinces, 2006

The Forestry Service identified approximately 110 farmer groups that lost wood resources due to the earthquake. Moreover, as a result of the earthquake damages and fallen trees, the management of 3 386.4 ha of community forest, 150 ha of production forest and 1 396 ha of

[8] Forest and estate service of Yogyakarta Province, *PIKIRAN RAKYAT* (daily), 22 June 2006: more than 600 ha forest were burned in Sleman, Yogyakarta.
[9] *SUARA MERDEKA*, 17 June 2006: value loss predicted at IDR 6 billion.

protected forest were obstructed. Production forest areas are forest areas whose primary purpose is producing wood, which is also used by farmer groups for tree-crop intercropping.

The post-disaster situation in the most affected agro-ecological zones
A summary of damage per AEZ, as revealed by the integrated RLA, is given below.

In AEZ-2 (a and b), crops were not directly damaged by the earthquake but were affected, since they are grown under irrigation; where the earthquake destroyed the irrigation channels, the crops suffered from lack of water and lack of attention in the post-emergency situation, resulting in an approximate 30 percent reduction in production. Sales prices of agricultural commodities dropped due to the absence of traders in the post-earthquake situation. Many cattle were sold to fund the rebuilding of houses while the cost of cattle feed rose, which induced further sales of cattle. The earthquake also destroyed fish ponds and the water supply canals, resulting in losses of fish stock. *Cat fish* and *gouramy*, the most common fish kept by fish farmers, were stressed, lost or died due to damage/leaking of ponds. Cutting of coconut trees and bamboo for construction of temporary shelters or permanent homes increased greatly.

In AEZ-3, crops including paddy, corn and beans were severely damaged due to terrace collapse. Even where there was no direct impact production, agriculture suffered from a lack of labour and attention. Production decreased significantly. Following the earthquake, farmers sold their cattle to afford rebuilding homes, paying for expenses and school fees and to reduce the costs for animal fodder. Groundwater courses were altered or lost in some places; some communities now live under increased threat of landslides due to the destabilization of mountain slopes above their villages.

In AEZ-4, farmers failed to harvest their horticultural crops and tobacco due to the ashes from the Mt. Merapi eruption. The hot ashes burned and destroyed the community forest in this area. The remaining crops were destroyed by hungry monkeys escaping from burned forests nearby. The production and the quality of dairy milk significantly decreased due to the stressful conditions and the limited availability and low quality of feeds. Under these conditions, the prices of livestock dropped. Unfortunately, this condition was accompanied by a very prolonged dry season in 2006, which led to the failure of crops managed under community forest. Fish ponds suffered from a lack of water supply due to the damage of water springs, canals or pipes, which caused significant decreases in the fish production. Living costs increased as communities had to buy water costing IDR 80 000–130 000 per 5 000 litre. At the same time, the price of fish fodder and fish feed increased. Water supply problems also negatively affected livestock keeping.

In AEZ-5, all crops were damaged by the ash from the Mt. Merapi eruption and there was no harvest. In this area, people indicated that horticultural production decreased by 80 percent after the eruption. Livestock fodder was burned or damaged by the hot ashes causing shortages, which in turn led to the sale of goats and cattle. Increased livestock sales over a short time period meant that prices dropped and farmers benefited less from the sales. In some areas where water ponds are available, fish died as the water was contaminated by ash.

Physical assets

In terms of physical assets, the damage caused to peoples' homes was naturally the worst. The shock and huge losses led to trauma and depression. Many people died, were injured and/or internally displaced. After the earthquake, thousands of people stayed in tents or temporary shelters, which were dusty in the dry season and cold and wet in the rainy season. In the most affected area (AEZ 2), the number of damaged houses reached 90 percent in one village. In addition to peoples' homes, most of the public buildings such as village government buildings, schools mosques, churches, community health centres (*PUSKESMAS*), and extension buildings were damaged..

The rehabilitation of agriculture was not the first priority of farmers, since they first needed to secure their homes. A few weeks after the earthquake, the Government of Indonesia reinstated its support to help victims rebuild collapsed houses. On average, each household received IDR15 million depending on the scale of destruction. In practice, however, not all households have received this funding. Faced with this situation, victims worked hand-in-hand to build temporary shelters for their families, in some cases with support from NGOs and community groups. On the other hand, rehabilitation of damaged agriculture facilities such as irrigation canals, laboratories, buildings, livestock shelter and fish ponds had to wait.

In terms of agricultural infrastructure, the earthquake destroyed some primary, secondary and tertiary irrigation canals. In some places, non-permanent irrigation canals were lost or their courses altered. Many farmers lost tools such as hoes, sickles, hand-sprayers and hand-tractors.

Agricultural tools. Losses or damages to agricultural tools were experienced in all AEZs, as shown in Table 19. The greatest damage was to hoes, followed by sickles, hand sprayers and tractors. The most severely affected area was AEZ-3, where more than 50 percent of agriculture tools (except tractors) were damaged. In terms of total loss, the most severely hit people were farmers in AEZ-2a, who lost around IDR9.1 million worth of tools. In addition, all of the sprayers in this AEZ were damaged. AEZ-5, however, did not experience severe damage to agriculture tools: only 18 percent hoes and 14 percent of the sprayers owned by farmers were damaged. The overall financial losses due to broken hoes, sickle, sprayer and tractors amounted to IDR thousand 667.0; 205.4; 1 771 and 3 400, respectively.

Table 19. Damage of agricultural tools (%) and losses, by AEZ (N=144)

Items	Caused by earthquake						Caused by eruption			
	AEZ-2a		AEZ-2b		AEZ-3		AEZ-4		AEZ-5	
	%	Loss (thousand IDR /household)	%	Loss (thousand IDR /household	%	Loss (thousand IDR /household	%	Loss (thousand IDR /household	%	Loss (thousand IDR /household
Hoes	29.7	1 285	24.3	415	57.4	1 345	5.6	290	17.6	0
Sick-les	29.2	518	10.8	70	53.0	389	3.4	50	0	0
Spray-ers	100.0	7 300	50.0	300	50.0	1 255	0	0	14.3	0
Trac-tors	0.0	0	100.0	17 000	0	0	0	0	0	0

Source: Analysed data from the household survey of quantitative RLA

Livestock shelters. Major damage was caused to livestock shelters. The in-depth study carried out in November 2006 revealed that approximately 70 percent of all livestock shelters had been destroyed by the earthquake (Table 20). Moreover, since livestock are a means for farmers to save assets, any disturbance in this sector impacted immediately on the their overall household economy.

Table 20. Damage of livestock shelters and estimated loss, by livestock type and AEZ (N=144)

Types	**Caused by earthquake**						**Caused by eruption**			
	AEZ-2a		**AEZ-2b**		**AEZ-3**		**AEZ-4**		**AEZ-5**	
	%	**Loss (million IDR /household)**	**%**	**Loss (million IDR /household**	**%**	**Loss (million IDR /household**	**%**	**Loss (million IDR /household**	**%**	**Loss (million IDR /household**
Cattle	81.3	0.82	72.7	1.15	63.2	0.74	14.3	0.2	27.3	0.5
Sheep	0	0	0	0	100.0	0.5	0	0	0	0
Goat	25.0	0.1	55.6	0.35	55.6	1.55	25.0	0.5	33.3	1.5
Chicken	81.8	2.69	33.3	0.50	70.0	1.91	0	0	0	0.50
Duck	100.0	1.8	0	0	100.0	6.75	0	0	0	0
Quail	100.0	0.225	0	0	0	0	0	0	0	0

Source: Analysed data from the household survey of quantitative RLA

Rehabilitation of the livestock sector remains very slow, since most farmers have neither the funds to buy new livestock (cows and goats) nor repair livestock shelters.

Fish ponds. Most fish pond damage occurred in AEZ-2b and AEZ-4 (Table 21). In these AEZs, more than 60 percent of the fish ponds were completely damaged. In AEZ-5, some farmers keep catfish, tilapia and *Nila*; the ponds were not damaged by earthquake.

Based on secondary data from the Fishery Office in both provinces, the total numbers of ponds damaged were 2 180 and total losses due to fish ponds damage were 12 billion IDR, or US$1.4 million.

Table 21. Damage of fishpond and estimated loss, by AEZ (N=144)

	Caused by earthquake						Caused by eruption			
	AEZ-2a		AEZ-2b		AEZ-3		AEZ-4		AEZ-5	
	%	Loss (million IDR /household	%	Loss (million IDR /household	%	Loss (million IDR /household	%	Loss (million IDR /household	%	Loss (million IDR /household
Catfish	n.a.	n.a.	100	3	n.a.	n.a.	50	1	0	0
Tilapia	n.a.	n.a.	100	2	n.a.	n.a.	100	2	0	0
Nila	n.a.	n.a.	0	0	n.a.	n.a.	100	2	0	0
Shrimp	n.a.	n.a.	100	1	n.a.	n.a.	0	0	0	0

Source: Analysed data from the household survey of quantitative RLA

***Agro-business*.** Many agribusiness buildings such as tobacco drying sheds were damaged, leading to loss in income and unemployment. home-based agribusinesses were massively affected when houses crashed. Facilities including equipment and tools were damaged and/or lost. These damages were concentrated in AEZs-2a, 2b and 3. Table 22 summarizes the damages to agribusiness equipment.

Table 22. Damages and losses of agribusiness equipments, by AEZ (thousands IDR)

	Caused by earthquake					
	AEZ-2a		AEZ-2b		AEZ-3	
	No.	Loss (thousands IDR)	No.	Loss (thousands IDR)	No.	Loss (thousands IDR)
Tobacco oven	14	215 000	7	105 000		
Tobacco processing unit	0		7	n.a.		
Tobacco stove	14	70	7	35		
Virgin coconut oil (VCO) processing unit	15	112 500				
Natadecoco processing unit	2	10 000				
Coconut husk processing unit	2	20 000				
NTFP processing unit	5	25 000				
Kacip	125	9 375				
Cacao processing unit	0		0		3	10 000

Source: Estate Crops and Forestry Department, Yogyakarta Province, 2006

The reduced capacities of the agro-business subsector decreased demands for raw products, thus further destabilizing local markets and farmers' income opportunities.

In AEZ-4 and AEZ-5, villages and physical structures were covered by ash from the Mount Merapi eruption. Some tourist facilities were damaged, leading to fewer visits. Some water dams were damaged or lost due to lava inflow.

Financial assets

Most of the population in affected areas works in farming and small- and medium-sized enterprises, and home-based agribusiness, which are usually located within the home. During the earthquake, many lost almost all of their properties, including house, cattle, fish and fish ponds, machinery, equipment and other facilities needed for implementing daily livelihood activities and income-generation. Responding to the situation, many government and private agencies, i.e. government, private companies, individual, humanitarian agencies, academics and other concerned parties, delivered aids and supports in the form of clothes, foods, water and sanitation, tents, medicine and monthly support in form of money – up to a certain period.

The earthquake caused many to spend all their time trying to rebuild their temporary shelters or home. They could not, therefore, engage in productive activities and had no means to earn money for school fees and other expenses. Since most of them did not have any cash money at hand, they were forced to sell remaining belongings, particularly jewellery and livestock. As shown in Table 23, more than 40 percent of the livestock owned by the farmers had been sold to engage in productive activities. Hence, the number of livestock sold in markets showed a significant level after the earthquake.

Another path chosen by many households to afford some basic needs and rehabilitation was to take loans either from banks or informal creditors, who usually charge high interest rates. According to respondents, farmers particularly needed special credit since they had no collateral or capacity as common bank clients. Farmers also felt that they were at a stage where farming inputs were unaffordable unless special prices/ subsidies were set by the government.

Table 23. Percentage of livestock sold per household, by AEZ (N=144)

Livestock	Caused by earthquake			Caused by eruption	
	AEZ-2a	AEZ-2b	AEZ-3	AEZ-4	AEZ-5
Cattle	34.1	45.8	28.9	21.4	35.3
Sheep	0	25.0	66.7	0	33.3
Goat	44.1	50.0	14.5	45.0	25.0
Chicken	9.6	35.4	20.4	0	28.6
Duck	44.0	0	0	0	0
Quail	61.4	0	24.3	0	0

Source: Analysed data from the household survey of quantitative RLA

Human assets

Due to the intensity of the earthquake, an estimated 37 000 people were injured. Support and special programmes designed to assist these persons were initially conducted by humanitarian agencies, government, health departments and/or hospitals. Six months later, a large proportion of health facilities and services provided by foreign agencies as part of the emergency effort were closed or reduced as the emergency period ended. In many instances, there were no special facilities in the workplace that could enable these people to return to work.

Entire communities in affected areas were traumatized by the earthquake, having lost families, relatives, friends and belongings in a matter of minutes. There was internal and external support for some trauma-healing activities, including community meetings and discussions with experts. Not all levels and components of society were reached, however, due to human and financial resource constraints.

Education suffered as many schools were completely destroyed. Children have since been studying in temporary shelters or tents. Six months after the earthquake, the reconstruction of

school buildings in the affected areas still continues due to the allocation of aid from many organizations.

Most of the population in earthquake-affected areas worked as farmers and traders for small- and medium-sized enterprises. After the earthquake, the richer people were able to restart their livelihood income and businesses. But most people experienced difficulties that constrained them from restarting their livelihoods: limited land ownership, limited access to credit and lack of valuable properties to sell. At the time of the follow-up study, the rainy season had not yet started, so many farmers were generating an income by working in home reconstruction, and some migrated to the cities to work in factories or as casual workers in order to feed their families.

Women farmers usually have a low level of education, mostly only up to the elementary school level, since the community does not prioritize their higher education. Low levels of education combined with limited access to resources constrain them from enjoying similar opportunities to men. In addition, most agricultural tools, technology and capacity-building programmes tend not to be designed to address women farmers' needs. However, women in rural areas play an important role in restarting their agro-based home industries, such as cassava starch production for family income-generation.

Social assets and gender considerations

Before the earthquake, there were a number of social groups within communities such as men farmer groups, women farmer groups and youth groups. These groups were established both by the government and the community. They hold regular meetings to discuss problems related to their respective occupations, mostly in farming and home industry, or other social issues within the community. Groups play an important role in improving their members' bargaining position with outsider institutions such as the market. Group members have the opportunity to share all kinds of information, skills and experience. The Credit Union group, known as the lending and borrowing group (*kelompok simpan pinjam*), is one of the community groups that plays an important role, acting as an informal money lender that provides access to credit or inputs (such as cattle) on a revolving basis to its members with less complicated requirements than other financial sources.

The earthquake impacted the groups indirectly as most group members lost families and belongings. The first priority for group members was to restore their livelihoods. Hence, regular group activities stopped, and members become inactive after the earthquake. It was common practice in the post-earthquake emergency and recovery phases for agencies to provide aid through groups rather than directly to individuals. A database of members affected by the earthquake was produced within the first six months to ensure that aid was received by those in need.

Six months after the earthquake, some groups took steps to restart their original activities, due to the received aid. For example, some farmer groups received farming equipment such as backhoes, paddy and crop seed, fertilizer, cattle and working capital, while small home-based agribusinesses received support in the form of tools and working capital. Support given to community groups came from the government, humanitarian agencies, universities and NGOs during the emergency and first recovery phases.

After the earthquake, villagers worked together voluntarily to help their neighbours and relatives rebuild their collapsed houses. Strong social cohesion among villagers in affected rural areas contributed to the acceleration of house building. In addition, they were willing to share their remaining belongings, such as clothes and food with their suffering neighbours.

With regard to gender considerations, women are involved in most stages of farming, from cultivating to post-harvest handling, although their role may not recognized by the community. It is women who plant the paddy and crops at the beginning of the planting season with simple hand tools. Women are also responsible for maintaining the paddy and other crops until they are ready to be harvested and sold in the market. In addition to work in the fields, women are also in charge of domestic work, house-cleaning, cooking for the family and washing clothes. They also maintain social relationships in surrounding neighbourhoods. In addition, many women work outside their homes either as domestic workers, traders selling agricultural-based, home-based industry products (crackers, snack, clothes, etc) in the market, shopkeepers and casual labourers in the city. They therefore have a "triple burden" of domestic, productive and social commitments. Accordingly, careful consideration should be given to constraints experienced by women to ensure the most effective programme intervention, which does not add to their burden.

The Asset Pentagon Analysis stated that physical and financial assets are affected worst than human, natural and social assets. Therefore, improving these assets in the short term is particularly important for farmers. It can be achieved through: the provision and distribution of farming inputs (certified field crop seed, fertilizer, tools) and livestock; rehabilitation of physical facilities such as livestock shelter, inland fisheries ponds, secondary/tertiary irrigation canals and damaged forest land; and development of agribusinesses to support family income in affected areas.

According to the SLA, programme intervention must be based on the community strength and current assets. In the case of the Yogyakarta and Central Java earthquake, the strong social assets and human resources contributed significantly to accelerate livelihood improvement. Community self-help groups and empathy played important roles to ease the suffering caused by the earthquake.

Vulnerability of different beneficiary groups

Indonesia, in particular Java Island, is well known for its rich natural resources, fertile soil and abundant water suitable for cultivating paddy and other valuable crops. For centuries, people enjoyed the generosity of nature without knowing that the country is also fragile and susceptible to natural disasters from the ocean (tsunami), land (landslide, earthquake) and mountain (eruption), as the archipelago lies within the Pacific "Ring of Fire".

The following factors have increased the vulnerability of communities in the disaster-affected areas:

- relatively weak coordination in the implementation of early warning systems and disaster risk management;
- poor knowledge on how to live alongside potential disaster;
- poor housing and building construction, which is not designed to resist earthquakes.
- poor and limited livelihood assets of most of the population in the affected areas: after the earthquake, they lost many if not all assets and had to sell their remaining belongings; they are unprepared for any kind of new shock.

The vulnerability of farm families varies. Land owners and renters usually have a variety of livelihood assets. They are also equipped with strong social capital and high education (senior high school on average). Due to their strong financial assets, land owners are also able to diversify their income through other business activities, such as trading. Further, they often have a better opportunity to receive the necessary support for recovering their livelihoods than do share croppers and landless labourers. Six months after the earthquake, most of the land owners were able to restore their houses, if not entirely, then at least partially.

Sharecroppers and landless labourers are in a far more vulnerable position. Commonly very poor, they have a low level of education, less variety of livelihood assets and often large families. Farming is their main job and skill. Hence, damage to farming in general destroys their only livelihood income source. Six months after the earthquake, poor sharecroppers and landless labourers can still be found living in tents or shelters made from bamboo and plastic materials.

Coping mechanisms

Most people sold their remaining belongings such as cattle and jewellery to fulfill their most urgent family needs such as rehabilitating their homes, buying food and clothes, and paying school fees. However, with most of their belongings now sold, they have become even poorer and more vulnerable six month after the earthquake.

As farming facilities in many places were still awaiting rehabilitation, most farmers were earning money from work in non-farm activities, such as labouring, *becak* (pedicabs)-driving, as carpenters or migrant workers. Wives of farmers also work outside their homes either as servants/domestic household workers, clothes washers, labourers and migrant workers. Another part of their coping strategy was to sell livelihood assets (20 percent), take loans from banking institutions, and neighbours and/or relatives (18 percent), among others

Six months after the earthquake, based on the household survey, the household head respondents disaggregated by sex indicated some coping mechanism adopted by their family, as shown in Figure 5.

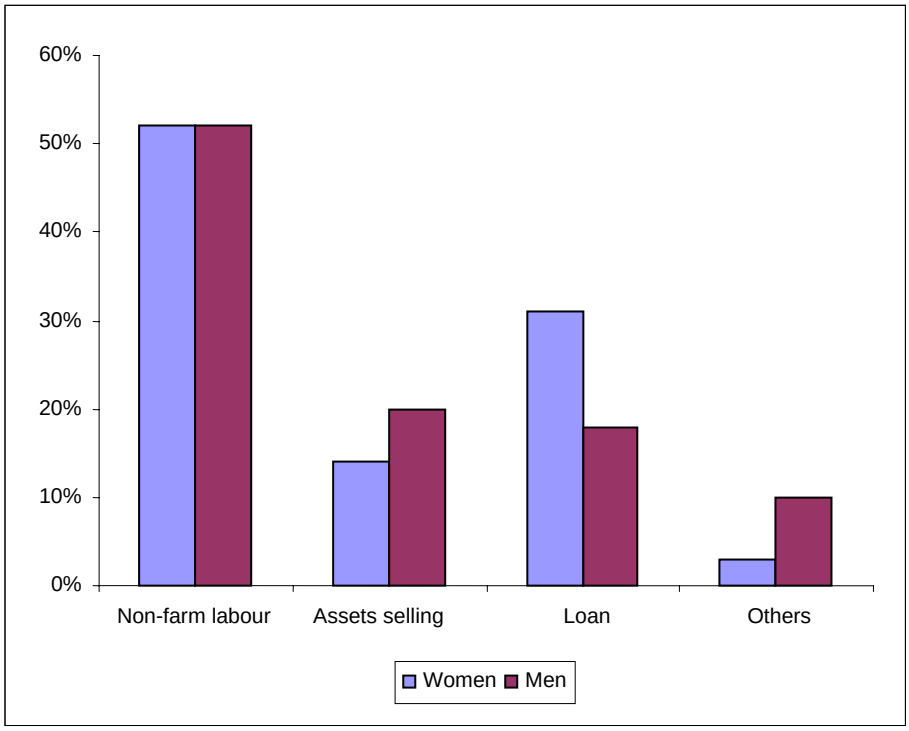

Figure 5. Coping mechanisms indicated by the surveyed respondents

In order to maintain their livelihood basis, many women accepted labour in the non-farm sector as household servants, small traders, etc. (53 percent of all women farmers interviewed) .The second common coping mechanism implemented by women respondent was to take loans/debts/credit (33 percent), either from banking institution, neighbours and/or relatives due to a strong communal system and social capital in affected earthquake areas.

Also, women not only sold off assets (mostly livestock, 12 percent), but also motorcycles (2 percent).

Another common coping strategy was living in temporary shelters. After the earthquake, the market demand for reconstruction material increased significantly, leading to increasing prices for wood, cement, sand and other materials. For most victims who lost most of their assets, the price of these materials became unaffordable. Hence, instead of buying expensive construction materials, they are using bamboo, all kinds of wood, plastic sheeting, tents, and second-hand materials to construct their homes, rather than engaging in permanent home reconstruction.

Even though farmers lost most of their farming equipment and irrigation canals have not yet been repaired, they hope that with the onset of the rainy season, they will be able to plant paddy and crops. They hope for good rains for a successful harvest, which would allow them sell these crops in the market, so that they will regain working capital to restart full productive activities.

In addition to the above community coping mechanisms, many people received government or/and external aid due to the rapid national and international response to the earthquake. Support received form external parties included provision of temporary shelter, food, medicine, water and sanitation and temporary school buildings. In terms of agriculture, however, only very limited amounts of inputs and very few basic equipments were distributed by local and international agencies to restart cropping activities

Case study interviews on the livelihood assets situation

Three months after the earthquake

Social assets

Trauma: All people interviewed were still highly traumatized, finding it very hard to return to the field, their routines, and some kind of normality. The main concern of most farmers was to restore their homes and belongings.

Community cohesion: Almost everywhere, villagers were very active in helping each other to restore community buildings under the *gotong royong* system. All farmers have benefited from community solidarity.

Physical assets

Housing: All people interviewed lived in temporary shelters made of bamboo, wood and plastic, or in tents. All of them needed financial aid from the government to rebuild or repair their homes, since they did not have any savings or capital left. They could not predict when they would be in the condition to return to normal life. Interviewees gave the impression that they did not have a long-term plan, but instead focused on daily survival. Housing was their maximum priority, taking precedent over all other matters.

Natural assets

Agriculture: All people interviewed were dependent on farming activities. Some of the farmers (both men and women) owned land (100–5 000 m^2), while others were simply tenants, sharecroppers and landless workers. It is interesting to point out that the size of the land was not strategic to the welfare of the most vulnerable farmers. For example, one woman household head who owned 5 000 m^2 could not obtain a high yield since she was too old to work the land alone and too poor to employ an assistant.

None of the people interviewed were working in the fields, mainly because water availability was low or non-existent due to the dry season and the poor irrigation systems in all visited areas or because farmers were fully involved in the rebuilding their houses and with the *gotong royong* to help other villagers to restore their belongings.

All interviewees were waiting for the rainy season to restart their farming activities. Most farmers did not have capital to buy the necessary seeds and agro-inputs for paddy cultivation. The seasonal rural workers simply hoped that, when the rainy season came, farmers would be in the condition to hire them to work in the fields; alternatively, the workers planned to find other off-farm jobs, possibly in nearby villages. During the dry season, some interviewees had vegetables in the field for domestic consumption, not for the market.

Livestock: Few of those interviewed owned livestock: they lacked capital to buy more heads, and they were not planning to get any livestock right after the earthquake. One individual sold two goats even before the disasters in order to have cash for his household's daily needs. A common practice was shared cattle breeding: the farmer feeds the neighbour's cattle and at selling time, the profits are shared.

Food availability: After the earthquake, the Government of Indonesia promised victims 10 kg of rice per person per month for three months. To date, the farmers have only received the first of these instalments. At the time of reporting, NGOs were still very active in the villages, distributing food (biscuits, instant noodles and water), although over time their presence in the field became less frequent. People still had some rice left from the previous rainy season, but their stocks were being depleted. They were trying to sell anything to get some cash to purchase food.

Financial assets

Source of income: All interviewees were waiting for the promised government compensation (IDR30 million at first, which later became IDR15 million). The economic life in the villages – markets, *waroeng* (typical Indonesian street food shops) and micro-businesses had still not restarted because people were very busy rebuilding their homes. Most interviewees did not have any savings to be utilized for rehabilitation. As a consequence, there was an increased number of loans to build houses and to pay school fees.

Cost of living: Generally, all prices had increased after the earthquake, although people had not yet started consuming as previously.

Employment: Some farmers were helping the richest people in the villages to rebuild their houses, earning around IDR18 000–20 000 per day, while others were working as builders in nearby areas. On the whole, all the people were involved in the *gotong royong* system, which meant working for free until the village was restored to a decent level. No one could predict when they would start earning some money again

Human assets

Education: Generally, the children of this area all received a primary education at least, since it was socially unacceptable for a family not send them to school. For this reason, education expenditures were always one of the main items in a family budget. The earthquake had a major impact on the education sector: in Bantul District over 90 percent and in Klaten around 38 percent of educational buildings were damaged or destroyed. Classes were held in tents, promptly set up during the first emergency interventions. In a school almost untouched by the tremors, students needed time to recover from the trauma and to return to studying in a building.

Health: Respiratory infections, trauma and diarrhoea have been the most common illnesses among the interviewees. Most cases were reported in Bantul (42 percent), Klaten (22 percent), Yogyakarta City (19 percent) and Sleman (17 percent). Only one farmer in this study (was lightly injured during the disasters and received medical assistance.

Livelihood assets situation six months after the earthquake

Social assets

Trauma: Relief aid from NGOs has been provided in most areas and the government has still many operations to complete, e.g. repairing roads, irrigation systems and distributing compensation for affected households. Some people were still sleeping outside their houses after six months, even if they had already restored the buildings, because they were scared of another earthquake. All interviewed farmers reported new, small tremors on a weekly basis; they were aware that from one moment to the next another large earthquake could hit their village again. Nevertheless, people seemed very active and felt that village life had almost returned to normalcy. Except for the elderly who had no goals but to survive, the rest of the population were working hard to restore their lives and looking into new opportunities for rehabilitation of their livelihoods.

Migration: No interviewee moved away from the village or was planning to do so. Migration was a phenomenon that has not touched this area, according to reports by the heads of the villages during the assessment. The social network and solidarity was so strong in the villages that people did not feel insecure and did not harbour any desire to leave their families.

Physical assets

Housing: Half the people interviewed last August recently went back to live in their restored houses after five months in temporary shelters. In the villages, especially those suffering the most damage (mainly in Bantul District), there were still many shelters built with the help of NGOs. The members of three households in this study were living in very precarious shelters, unsuitable for the rainy season. Moreover, the only assured assistance available to them was from their communities. Once the interviewees returned to their homes, they felt their lives had significantly improved. As homes were no longer a concern, it seemed they were not worried about the future, even if they still did not have a defined plan for the future and were jobless.

Natural assets

Agriculture: Since it was the dry season, most of the interviewed farmers were not managing farming activities (except for feeding their animals). In some areas, conditions were similar to a severe drought that hits every five years. Even in villages with an irrigation system, some farmers were not active due to lack of water and major damages, or because they were still too busy rebuilding their homes.

Only the land owners did not stop their livelihood activities since their land had not suffered from the drought; they owned pumps, which provided the necessary water for the cultivated area. Farmers who received seeds and fertilizers from FAO were waiting for the rainy season to plant them.

Those who did not receive seeds and fertilizer from the government or any other institution were planning to request a loan from the bank or from friends and neighbours to purchase them.

In general, all farmers, whether tenant, land owners or landless, were looking for alternative sources of income rather than cultivation, since agriculture no longer seemed profitable, mainly due to a lack of capital, limited land size and the high price of agro-inputs. For this

reason, some of them were trying to get loans to start other small business, but they did not have clear plans on how to proceed or what kind of business to create.

The farmers of this study renounced the traditional additional income from tobacco (in Bantul and Klaten areas) because the market had totally collapsed since the earthquake had hit these areas. The traders rarely went to the villages to buy the farmers' harvest, and when they did, they only offered half the usual price. This translated into only one crop season (paddy) for farmers to date.

Livestock: Nothing has changed since the last visit. None of the interviewed farmers bought new cattle, goats or chickens, mainly because they lacked capital. All the money they were able to collect had been used to restore their homes. Farmers showed an interest in owning livestock, explaining, however, that they would wait for the government or other institutions to provide it. Among the three landlords interviewed, one household owned two cattle, which were displaced because the shelter had been destroyed during the disaster. As soon as possible, the farmer would rebuild a new shelter made of wood and bamboo.

Food availability: In general, interviewees did not have severe problems with food availability (even if their physical appearances suggested malnourishment). The quantity and quality of the food available was regrettable, however, and of the poorest type/quality.

Financial assets

Source of income: All the households of this study were still facing problems with income. It was still the dry season and they were just surviving while waiting for the rain. Many interviewees requested loans from Bank Rakyat Indonesia (BRI), which provided the most convenient interest rates. Applying for loans has been a very common practice in the area, before and after the earthquake, to rebuild homes, start businesses and purchase assets.

Cost of living: Due to their extremely vulnerable condition, households considerably reduced their expenditures because prices of all goods seemed prohibitive at that time.

Employment: None of those interviewed had jobs due to the general crisis in each village. Some farmers were still very busy rebuilding their houses. Once finished with the work, however, they planned to go back to the fields (if the rainy season were to start) or look for off-farm employment opportunities, since the farming sector did not seem profitable any longer, according to most of the farmers interviewed. Only one of the land owners was very active on his field and outside since he was a farmer group leader.

Human assets

Education: Didactic activities restarted and in many cases, students were studying in tents or temporary schools. The problem for the most vulnerable categories of farmers was to pay for school fees, as most of them did not have any income at that time.

V. COMMUNITY RECOMMENDATIONS

In line with efforts to rehabilitate the agriculture sectors of the affected areas, some community recommendations for short-, medium- and long-term interventions were collected and extracted from an integrated RLA supported with disaggregate data of farmers' needs and three consultation workshops attended by range of stakeholders.

With regard to short-term needs, farmers indicated the need for assistance in purchasing agricultural tools, food-processing equipment, inputs (i.e. seed and fertilizers), cattle and goats fish seeds and working capital. This kind of provision would enable poor farmers – and those further impoverished after the earthquake – to re-start their livelihoods. They indicated that practical needs should be addressed first, before longer development programmes could successfully take place.

Since *irrigation* is a significant factor for many farmers, respondents recommended that the responsible authority should repair the major destruction to primary and secondary canals as soon as possible, since thousands of farmers depend on them for irrigated paddy fields. For the next rainy season, small rehabilitation works can help farmers temporarily, but in the longer term, major rehabilitation must be done. Land owners and sharecroppers will directly benefit from this intervention, while agricultural labourers will indirectly benefit from the increased opportunity to work.

Responses clearly stated that a ***pro-poor policy in the agriculture sector is critically needed*** to protect farmers and ensure decent prices for their outputs, as well as affordable agriculture inputs in post-emergency situations. The current high prices of agriculture inputs, combined with the very small proportion of land ownership (less than 0.20 ha/person), limited skills and knowledge, and low profits gained from farming as experienced after the earthquake puts farmers into extreme difficulty. It is important that the government provide the framework to further develop the agriculture sector and protect farmer livelihoods from unfair market competition. At the same time, the government should proactively provide programmes to assist farmers to develop their capacities and skills to be able to better compete in the market.

The provision of appropriate and soft credit schemes with low interest rates were considered appropriate and useful. Since most farmers are poor, they do not have decent collateral, capacity or capital to ask for credit from commercial banks. Most farmers face difficulties when they want to take loans from a bank, so they prefer to take loans from informal sources, which are faster and less complicated, but in general more costly. Farmers often get trapped into a debt circle of paying high interest rates and sometimes having to borrow money from other sources, such as relatives, in order to be able to pay back monthly instalments. As a result, they cannot earn savings for the family and remain in debt.

Based on disaggregated data collected from a quantitative study, men and women farmers expressed their own specific needs in line with their activities in household and fields, as shown in Figures 6 and 7.

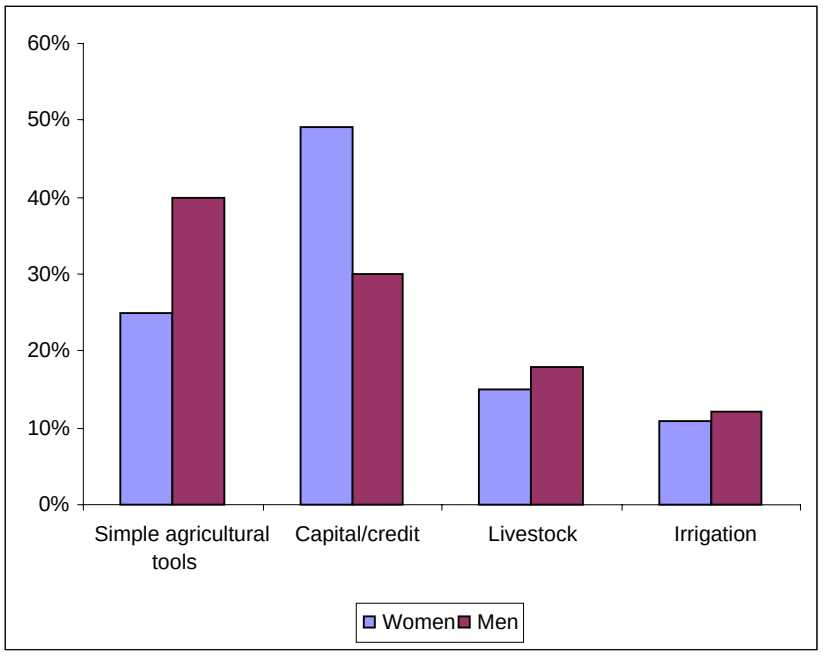

Figure 6. Medium-term needs indicated by the surveyed respondents

With regard to medium-term needs, the holistic approach in the rehabilitation strategy will address all productive and vulnerable household assets, which may include food crops and orchards. Livestock and other on-, off-, and non-farm income-generating activities build capacities of range of stakeholders such as farmers, farmer groups, community-based organizations and government staff.

a. **Rehabilitation and improvement of farm production systems**
   Highest priority will be given to help farmers and other persons who depend on agriculture (landless labourers, traders, processors and input suppliers) to restart farm production and to link their supply chain with the agribusiness, including agro-industry and its marketing.

b. **Income-generation through the diversification of income resources and development of agribusiness/enterprises**
   The adoption of relatively new commodities with quick yield income-generation will be considered one priority. These commodities include vegetables and other quick yielding income-generating activities. Other interventions in on- and off-farm food processing activities would directly benefit producers, traders and labourers, including men, women and youth. New investment opportunities, possibly through public-private partnerships (e.g. in agro-processing) will be considered. These would require technical, economic and financial feasibility assessment and market assessment and well as skills and capacity development of farmer/producers, traders and other potential community groups to meet new market demand and requirements.

c. **Improvement of support services**
   Improved private and public support services should be put in place to assist in the resumption of agricultural activity as a whole system. Some services will be provided by the public sector and other services through public-private partnerships with farmers' or producers' associations, traders, input suppliers and credit institutions.

d. **Capacity-building activities for the range of stakeholders involved**

Improving capacity for the range of stakeholders involved, such as farmers, farmer groups (men's and women's groups), youth farmer groups, community-based organizations and government staff, will be an essential part of the programme. Activities might be delivered differently according to the strengths and weaknesses of each stakeholder, as follows:

a. *Farmers*
Since farmers lack knowledge and skills required to meet market demand, a capacity-building intervention could include: workshops, training and comparison studies on how to develop agribusiness, promotion and marketing techniques, business management and processing of raw material into value-added product ; linking of farmers' or producers' associations with private enterprises with specific skills-related with market requirement, etc.

b. Community-based organizations
Project activities could include training on: how to organize communities: how to communicate effectively with various stakeholders involved in the farming rehabilitation programme; and on organizational management, etc.

c. Government staff (i.e. extension services)
Project activities for government staff could include training on how to deliver farming services effectively, new farming methods, and how to link the farmers with private sectors, among others.

Based on disaggregated data, men and women expressed their own specific policy priorities and long-term needs, as shown in Figures 7 and 8.

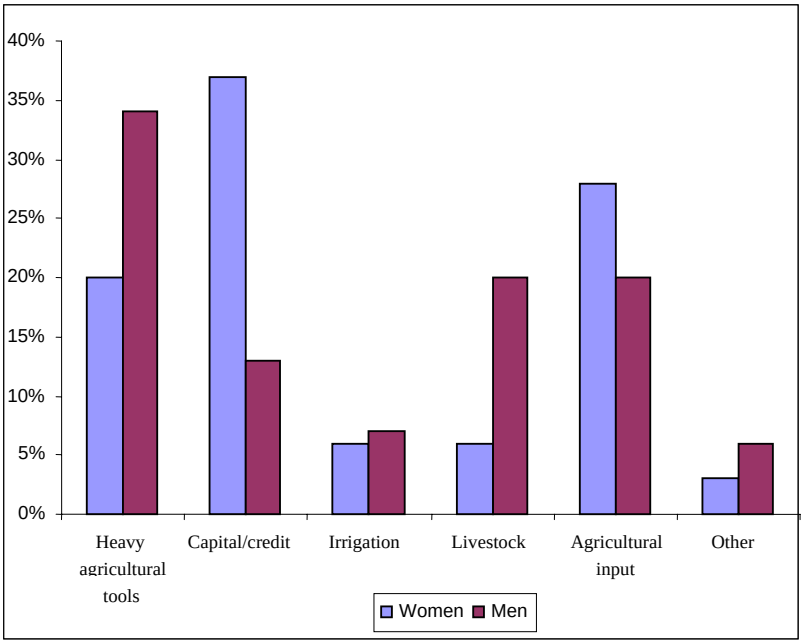

Figure 7. Long-term needs indicated by the surveyed respondents

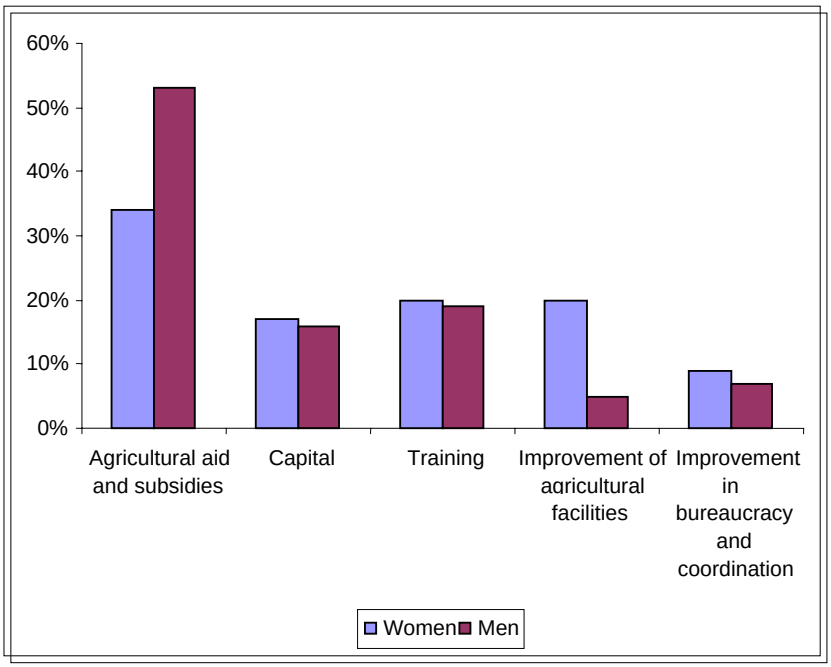

Figure 8. Government policy priorities as requested by the surveyed respondents

VI. CONCLUSIONS

The earthquake and the Merapi eruption affected farming-related livelihoods. The most seriously earthquake-damaged areas were AEZ-2a, AEZ-2b, and AEZ-3, while the Merapi eruption caused agricultural sector damage in AEZ-4 and AEZ-5. The results of the Integrated RLA indicated that most community livelihood assets were still depleted six months after the earthquake. Despite aids given, livelihood restoration was progressing extremely slowly. According to respondents in this RLA, the crucial factors causing the vulnerability and stalled livelihoods were: (i) limited natural resources owned and managed by the farmers, i.e. very small land ownership and water irrigation; (ii) limited access to financial and capital supports, agriculture inputs and water irrigation; and (iii) lack of knowledge and livelihood opportunities.

Housing has been the first priority for the people in earthquake-affected areas, since their homes serve many functions in the livelihood rehabilitation process, as sites for agro-industry production and warehouses, etc. In this study, almost all farmers gave precedence to house reconstruction, abandoning all income-generating activities for almost six-months. The big land owners with enough capital left revealed they had still enough capacity to return to normal life, whereas the most vulnerable groups, i.e. land labourers and land renters, were still heavily suffering the impact of disasters.

In the food crops subsector, the affected farm households harvested their crops late or sometimes left crops in the fields, since they focused on house reconstruction. Livestock that were not killed or injured when their shelters collapsed were in many cases sold prematurely to cover rebuilding and daily living costs. As livestock are a means of asset saving by farmers, any disturbance in this sector impacted immediately on the overall farmer household economy. Aquaculture was impacted on both due to direct damage to fish ponds and to drying up of ponds fed by damaged canals. All types of forest (production, protected and community) were damaged and disturbed, and terraces were destroyed to some extend, leading to a reduction of the food crop area in the community forests.

In terms of agricultural infrastructure, the earthquake destroyed some primary, secondary and tertiary irrigation canals. Many farmers lost their tools such as hoes, sickles, hand sprayers and hand tractors. About 70 percent of all livestock shelters had been destroyed by the earthquake. Most of the fish pond damage occurred in AEZ-2b and AEZ-4. Many agribusiness buildings such as tobacco-drying sheds were damaged, leading to losses in income and unemployment. Facilities including factory houses, equipment and tools were damaged and or lost. The earthquake impacted the farmers and community groups indirectly, as most group members lost families and belongings. The first priority for group members was to restore their homes through the *gotong royong* system. Hence, regular group activities stopped and members become inactive after the earthquake.

Most of the population in earthquake-affected areas work as farmers and traders for micro-, small- and medium-sized enterprises. After the earthquake, richer people were able to restart their income-generating activities and businesses. But most of the people experienced difficulty – due to limited land ownership, limited access to credit and lack of valuable properties that they could sell – which constrained them from restarting their livelihoods. Most people sold their remaining belongings such as cattle and jewellery as a coping mechanism to fulfil family needs, such as rebuilding their homes, buying food and clothes, and paying for school fees. However, as most of their belongings are now sold, they have become even more poor and vulnerable. Since farming facilities awaiting rehabilitation everywhere, most farmers are earning money by working in non-farm activities to survive.

In the short term, farmers indicated that they needed assistance, including the provision of agricultural tools, food-processing equipment, and seed and cattle as working capital. This kind of provision would enable poor farmers – who have become poorer after the earthquake – to start their livelihoods again. In the long term, provision or access to capital, agriculture support/subsidies, agriculture and agribusiness-related training, e.g. in improving product quality, market linkages and organizational development, remain the highest priorities.

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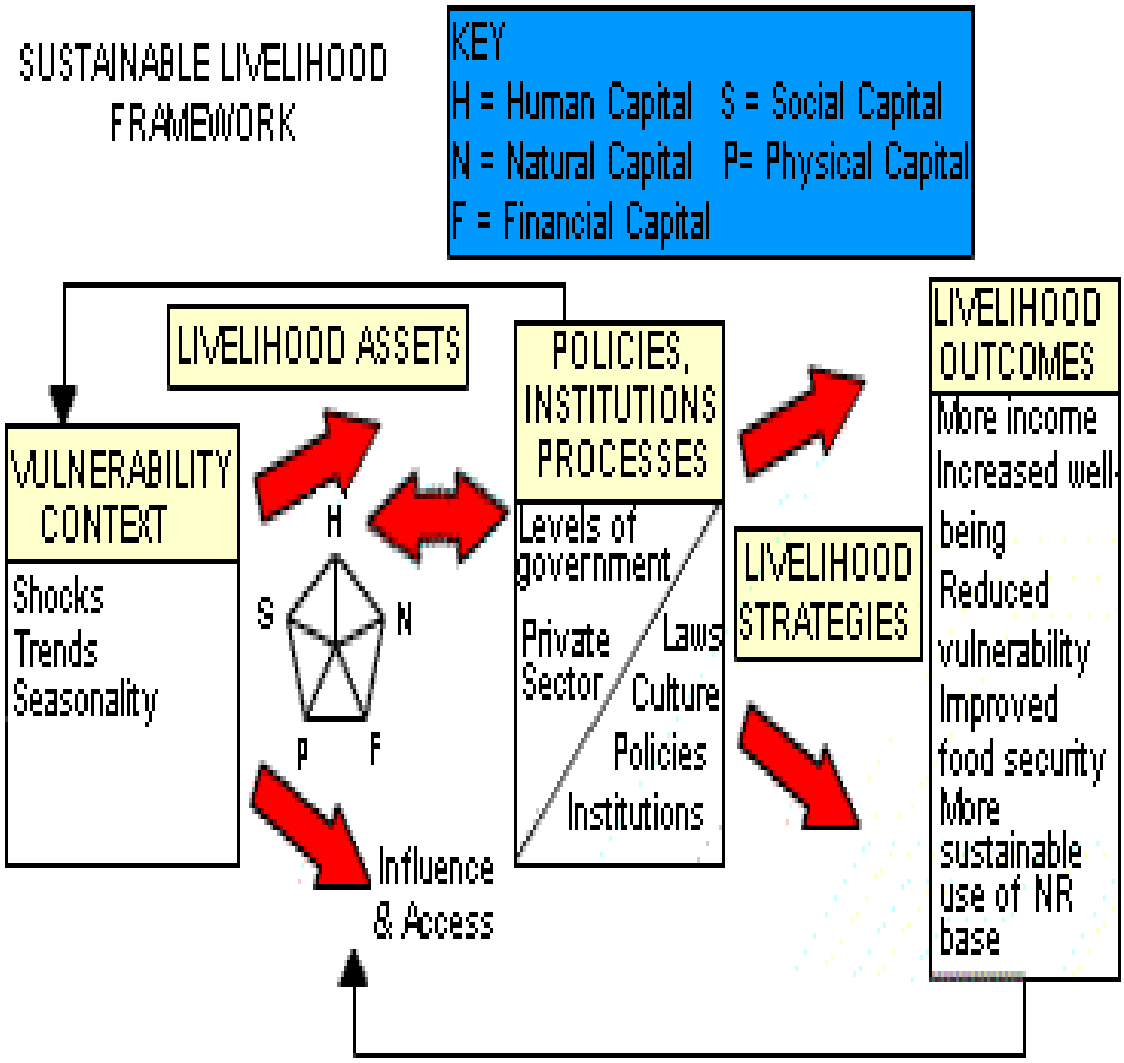
Annex A: The Sustainable Livelihood Framework (SLA)



Annex B. Interview checklist and data management forms of a qualitative Rapid Livelihoods Assessment (RLA)

I. Focus group discussions (FGDs) with village heads and community leaders

Objectives:

1. To identify the most important livelihood resources within the villages.
2. To identify the variety of damage to community livelihood resources caused by the earthquake.
3. To identify the main farming activity and season calendar.
4. To identify community groups based on their welfare status in order to conduct in-depth interviews.
5. To identify community groups and their roles.

Methods:

1. FGDs are conducted by discussions with five to six persons (community group leaders) who are familiar with village conditions.
2. Introduce the entire team into village and state that the survey is not linked to aid support.

Ask the following questions:

1. Income resources

Discuss the community's main income resources that support their livelihoods.

a. Make a list of livelihood and income resources of the community with the participants of the discussions. Start from the most important income resource.

2. Impacts of the earthquake on livelihood conditions

a. How did the earthquake impact the livelihood of the community?
b. What kind of support was provided by the government, the United Nations or other humanitarian organizations?
c. Who received the above-mentioned support?
d. Is there any group that has not received support?

3. Planting calendar/main activities

a. Main planting rotation practised by farmers in the village (use planting schedule provided)
b. What are the main activities related to livestock, fishery, and wood and non-wood collection?

4. Level of community welfare

Within the village, discuss the groups of poor and rich persons (taking into consideration that the difference may not be as obvious after the earthquake):

a. What are the symbol of being rich or poor, for example, amount of land owned?
b. If possible, identify groups who receive welfare support and the number of welfare groups receiving-
c. What is the number or percentage of households for each wealth-ranking category?
d. How many families are headed by women?
e. Are the poorest family usually headed by women?

5. Community groups

a. How many farmer groups or other groups are there in the village?
b. Where are they located?
c. How many groups are active?
d. When was the group established?

e. What are the activities and roles of the groups within the community?

6. Other income sources

Supplementary work

a. What kind, if any, of supplementary employment is carried out by each member of family?
b. Where did they work?
c. Do they move to be closer to the job?
d. Who is their employer or who hired them?
e. In what month was this job available during the last year.
f. What is the average salary?
g. Did the earthquake affect this job? If so, please explain how.

Formal jobs

a. Is there any member of family working in a formal job? If so, in what sector?
b. Where did or do they work? Do they commute daily or have they moved (e.g. in a boarding house)?
c. Did the earthquake affect this job? If so, explain how.

Foreign money

a. Are there any relatives or members of the family who have worked in a foreign country and did they send remittances regularly?
b. Where did they work and in what capacity?
c. Did the earthquake affect their job or remittances received? If so, please explain.

Other sources of income

a. shopkeeper;
b. retired (on pension from formal job; provide amount);
c. cash aid from the government.

II. Semi-structured Interviews (SSIs) with the household

Objectives:

1. To find information on main livelihood sources of the community before the disaster.
2. To assess the overall impact of the disasters on household assets.
3. To identify how the households cope the loss of household assets.
4. To identify the main agricultural activities, persons responsible, or other actors in these activities and time needed.
5. To assess the main short- and long-term needs for reviving their livelihoods after the disaster.

Method:

1. The interviewers will work in pairs.

   1. Livelihood sources:

   a. Ask the household: the number of household members, ages, sex
   b. Ask about the contribution of their job as a source of the household income, prior to the disaster
   c. Ask household members if they changed their job after the disasters.

2. Land, crop, agricultural activities

a. How much land do they own or rent?
b. What kind of crops are planted on their land during the year?
c. Explain the use of production inputs for each crop/land.
d. Is the seed they use purchased or saved from the previous harvest?
e. Do they buy organic fertilizer or do they use it from own livestock?
f. How do they plough the land (by tractor, cattle or hoe)?
g. Do they have their own equipment to cultivate the land or do they rent it from others?
h. Do they use pesticides?
i. How many crops did they produce before and after the disasters?
j. What was the reduction in crop production after the disasters?
k. Which crop do they consume, sell or use as livestock feed?
l. What is the effect of the disasters on their farming livelihoods (on harvesting/savings/ access to agriculture inputs and post-harvest conditions)?
m. Did they already harvest their crop before the disasters?
n. If so, are there damages to their agriculture storage?
o. If not, were they able to harvest after the disasters?
p. For how many months could they store food?

Food production and consumption pattern

a. What are the food sources that they can produce by themselves and what food has to be bought from outside?
b. What has been the change in the consumption pattern since the disaster, including costs?

Livestock conditions

a. If there is livestock, please mention priority, number and the use of each livestock (e.g. for milk, meat, ploughing, sale etc.)
b. If livestock is the main source of income, how many cattle have been sold immediately after the disasters?
c. What is income from livestock sales per year?
d. What the average price of the cattle?
e. Where did you usually sell your cattle?
f. To whom?
g. Describe the situation of the family-owned feed or the supply from communal grazing areas?
h. Were you still able to obtain feed? How much of the feed did you have to buy?
i. Did you lose your cattle during the earthquake?
j. Are the cattle fences still in use?

Priority needs

a. What are the short- and medium-term needs for their family to allow their farms and livelihoods to function normally?
b. Prioritize these needs and provide the amount of costs.

YOGYAKARTA LIVELIHOOD SURVEY

List of commodities produced and used

Village Respondent

Date Interviewer

Commodity	Land size	% Self- consumption	% for sale	% for fodder

NEEDS FORM

Short-term (next six months)	**Priority**	**Amount**	**Note**

Middle-term need (next 18 months)	**Priority**	**Amount**	**Note**

Planning calendar and activities

Activities	January	February	March	April	May	June	July	August	September	October	November	December
Nurseries												
Planting												
Fertilizing												
Weeding												
Pest-control												
Harvesting												

Annex C: Farmer Household Survey Questionnaire and Focus Group Discussion (FGD) Data Management Form of a quantitative Rapid Livelihoods Assessment (RLA)

1. Survey Questionnaire for Farming Households

Objectives:

1. To identify livelihood resources problems, livelihood assets depletion and poverty as experienced by the community affected by the natural disasters (earthquake and eruption).
2. To identify the strategy/efforts by the community to sustain livelihood assets in the aftermath of the disasters.
3. To identify livelihood strategies/approaches that suit community needs.

Methodology

Interview

- Four respondents in each village will be interviewed, two men and two women.
- Four respondent categories: land owner and operator, share cropper, land renter and farm worker.
- Please note that an answer is required for each question.

Head of family :		Male/female; Age	:
Respondent's name	:	Respondent category	:
Main occupation	:	No. of household members	:
Address	:		
Village	:	Sub-village	:
District	:	Regency	:

A.Household status

1. No. of family members in the extended family

Family member	Age	Sex	Main occupation	Code (Main income-generating occuption)
				Farmer = 1 Labour farmer = 2 Labour – non-farming = 3 Private employee = 4 Government employee = 5 Retirement = 6 Unemployment= 7 Others = 8

* Enter code as appropriate – it can be more than one

2. How many members do you have in the community? How many women-headed families?

3. Food security

a. In your opinion, do you have adequate food until the next harvest period? Yes/No.
b. If you experienced food shortages, then for how many days could you survive?
c. Before the disaster, was your family able to eat regularly?
How often per day? Did this change after the disaster?

d. Do you have sufficient income to feed your family?
e. If not, how do you cope?

B. The livelihood situation based on crop production activities

1. Land ownership, crop production and destruction

Variety of Plants	land status (area)[1]		Land category [2]	Normal plant production (Vol/area)	% Destructed (caused by disaster)	Main factors of destruction [3]
	Owned	Rent				

Notes:

1. The size of the land is total land size owned or managed by one household and not limited to what is owned by respondent. If it is difficult to measure it by a general measure/scale (m^2), then it could be measured by a traditional scale, for instance, Ru = 14 m^2, Bahu = 7 000 m^2, Patok = 1 000 m^2

2. Irrigated land (SI), rainfed (SR); dry land (DL); garden (HY); fruit and wood garden (G)

3. Main factors of destruction:
Limitation of water supply (AK) ; destruction of irrigation canal (KSI); unfertilized (TP); ashes (Db); lava (Lv); gas for heating (AP), other (L).

2. Usage of agriculture products

Variety of plants	**Usage**	
	Percentage (%) sold in market	**% Domestic consumption**
Paddy		
Corn		
Soy bean		
Cassava		
Peanut		
Vegetable		
Fruit		
Wood		
Others*		

3. Agriculture tools

Tools	No.	Non-functioning/Lost	Estimated loss (IDR)
Hoe			
Sabit			
Tractor			
Others			

4. Usage of agriculture production tools

a. Fertilizer

What kind of fertilizer did you usually use for your crops?

- Urea .....kg; TSP/SP-36 .....kg/ha
- KCL .....kg;

Did you use organic fertilizer?

If so, what is the percentage of overall use?

b. Pesticide

Did you use pesticides?

If so, what kind of pesticide ?

c. Seed

Crop	Variety of seed	Method in obtaining seed (buying/own)
Paddy		
Field crop		
Vegetable		
Fruit		
Perineal		

d. Do you use any other agriculture inputs?Please describe.

- leaves fertilizer;
- fruit fertilizer.

C. Livelihood situation related to livestock-rearing

1. Ruminant and poultry ownership

Variety of Livestock and Poultry	Ownership							Information[1]
	Pre disaster	During disaster				Post disaster		
		Died	Sold			number	value	
			Number	Value (Rp)	Reason			

D. Livelihood situation related to fish production

1. Fish ownership

Variety of Fish	Fish ownership							Information [1]
	Pre disaster	during the disasters				Post Disaster		
		Died	Sold			number	value	
			number	Value (Rp)	Reason			

2. Pond damaged

Pond	Area of pond	Current situation [1]

Note:

1. Has it been renovated? If so, what is the percentage of renovation and source of funding?

E. Income and agricultural production cost – previous harvest season

Inputs (seed, fertilizer, etc)	*Worker*	*Land rent*	*Harvest & processing*	*Other (tax, i.e)*	*Total* [2]

Notes:

1. *If it is difficult to calculate in currency, use volume and convert it according to a standard price.*
2. *If the respondent could only remember the total budget, please fill in the total budget coloumn; but if not, please fill in the detail breakdown.*
3. *It can be in the form of woods (e.g. firewood).*
4. *It can be in the form of trade – spices, cattle food, etc.*

F. Other non-agricultural sources of family income

Source of income	Value (IRD)		Change	
	Men	Women	% Increase	% Decrease
1. Labour wage				
2. Salary				

G. Please specify your needs related to the restoration of livelihood resources. It can be in the form of production tools, capital or vehicles/transportation means

1. Needs to recover economic condition

Category of needs	In-kind	Volume
Short-term (2-3 months)		
Medium-term (6 months)		
Long-term (1 year and more)		

2. Government support

a. What should be done by the government with respect to the recovery of community's economic life or policies at the national level

b. In general, what have you done to restore your agriculture or economic livelihood?

c. Have your efforts been fruitful? If so, then what were the determinant factors?

Thank you

Name and signature

C.2 Guidelines for Focus Group Discussion (FGD)

Objectives:
1. To identify the kinds of livelihood resources within the community.
2. To identify the kinds of livelihood assets depleted due to the disasters

Method:
FGDs with five to six members of the community who represent local government employees, [farmer groups and other dominant groups in the village, giving priority to the marginalized**.**

1. Livelihood resources
Make an inventory of livelihood resources within the community. Begin with the most important.

2. Impact of the disasters
State the impacts of the disasters on community livelihoods

Kind of livelihood income sources	**Impact***
Food crop	
Cattle	
Fishery	
Forestry and/or plantation	
Home-based agribusiness	
Trade	
Others	

*** not limited to the physical aspect**

3. The destroyed infrastructure and facilities, by main commodity

Subsector	**Main commodity**	**Kind of destruction**
Food crop		
Cattle		
Fishery		
Forestry and/or plantation		
Home-based agribusiness		
Trade		

4. Community group situation

			Membership status	
Kind of group	**No.**	**Activities**	**Organization**	**%**
Farmer groups				
Credit union				
Business/trade				
Others				

5. Government policy

Is there any policy that you would like to be established in order to improve the livelihoods of the affected community?

Annex D. Report of case studies in earthquake-affected areas, two and six months later

1. Bantul District– Imogiri Subdistrict – Selopamioro village

Ms M. is a 78-year-old widow. She has seven children, all of whom are married. Her house was almost completely destroyed in the earthquake. Since no village members are available to help her build a temporary shelter, she is forced to live in a tent with one of her sons, her daughter-in-law and her nephew. She is the owner of 300 m^2 of land. One of her sons assists her in the field, while the other family members work as construction workers. Also, some of them live close to Miduk in Imogiri since their houses were also destroyed by the earthquake. Her other son works on neighbours' lands as a farm worker. Neither Ms M. nor her son are members of the farmer group in their village. Like many other earthquake victims, she received IDR90 000[10] plus 10 kg of rice from the government.[11] Her sons usually provide her with tobacco leaves, which she dries and sells door-to-door, earning IDR1 000–4 000 per ounce.

Ms M. remains very indigent. She is waiting for help from the government to rebuild her house. She feels that only the authorities can improve her quality of life; she is old and tired, and cannot get back on her feet again without outside help.

Six months later: Ms. M. is finally back living in her home after spending six months in a tent. She received a government grant of IDR3.6 million, which was enough to repair the most damaged sections of the house. A great deal of work remains to fully restore the structure, but she is already very happy to have some semblance of a home restored. Regarding her daily activities, nothing has changed; she still sells tobacco door to door, but her small income is not enough to buy the seeds needed for the coming rainy season. Consequently, as she has done many times before, she will apply for a loan from Bank Rakyat Indonesia[12] (BRI).

2. District Bantul – Imogiri Subdistrict – Selopamioro village

Mr WW. and Mrs T. are both 80 years old and each own 500 m^2 of land. They also work on others' lands. Mr WW. is a member of a farmer group, but it is not very active; its only current activity is the *gotong royong*. The couple have four children, all adults, and the youngest daughter lives with her husband's parents.

Before the earthquake, they cultivated rice in the rainy season, and long beans and corn during dry spells, all for domestic use. Mrs T. also worked on the land of other farmers, but since she was injured during the disaster, she is no longer able to work. In fact, the condition of the family was already critical before the earthquake since they had no other option than to sell their only two goats for cash to survive.

Since losing their home, they have been living in a temporary shack, which is not structurally suitable for the rainy season (July). In this season, the corn grows in their field, and despite the desperate conditions, the family continues working in the field to manage it. The only income at the moment comes from wealthy neighbours who pay Mr WW. and Mrs T. IDR20 000 per day to help clean their damaged home. Meanwhile, they have received from

[10] US$1 = IDR9 100 (November 2006).
[11] The government promised to distribute this aid to all affected families once a month for three months. To date, however, this assistance has been disbursed only once.
[12] One of the most famous Indonesian banks among farmers due to its favourable interest rates.

the government the small total of 10 kg of rice per person plus IDR90 000 per person, like many other victims before them.

At the moment, family expenditures have been reduced to food needs and medicine for Mrs T. They know they must buy seeds for the coming rainy season, but they have no savings. They will plant the seeds kept from the previous year, even if their quality is extremely poor. The harvest is going to be much less productive than usual, but they have no choice.

Their priority is having a proper place to live. They strongly need the government's help; or else they will never be able to rebuild their home.

Six months later: As a result of a loan from their relatives, they have been able to repair the damages to their home. After six months in the shelter, they are just now getting back to normalcy. Some members of the family still insist on sleeping outside at night since they are still traumatized by the earthquake and too scared of a repeat occurrence. They are planning to apply for a loan from BRI to buy the 5 kg of seeds necessary for the rainy season. At the moment, however, no one in the family is working the field since the climate is too dry to cultivate anything.

The family's only source of income comes from the market. The couple usually borrows raw ingredients from its neighbours, processing the food to sell it as snacks in the village market. With this revenue, they pay back their creditors and buy some food. Nonetheless, they are hopeful that things will improve with the upcoming rice harvest, since they will use the rice produced for domestic consumption.

Despite their age, the couple is still motivated to work, but lack the capital that would allow them to start up their preferred business. They no longer wish to rely solely on agriculture, since they no longer deem it profitable.

3. District Bantul –Bambang Lipuro Subdistrict –Sidomulyo village

Mr K., 53-years old, is a land-owner farmer with four children: one works in Jakarta; one studies at the University of Yogyakarta; one studies at high school; and one helps out in the field. Both he and his wife did not finish their elementary school education. Mr K. is a member of a farmers' group, which is no longer active.

Mr K owns 1 000 m^2 of land. He rents an additional 6 000 m^2 and sharecrops on 2 000 m^2. He is also the owner of two dairy cows.

In his area, there are three crop seasons, so Mr K. cultivates rice during the rainy season and produces soybean and peanut for the market in the dry season. He is able to cope with this dry season due to a well and pump that he bought some years ago with a bank loan.

Years ago, Mr K. bought a hand tractor, which he either rents out to other farmers or uses during for his own planting activities. He usually employs six workers at planting time at the beginning of the rainy season, paying them IDR15 000 per day. Every year, Mr K. borrows money from BRI to buy seeds and fertilizers.

Until a few years ago, he was a wealthy farmer with many assets, but recently, with agro-input prices on the rise, his annual income has decreased with every passing year. Now he makes just enough to cover the most basic needs of his family. For extra expenditures, such as the cost of education for his children, Mr K. has to borrow. For this reason, he and his wife hope that their children, once adults, will not work in the fields like their father.

The earthquake caused heavy damage to Mr K.'s house, forcing him and his family to live in a tent for six months. He has since received the first compensation instalment of IDR5.9 million from the government, but this is not enough to completely restore his home: the cracks are extensive and the house is too structurally unsound to sleep inside. To make the necessary repairs to his similarly damaged warehouse, Mr K. has requested a IDR7 million loan from the bank.

Like many other villagers, Mr K. has been very busy with the reconstruction of his home. He has, therefore, almost totally abandoned his peanut crop, harvesting an unusually low yield in 2006.

Six months later: Mr K. has recently finished restoring his warehouse, which has allowed his family to move out of the tent and sleep in this storage area while repairs to their home continue. With the warehouse finished, Mr K. can now focus on building a new shelter of bamboo and wood for his cattle, since the previous one, made of bricks, collapsed in May.

His house is still far from ready for habitation, but at present, Mr K. does not have money to finish the work.

Regarding his field activity, he still does not know whether to ask for a loan from the bank or to use his meagre savings to buy seeds and fertilizers. What is sure is that he will not hire the usual six workers to help him in the field this year.

4. District Klaten – Gantiwarno Subdistrict– Kerten village

Mr K., 37 years old, is a landless farm labourer. He lives in a village severely damaged by the earthquake; around 90 percent of the buildings were destroyed.

He lives in very precarious condition with his wife and two children. The family was living in a humble hovel even before the earthquake, but now Mr K. can be considered an indirect disaster victim, since all the farmers in his area have abandoned agricultural work for rehabilitation activities. They no longer work in the field for lack of time and capital. As a result, farm workers like Mr K. do not earn any money.

Before the earthquake, Mr K. and his wife worked occasionally on others' land at planting, weeding and harvesting times. He also fed his neighbour's cattle for additional income; at the selling time, he and the owner would split the livestock-generated profit.

Before the disaster, Mr K. earned IDR15 000–17 000 per day in the field. As this was not enough to support his family, he often borrowed money from the neighbourhood, approximately IDR50 000 per month. Now, since there are no jobs in the field, he participates in the *gotong royong*, which means that he does not have any income at the moment.

His main family expenditures are food and his children's education.

Mr K. and his wife hope the government will provide for the post-disaster needs of their family. He also hopes someday to live in a decent house, since he and his family have been living in precarious condition for far too long.

Six months later: The life of Mr K. is finally improving since he is one of the beneficiaries of a governmental programme called *Program Pengentasan Kemiskinan Perkotaan* (Urban Poverty Alleviation Programme). As a result, he has received the money he needed to buy

building material for a proper brick house. At present, Mr K. is working hard to construct the house, helped by two workers whom he will soon have to pay.

Since he is busy with the construction of the house, he cannot go to the field or carry out other activities. As a result, no income is provided for his family and acquiring food is becoming increasingly difficult.

It is hoped that once he has finished the construction, which has just begun, he will be able to return to the fields or to find another job. He is not optimistic about his prospects, however, since there has been a general crisis in the area since the disaster.

Another source of worry is the education of his children: before the disaster, school was free, but now every student has to pay a fee. The building was destroyed during the earthquake and had to be rebuilt. Mr K. is obviously not in the condition to pay for his children and has already received a warning from the principal of the school.

5. District Klaten – Gantiwarno Subdistrict–Kerten village

Mr S., 43 years old, is a farm worker and former teacher. He quit teaching some years ago, because at the time, he considered farming a profitable activity. Now he is more vulnerable than ever, after having lost his house during the earthquake. He lives with his wife, two children and his aunt, who all sleep in his mother's house now that the house has been wrecked.

Before the earthquake, Mr S. used to work as sharecropper in another farmer's field (1 300 m^2), buying all the necessary agro-inputs himself. At the harvest time he shared the crop with the landlord. During the rainy season, he cultivated rice, and in the dry period, tobacco and vegetables.

Since the earthquake he has not been able to go to the field, because he has been too busy with the *gotong royong*, helping a friend to rebuild his house. Mr S. used to cultivate the land for food, selling part of the crop in the market, but is currently not in the condition to do so because he is too busy helping the neighbours. His main expenditure has always been his children's education. At the moment he does not have money to pay his son's school fees.

Since he is in dire straits, he hopes the government will provide relief money as promised to rebuild the house. It took Mr S. almost six years to collect the money needed to build his previous home, but this time his conditions are worst due to the earthquake. Without external help he will never be in the condition to rebuild a house for his family.

Six months later: Mr S. is now impressively thin. With the help of Community, Habitat and Finance (CHF) International, an American NGO, he and his elderly aunt are living in a temporary shelter made of bamboo and wood. The rest of the family is still living in their grandmother's house, since the shelter is too small to accommodate everyone.

Right after the disaster, he had no motivation to go on. Since then, however, with his children's education in mind, he realizes that he cannot give up. For this reason, he has returned to the field. Unfortunately, in the current dry season, he cannot cultivate anything except for vegetables for domestic consumption and for sale to traders who sporadically visit his village. He could have an opportunity to earn an important, additional income from tobacco cultivation, but the market plunged after the earthquake; sale prices are tremendously low. In fact, all the farmers have given up on tobacco cultivation, abandoning this crucial source of income. Their food security now solely depends on the results of paddy rice cultivation in the coming rainy season.

Mr S. was a beneficiary of seeds and fertilizers distributed by FAO in October, but has not enough money to hire rural workers for land preparation. To this end, he will take advantage the *gotong royong* system. His priority is still his house and he is waiting for government aid.

Six months later. Mr S. is still unable to make plans for the future: the challenge is still providing the daily food for his family. Regarding the wellbeing of all the farmers of his village, he also hopes that the government will build an irrigation system. Water availability has been a problem for years: the water is very deep (8 m), and farmers need government assistance to establish a proper water management system.

6. District Klaten – Gantiwarno Subdistrict– Kerten village

Ms S. is a 60-year-old widow and owner of 500 m2 of land inherited from her father. She lost her house in the earthquake and is currently living alone in a son's wooden house. She has two sons who are unable to assist her since they also live in deprived conditions.

She cultivates rice for consumption and tobacco for sale. She is not a member of any farmer group. She usually sells tobacco to a trader, earning IDR400 000 per year, with which she buys food, agro-inputs and seeds.

She is completely dependent on government donations to rebuild her house, because she is not in the condition to save money to buy building materials.

Six months on: Like every year, she has sold the tobacco harvest to a trader, but her usual income has been halved (IDR200.000) due to tremendous decreases in market prices this year.

At present, she is currently waiting for the rainy season to plant the seeds received from FAO. In the meantime, she has started sowing and repairing clothes from the people of the village for a minimum income.

She does not have hopes for the future – she just lives day by day, without plans. She does not even expect help from the government, because every time she tried to apply for a grant, she had to face too much bureaucracy. This has discouraged her from trying to ask for some kind of help in this time of need.

7. District Klaten – Prambanan Subdistrict– Kemudo village

Mr S. is 41 years old and the leader of the *Sedyo Rukun* Farmer Group, which consists of 60 members and has been active for 15 years.

He is a farmer and teacher in the high school of Prambanan. He is very well-known in the village for being the only one with a bachelor's degree.

In his area, there are three cropping seasons and the members of his group cultivate rice and vegetables for the market. The group has two sub-units: an organic horticulture group and a livestock group.

The horticulture group is comprised of 15 members trained in organic agriculture topics and assisted in the production process by extension workers and private foreign companies (United States and Japanese enterprises). In 2003, these companies signed a collaboration contract by which they provide seeds and fertilizers free of charge to the group for testing. As

the yield is of good quality, the group sells all the harvest to a market agent from Solo, a large city east of Yogyakarta. Mr S. attends many workshops in Central Java on organic agriculture, does research on the Internet and reads books on new technologies and practices to be used by his group.

The livestock group owns 40 cattle, recently provided by the government. Animal dung and urine are collected daily by the farmers to be distributed in the field as organic fertilizers. The animals are kept in a communal shelter, but the single farmer owns the animals, not the whole group. Group activities and financial management are dictated by rules and regulations that each member has to respect.

The village was extensively damaged by the earthquake (90 percent of the buildings collapsed), and for the first period after the disasters, the members helped each other to repair the buildings with the *gotong royong* system. Mr S.'s house was also partially damaged and has not yet been repaired. For the first two months, the market agent did not visit the village to buy the vegetables: the members tried to sell the crop in the local market, but the prices were so low that they quit, renouncing two months of income in the process.

Six months later: Six members still live in shelters. The vegetable trade is back to normal as are the lives of the members of the farmer group.

Mr S. will hire two workers to help him during the entire rainy season, because his activities as teacher and leader of a farmer group make him too busy to take care of the field on a daily basis.

He has just set up a Women's Farmer Group as a branch of the larger one. The business plan for *tempe*[13] processing has already been done, but the members are still not active because he cannot find a woman group leader.

8. District Gunung Kidul – Patuk subdistrict–Semoyo village

Mr A., 65 years old, and Ms R., 55 years old, live in an isolated village, far from the main road. Since it is not easily accessible, the village has not been well assisted by the government and NGOs.

The couple live with their two sons, two daughters-in-law and two grandchildren in a temporary shack, unsuitable for the coming rainy season; their house was severely damaged in the earthquake and afterwards demolished.

Mr A. is a sharecropper, cultivating the land of the village chief. In the rainy season, he cultivates rice, sharing the harvest with the land owner. During the dry season, he plants cassava, corn and groundnut for the market. The harvest is usually scarce, since there is a great lack of water in those months. His only source of solid income comes from the market (IDR1 200 per kg of corn, IRD2 000 kg of groundnut). His sons are also labourers.

For the coming rainy season, Mr A. will have to buy rice seeds, making numerous sacrifices and selling off his few chickens. The future is hard, and the family has no plan for recovery. If the government does not help the family, they will have to live through extremely hard times, but they believe they will survive somehow.

[13] Soybean cake, part of the daily diet of the Indonesian population.

Six months later: After all this time, the family is still living in the same temporary shelter. After a night of rain, the floor is wet, as is the interior furniture. Since Mr A's field does not benefit from the irrigation system recently repaired by the government, he is not presently cultivating. The family survives as a result of a loan from relatives in Sumatra. They do not even know if they will plant rice in the rainy season, because they would prefer starting a little business selling fertilizers and pesticides.

9. Gunung Kidul District– Patuk Subdistrict– Semoyo village

Mr P., 42 years old, and Ms T., 43 years old, were in a difficult situation even before the earthquake. Now, after the disaster, their situation seems to be almost hopeless. They live in a tent with their only son and Ms T.'s mother. They lost everything in the disaster.

Before the earthquake, the couple worked as seasonal farm labourers. Now there are no farmers nearby who can hire them to work in their field. Everyone lost their homes and there is no capital left for agriculture.

Before the disaster, their income was already tremendously low, earning IDR8 000 (around US$0.87) per day for hoeing; they only received lunch and cigarettes for planting operations. They are currently helping people of the village with the *gotong royong*, so they do not have any kind of income and cannot foresee when they will ever make some money again.

At present, finding food and fresh water in the forest is already a constant challenge, for that reason they cannot plan anything for the future. If the government or other institutions do not help them and the nearby farmers, there will not be any future for Mr P.'s family.

Six months later: The family has lived for almost four months in the tent, but are now living in the rebuilt house. The reparation has been possible due to a loan of a friend in Jakarta. He will keep the house certificate until they repay the loan in full.

The value of the repairs is IDR11.2 million, but since Mr P. and Ms T. are still jobless, they do not know how to pay back the money. They hope the farmers will be in the condition to hire them for the next crop season; otherwise they will look for other jobs. They are thinking of trying to run some kind of business.

Morale is very high now that they have their house back: that was their only concern—not the lack of money or job. They just want to continue living happily.

10 Gunung Kidul District– Panggang Subdistrict – Girisekar village – Bali sub-village

The Women's Farmer Group *Nawangsari* is made up of 15 members. The group aims to improve farming revenues mainly through training and technical assistance provided by extension workers. Only one member, who lost her house, was affected by the earthquake.

All the member's husbands were working as builders in other villages, but now do not earn money because they returned to help people in the *gotong royong* system. In the rainy season, the members of the Women's Farmer Group cultivate rice, corn and cassava, while in the rest of the year, they only cultivate long bean and groundnut. They cultivate rice for consumption and long bean and cassava for the market (10 percent of the harvest). The earthquake has also had a considerable impact on the rice price, which increased from IDR3 500 per kg to IDR7 000 per kg. This is explained by the fact that the rice usually came directly from the district of Imogiri, but now all the warehouses have been destroyed and the rice has become a precious commodity.

D.11 District Gunung Kidul – Panggang Subdistrict – Girisekar village

Mrs N. is the owner of 5 000 m^2 inherited from her father. She is around 70 years old (she does not remember her birthdate), and her husband, Mr KS., is around 80 years old.

The couple had two daughters, but one passed away during childhood. Since then, Mr KS. has increasingly suffered from mental illness. After the earthquake, he got visibly worse, thus is unable to work and help his wife. The second daughter works as maid in a nearby village. In the rainy season, Mrs N. also works in others' fields, but earning no more than IDR3 000 to 6 000 per day. Another source of income comes from the daughter, who occasionally sends IDR200.000. In her field, she cultivates rice (for consumption), long bean and corn (partly for the market) and cassava (for domestic consumption). When she needs cash, she prepares *gaplek* (dried cassava) to sell at the market: 1 kg of *gaplek* sells for a meagre IDR5 000 (around US$0.55).

The couple lost their home during the disaster; after the earthquake they had to sleep in a tent for three weeks. As a result of *gotong royong*, the neighbours helped them build a shack. Until now, they have only received 30 kg of rice from the government.

Regarding the future, Mrs N. does not have plans; she only knows that she needs the money promised by the government to rebuild her home. "Everything is in God's hands" she says.

Six months later: Since the beginning of June, nothing has changed in this couple's life. They still live in the village-built shelter because the government has rejected their request for compensation. Since it is still too dry to cultivate anything, Mrs N. works occasionally as a maid in neighbourhood homes. Since her husband has not recovered from his mental disability, she realizes that she cannot rely on his help. They are both too old and lack the capital and knowledge needed to rehabilitate their livelihoods.