

## 6 RESULT OF THE PARTICIPATORY SURVEY

### 6.1 Objectives

The participatory survey was conducted with the following objectives.

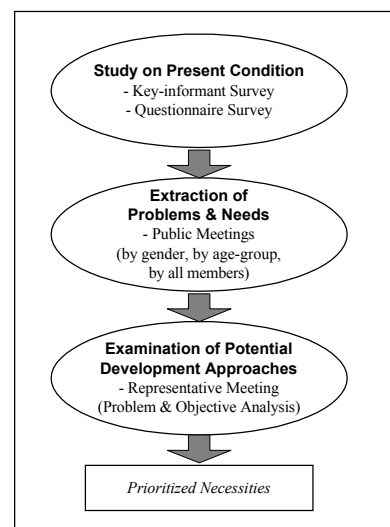
- (1) To analyze the present condition of the community in the selected four micro-basins,
- (2) To identify problems, needs, and potentials from the farmers' viewpoints , and
- (3) To extract potential development approaches from the community members through participatory approach.

### 6.2 Methodology

To conduct the survey, local NGOs were used as the sub-contractors in consideration that they are more familiar with the community people in terms of working experience, cultural background, and local language. For the selection of NGOs, following criteria were taken into account.

- (1) Working experience in the selected community or area nearby;
- (2) Experience in participatory survey; and
- (3) Expertise scope covering the fields of socio-economic development, infrastructure development, health and sanitation and environmental conservation

The survey itself was basically composed of three components, namely, “Study on present condition”, “Extraction of problems and needs”, and “Examination of potential development approaches”. Firstly, overall view of the community was grasped through the key-informant survey and questionnaire survey. Then, problems and needs are extracted through a series of public meetings. During this stage, attention was also paid to gender-specific issues and age-specific issues, for example, decision making, job opportunity, access to education and so on. Lastly, examination of problems and potential development approaches was made among the community representatives by applying the Project Cycle Management Method (PCM). At the end of these activities, a final public



meeting was held for all community members in order to rank their necessities.

Practically, the survey was conducted in five steps shown below and the details are explained in Table 6.2 (1).

Steps	Activities
1. Explanation of the survey	1) Public Meeting I (Plenary)
2. Study of present situation	1) Key-informants Survey, 2) Questionnaire Survey
3. Extraction of problems and needs	1) Public Meeting II (by Gender) 2) Public Meeting III (by Age-group) 3) Public Meeting IV (Plenary)
4. Investigation of problems, needs and potentials	1) Field Inspection, 2) Representative Meeting I (Problem Analysis)
5. Examination of potential development approaches	1) Representative Meeting II (Objective Analysis) 2) General Public Meeting V (Plenary)

### 6.3 People's Participation

#### (1) Overall Participation

The number of participants in the activities for each micro-cuenca is summarized below and details are shown in Table 6.3 (1).

Activities	(person)			
	Xeatzán Bajo	Panyebar	Pachum	Palestina
a) Public Meeting I	240	160	70	190
b) Public Meeting II	220	178	80	195
c) Public Meeting III	290	172	39	153
d) Public Meeting IV	245	203	73	141
e) Public Meeting V	170	159	84	158
Average participation	233.0	174.4	67.2	167.4
Number of households	325 (212)	360 (206)	160 (68)	297 (222)
Participation Rate	71.7 % (109.9 %)	48.4 % (84.7 %)	42.0 % (98.8 %)	56.4 % (75.4 %)

Note 1: Number of households are obtained through the interview of the community representatives.

Note 2: Numbers in parenthesis are the data of FIS, 1994 and the participation rates in parentheses are the figures calculated with 1994 data.

The average participation rate was roughly estimated by dividing the average number of participants by the total number of households in the communities.<sup>1</sup> Through this estimation, following points were observed.

- 1) Approximately half of the total households participated in all communities.
- 2) Assuming that the present number of households is correct, the highest rate of participation was observed in Xeatzán Bajo and lowest rate in Pachum. Reason for high participation in Xeatzán Bajo would be a) well-organized community and b) high enthusiasm for the community development. Low participation in Pachum would be due to a) business outside the community and b) conservativeness.
- 3) According to several interviews<sup>2</sup> to community members, major reasons for not participating in the activities are as follows.

a) Busy with their work

Some of the community members have to go out of the community for working. Because of this type of economic activity, they were not able to attend the meetings. This tendency was observed especially in Pachum and Palestina de Los Altos.

b) Religious reason

There are some religious extremists who show no interest in development activities. Those extreme sectors are often established among evangelicos. This case was observed in Panyebar and Palestina de Los Altos.

c) Doubt in survey activities

Some people mentioned their experience that past surveys did not realize any projects in their community. Therefore, those who think so do not show any interest in participating in survey activities. This answer was heard in Sector I of Palestina de Los Altos.

d) Conservativeness and insufficient communication about the activities

There are people who were not well informed about the survey activities. Because of this unsatisfactory communication, combined with people's conservativeness, people did not attend the survey activities. This tendency was observed especially in Pachum. It should be noted, however, that the number of participants had increased as the activities continued in Pachum. This indicates that people came to participate, as they understood the objectives and contents of the survey.

- 4) In the case of Pachum, because of improper date setting (Tuesday) and of heavy rain, the number of participants dropped to 39 persons in the public

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<sup>1</sup> It should be noted that these figures would be over estimation, since more than one member might have come from same households.

<sup>2</sup> NGOs tried to persuade those who do not participate and came across these answers. Comprehensive interview was not made to investigate the reason for non-participation.

meeting III.

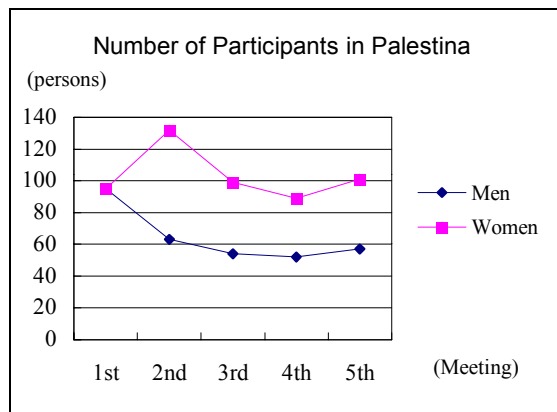
(2) Participation of Women

The following table shows the percentage of women in the total number of participants in the series of public meetings.

	(persons)			
	Xeatzan Bajo	Panyebar	Pachum	Palestina
Average number of female participants	101	80.6	25.4	103.2
Average total number of participants	233	174.4	69.2	167.4
Percentage of female participants	43.3 %	46.2 %	36.7 %	61.6 %

Regarding the percentage of women’s participation in the survey activities, the following points can be stated.

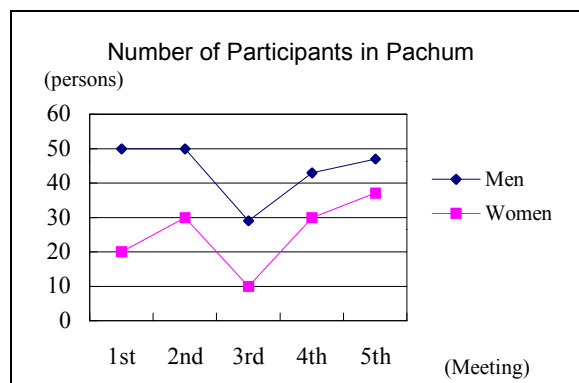
- 1) Nearly 50 % of the participants were women except the case of Pachum.
- 2) The highest participation rate was observed in Palestina. In this area, many men often go to the coastal area for working. During their absence, they leave domestic matters to their spouses.



Considering this fact, it is presumed that many women attended the meeting as a temporary representative of their households. As it is indicated in the figure shown here, the number of male participants decreased as the meeting proceeded, while the number of female participants

did not change much.

- 3) In Pachum, the lowest percentage of women’s participation was observed. This may be attributed to the conservativeness in the community. It should be noted, however, that the number of female participants had increased as the meeting proceeded.



This fact implies that community members, especially men who usually are decision makers in their family, came to understand, little by little, the usefulness of survey activities, and noticed the importance of participation for the community development. It can be said that this phenomenon is one of the positive side-effects of participation approach.

### (3) Impact of Participatory Survey on People's Awareness

With the implementation of the participatory survey, impacts on people's awareness were observed in terms of 4 points explained below.

#### (a) Awareness on Community's Problem

By setting a place for discussion on community's problem, community people came to have broader idea regarding the problems of community as a whole. Through the problem analysis of Project Cycle Management (PCM) methodology, it was observed that some people in the representative meeting started to analyze community's problems through its cause-effect relation and try to find major causes for their severe living condition. Besides, through the direct discussion between community people and the study team (or NGO), people's attention came to be paid to the problems that they had not perceived before, such as water quality, heavy workload and so on.

#### (b) Intention for Participation

At the beginning of the participatory survey, people were generally skeptical about the activity and their attitude in the meeting was not active enough. Discussion among people was dominated by a little portion of participants and the attitude of the rest was passive. As the meeting was held several times, however, other people started to talk their opinions in the meeting, although the tendency was not so remarkable. In Palestina, the people who couldn't attend the meeting because of migration participated in the last meeting, and expressed their intention to participate in the projects with promising their participation in other future necessary activities. Those who couldn't attend the meeting at all asked their wife to attend the meeting to get the information of the meeting, that indicates strong intention for the development. In Xeatzan Bajo, it was observed that several participants were taking note during the representative meetings. Besides, in deciding irrigation beneficiaries, people discussed among themselves and proposed a solution by themselves. These movements indicate that their interest and intention to participate in projects were developed through the participation process of the survey.

(c) Gender

In the rural area where decision-makers are usually men, it is very difficult for women to raise opinions in public meeting. With arranging meeting by gender, however, women got opportunities to talk freely and more opinions were raised from female participants. That situation helped to develop women's intention to participate in development projects.

Besides, as the public meeting proceeded, women came to raise opinion even in front of male participants. Especially in the case of Panyebar, discussion was made between male participants and female participants in deciding the priority of the approaches. This kind of situation would be a first step to more active discussion among the people regardless their gender. In addition, it should be noted that number of female participants increased through the 5 times of meetings in Pachum area where machismo is relatively strong and conservative. This tendency indicates remarkable impact of participatory approach from the gender points of view.

(d) Voluntary Action

There was a case that people took an action by themselves to improve their present condition in response to the direct discussion between community people and the study team. In Panyebar, collection rate of water charge had been quite low because of lack of beneficiaries' list. After the discussion with the study team, member of the water committee prepared beneficiaries' list and improved collection rate by themselves. It indicates the importance of direct contact between the study team and community people in a sense that stimulation from outside of the community brought about voluntary action of people for improvement of their present situation.

(e) Communication among People

The impacts on communication among people were observed both inside community and among communities.

Within a community, there are some people who usually have little communication with others because of geographical reason and/or social reason (such as religion). Although the chance of communication was not many, people got chances to talk each other. There is a religious group that did not participate in the public meetings in Panyebar. The people who belonged to other sectors of religion set a place for discussion and tried to persuade the group to participate in the meetings with instruction of NGO.

On the other hand, in Palestina, participatory survey provided a place for discussion for the five communities. Because of this arrangement, people came to pay attention to the problem and constraints that affect communities as a whole.

The participatory survey was conducted within about 2 months. Although the drastic change was not observed because of its short survey period, it can be said that the participatory survey gives positive impact in terms of five points, (a) people's awareness on the problems for community as a whole, (b) intention to participate in project, (c) vitalization of women's activity, (d) voluntary action of community people, and (e) provision of a place for communication among people.

On the other hand, however, it has several disadvantage in conducting participatory survey within a short period. (a) There is a possibility of talking only with a small group of people who are easy to participate in the survey activity such as public meeting. (b) Sufficient follow-up cannot be made for the people who can not attend meetings for some reasons. And (c) it is difficult to spend sufficient time in order to reach consensus.

## **6.4 Survey Result**

### **6.4.1 Xeatzán Bajo**

#### **(1) Gender-specific Problems**

Through the gender-wise public meeting, the following points were observed as the gender-specific issues.

- 1) Basically, both male and females have same understanding on the problems of the community, especially on the infrastructure and living condition.
- 2) However, female participants focus more on living condition, health, and education, while male participants focus more on infrastructure related to income generation.
- 3) Female participants mentioned, as their specific problem, that *women have no opportunity for paid work*. And, therefore, they expressed strong intention for producing and marketing textile products.
- 4) In this community, decision making is usually done by mutual consultation between men and women.

#### **(2) Age-specific Problems**

In Xeatzán Bajo, participants were divided into three age groups, younger group

(14~18 years old), middle group (19~49 years old) and older group (50 years old and above). The result of public meeting showed the following points as age-specific issues.

- 1) No big difference was observed among their perception on problems and needs of the community for all age-groups.
- 2) It is observed, however, the people under 49 years old pay attention to diversification of their income sources, for instance, textile production, while those above 49 adhere to agricultural production.
- 3) People in the age-group of 14~18 years old expressed their strong expectation for education opportunity.

### (3) Community-wise Problems and Potential Approach

Following are the major problems raised during the series of survey activities.

Category	Problems
1. Socio-economy	<ul style="list-style-type: none"> <li>- Small land holding size</li> <li>- Deterioration of housing condition</li> <li>- Lack of capital</li> <li>- Limited area for housing</li> <li>- Secondary school is not available in the community</li> <li>- Lack of market for non-traditional work</li> <li>- No paid work for women.</li> </ul>
2. Agriculture	<ul style="list-style-type: none"> <li>- Low price of agricultural produce</li> <li>- Agricultural chemicals are expensive</li> <li>- Use of agro-chemical has increased.</li> <li>- Delay of payment for agricultural produce</li> <li>- Low quality of agro-chemicals</li> <li>- Intervention of middlemen in the market</li> <li>- Only limited crops are produced.</li> </ul>
3. Infrastructure	<ul style="list-style-type: none"> <li>- Lack of adequate drainage system</li> <li>- Lack of irrigation system</li> <li>- Roads are in poor condition.</li> </ul>
4. Health & Sanitation	<ul style="list-style-type: none"> <li>- There are no permanent medical staff and medicines.</li> </ul>
5. Environment	<ul style="list-style-type: none"> <li>- Deforestation</li> <li>- Contamination of rivers because of chemical use.</li> </ul>

Based on the problems mentioned during the series of survey activities, a problem tree was prepared as shown in Figure 6.4.1 (1)<sup>3</sup>. Then, on the basis of the problem tree, an objective tree was prepared as shown in Figure 6.4.1 (2) and

<sup>3</sup> Original problem tree was prepared by the community representatives. Since there are many illogical leaps in the original tree, however, the revised tree was prepared by the Study Team.



potential approaches were elaborated. Among those approaches, following are the prioritized potential approaches of the community.

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***Prioritized Potential Development Approaches for Xeatzán Bajo***

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1. Installation of mini-irrigation system
2. Diversification of crop and crop rotation
3. Formulation of cooperatives
4. Construction of storage and processing facilities for agricultural produce
5. Establishment of market for selling textile products
6. Vocational school for technical orientation on agriculture
7. Construction of drainage system
8. Paving road with asphalt

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Note: Result of Public Meeting V, 28 August. 2000

#### 6.4.2 Panyebar

##### (1) Gender-specific Problems

Following are the observed issues regarding gender in Panyebar.

- 1) Basically, both male and female have same understanding on the problems of the community, especially on the infrastructure and living condition.
- 2) However, women pay more attention to housing, education, and health condition, while men focus basically on agriculture, income generation, and environment.
- 3) Women mentioned that *they have too many children* as a problem that leads to smaller landholding and less care for children. Besides, *no job opportunity for women* was mentioned as gender issue.
- 4) During the meeting, it was told that decision making is done by mutual consultation between men and women. However, in several individual discussions, women expressed that the influence of men in decision making is still strong and it is not necessarily by mutual discussion.
- 5) Women expressed that they have less opportunity for education and, hence, less opportunity for job.
- 6) Regarding health condition, lack of health training for women before and after child birth was mentioned.

##### (2) Age-specific Problems

Participants were divided into 2 groups, those who are above 40 years old and those who are less than 40 years old. This grouping was made based on the information that people have to be under 40 years old in to obtain job outside the community and those who are older than 40 limit themselves to stay in the community. Following points are the major age-specific issues.

- 1) Both the younger group and older group have same perception on the problems in the community.
- 2) People in the younger group expressed that they have intention to continue agriculture. They think, however, that technical assistance on agriculture would be compulsory for their continuation.
- 3) People in the older group mentioned that, in the future, they would like to continue agriculture in the form of enterprise farm.

### (3) Community-wise Problems and Potential Approach

Following are the major problems listed during the series of survey activities.

Category	Problems
1. Socio-economy	<ul style="list-style-type: none"> <li>- Lack of capital for working</li> <li>- Lack of formal and informal education</li> <li>- Lack of job opportunity in the community</li> <li>- There is no job opportunity for women</li> </ul>
2. Agriculture	<ul style="list-style-type: none"> <li>- Agricultural credit is difficult to access</li> <li>- Lack of technical assistance for coffee and horticulture</li> <li>- Lack of storage, processing, commercialization facilities</li> <li>- Only limited markets are available.</li> <li>- Lack of fertilizer</li> </ul>
3. Infrastructure	<ul style="list-style-type: none"> <li>- Shortage of drinking water</li> <li>- Poor condition of road</li> <li>- Lack of drainage</li> <li>- Insufficient number of latrines</li> </ul>
4. Health & Sanitation	<ul style="list-style-type: none"> <li>- There is no permanent medical staff and medicines in health post</li> <li>- Lack of ambulance</li> <li>- Lack of health training program.</li> </ul>
5. Environment	<ul style="list-style-type: none"> <li>- Deforestation</li> <li>- Contamination of water and decrease of water resource volume-</li> <li>- No technical assistance is available on natural resource management.</li> <li>- Malnutrition</li> </ul>

Based on the listed problems from the series of activities, a problem tree was prepared as shown in Figure 6.4.2 (1). From this problem tree, an objective tree was prepared (Figure 6.4.2 (2)) and potential approaches were examined. Following are the potential approaches prioritized by community members.

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***Prioritized Potential Development Approaches for Panyebar***

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1. Installation of water supply system.
  2. Credit assistance for agricultural activities and other productive activities.
  3. Improvement of road from Panyebar to Santa Clara La Laguna.
  4. Improvement of school facilities and utilization of the facility for vocational activity.
  5. Provision of technical assistance on production of coffee, vegetables, and soil conservation.
  6. Disposition of medical staff, medicines and transportation for patients in serious condition.
  7. Establishment of community organization and its strengthening.
  8. Implementation of mini-irrigation system.
  9. Installation of infrastructure relating to environment such as treatment plant, latrine, and drainage.
  10. Protection of water source to maintain available water volume.
  11. Implementation of soil conservation program.
  12. Implementation of environmental training program
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Note: Result of Public Meeting V, 9 August 2000

### 6.4.3 Pachum

#### (1) Gender-specific Problems

Following are the observed issues regarding gender in Pachum.

- 1) Decision is made by men as the head of household. Influence of men in decision making is still strong in their community.
- 2) Regarding workload allocation, women are in charge of taking care of family, while men usually work as agricultural labor and as merchant outside the community. Women do not have job opportunity for paid work.
- 3) Women have less access to education compared to men, which leads to less job opportunity for women. Female participants mentioned that they have no opportunity for going out of the community. Among the participants in the Public Meeting II, there were only 2 women (out of 30 participants) who had ever been outside the community. This conservativeness on gender is one of the main causes hindering women from access to education and job opportunities.

#### (2) Age-specific Problems

In Pachum, people (men) go outside for working as merchants as long as they wants and there is no significant cutting-age in terms of their economic activity. On the other hand, there was information that people will be in a respected position in their family once he or she gets 30 years old and will have strong influence on decision making. Therefore, 30 years old was used as the criteria for division group. It should be noted, however, some women even don't know their own age. For those who do not know age, that her age was judged by appearance or her status whether she is grandmother or not.

- 1) Decision is usually made by influence of older generation both in family and in community.
- 2) From 14 years old up to 55 years old, men often work outside the community merchandizing clothes, agricultural products, and other daily goods. They can work as merchants upto the age of 55 years as far as they wish.
- 3) People of younger generation expressed that they think agriculture unprofitable and do not want to continue unless there is any improvement in profitability.

### (3) Community-wise Problems and Potential Approach

Following are the major problems raised during the series of survey activities.

Category	Problems
1. Socio-economy	<ul style="list-style-type: none"> <li>- Low income</li> <li>- Illiteracy, especially among women</li> <li>- Lack of job opportunity</li> </ul>
2. Agriculture	<ul style="list-style-type: none"> <li>- Low price of agricultural produce</li> <li>- Low production of agricultural produce</li> <li>- Lack of technical assistance for agriculture</li> <li>- Inappropriate application of agricultural technique</li> <li>- Lack of credit for agricultural activities and other activities</li> <li>- Low application of fertilizer to soils</li> <li>- Lack of recreation center</li> </ul>
3. Infrastructure	<ul style="list-style-type: none"> <li>- Poor road condition</li> <li>- Shortage of potable water supply</li> <li>- Poor condition of housing</li> <li>- Lack of latrines and drainage</li> <li>- Non-availability of improved stove</li> <li>- Households do not have proper place to store water</li> <li>- There is no community salon</li> <li>- School yard becomes muddy when it rains</li> <li>- Cemetery is located too far</li> <li>- There is no marketing place in the community.</li> <li>- Local shops do not have enough supply of goods</li> </ul>
4. Health & Sanitation	<ul style="list-style-type: none"> <li>- Malnutrition</li> <li>- High morbidity and mortality of infants</li> <li>- Little access to medical service and lack of medicine</li> <li>- Majority of midwives are not well-trained in terms of medical knowledge</li> <li>- Smoke of firewood affects their health condition</li> </ul>
5. Environment	<ul style="list-style-type: none"> <li>- Excessive consumption of firewood</li> <li>- Occurrence of forest fire</li> <li>- Deforestation</li> <li>- Accumulation of inorganic garbage</li> </ul>

Based on the listed problems from the series of activities, a problem tree was prepared as shown in Figure 6.4.3 (1). From this problem tree, an objective tree was prepared (Figure 6.4.3 (2)) and potential approaches were examined. Following are the potential approaches prioritized by community members.

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***Prioritized Potential Development Approaches for Pachum***

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1. Improvement and maintenance of road
  2. Improvement of agriculture and livestock production
  3. Health service program
  4. Vocational training for non-agricultural work.
  5. Improvement of infrastructure (potable water, electricity, improved stoves)
  6. Improvement of amenity facilities (salon, telephone, grocery shop)
  7. Improvement of environmental condition (forest management, treatment of garbage)
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Note: Result of Public Meeting V, 30 August, 2000

#### 6.4.4 Palestina de Los Altos

The selected micro-cuenca in Palestina de Los Altos is composed of several communities. For conducting survey, communities were divided into 3 groups as shown below.

Group	Community
Group 1	Los Perez
Group 2	Los Diaz & Sector I
Group 3	Los Cabrera & Morales

##### (1) Gender-specific Problems

Following are the observed issues regarding gender in Palestina.

- 1) Although significant difference was not observed regarding the perception on problems for each gender, it seems that male's interest goes more to agriculture while female's attention is paid more to health and housing issues.
- 2) It is still men-dominated society and it is men who usually make decision in family and in the community. However, during the absence of husbands, women will be in charge of domestic matters.
- 3) Men usually go to coastal area or USA for working. Women expressed their worry about disintegration of their family because of frequent migration.
- 4) There is little job opportunity for both men and women in the community. Especially for women, finding paid work inside the community is quite difficult .
- 5) Regarding access to education, women have less opportunity for studying

and, as the result, many of them are illiterate. This could be one of the reasons for the lack of job opportunity for women.

- 6) In addition, the following issues are mentioned as the problems relating to gender.
  - Households in the community have too many children.
  - There are many teenage single-mothers.
  - Alcoholism of men and domestic violence.

## (2) Problems perceived by age-group

Participants were divided into two groups, those who are above 30 years old and those who are below 30, based on the information that job opportunity will be less once they get 30 years old.

- 1) Both the younger group and older group have same perception on the problems in the communities.
- 2) Regarding decision making, usually men around 30 to 45 years old make decision among the family.
- 3) Men under 30 years old have job opportunity in and near the community as agricultural labor, casual worker and so on. Outside the community usually get job in coastal area or U.S.A. Those above 30 years old, they usually work in the community as agricultural paid worker and/or work in their own farmland.
- 4) For women under 30 years old, although it is not much, they have job opportunity as paid housekeeper near the community. On the other hand, those who are above 30 years have almost no opportunity as paid worker and usually become housewife.

## (3) Community-wise Problems and Potential Approach

Following are the major problems of the micro-cuenca raised by community members during the series of survey activities.

Category	Problems for 3 groups of communities
1. Socio-economy	<ul style="list-style-type: none"> <li>- Lack of job opportunity</li> <li>- Low income</li> <li>- Emigration to coastal area or U.S.A.</li> <li>- Little access to education</li> </ul>
2. Agriculture	<ul style="list-style-type: none"> <li>- Lack of agricultural land</li> <li>- Lack of credit assistance</li> <li>- Lack of technical assistance on agriculture and livestock raising</li> <li>- Low price of agricultural products</li> <li>- Non-existence of market channel</li> <li>- Lack of irrigation</li> <li>- Cultivation is not diversified.</li> <li>- Lack of market for potato production</li> <li>- Drainage is not installed.</li> </ul>
3. Infrastructure	<ul style="list-style-type: none"> <li>- Poor road condition</li> <li>- Network of potable water is not sufficient</li> <li>- Electricity supply is not sufficient</li> </ul>
4. Health & Sanitation	<ul style="list-style-type: none"> <li>- Lack of health post in the community</li> <li>- Little access to medicines.</li> <li>- Shortage of potable water</li> <li>- Lack of medical service</li> <li>- Lack of health program for training</li> <li>- No assistance in primal health care</li> </ul>
5. Environment	<ul style="list-style-type: none"> <li>- Deforestation</li> <li>- Low fertility of soil</li> <li>- Little technical assistance for soil conservation</li> <li>- There is no communal forest.</li> <li>- Few water spring in the community</li> <li>- Inadequate use of agro-chemical</li> </ul>

Based on the result mentioned above, a problem tree and an objective tree with potential approaches were prepared for the whole micro-cuenca to grasp the holistic view as shown in Figure 6.4.4 (1). Then, based on the problem tree, an objective tree was prepared as shown in Figure 6.4.4 (2) and potential approaches were elaborated. Following are the prioritized potential approaches of the communities.

<i>Prioritized Potential Development Approaches for Palestina</i>		
Los Perez	Los Diaz/Sector I	Los Cabrera/Morales
1. Technical assistance for agriculture	1. Technical assistance for agriculture	1. Technical assistance for agriculture
2. Introduction of improved seeds for production	2. Mini-irrigation system	2. Agricultural credit
3. Agricultural credit	3. Agricultural credit	3. Commercialization of agricultural produce
4. Commercialization of agricultural product	4. Commercialization of agricultural produce	4. Mini irrigation system
5. Rehabilitation of water tank for washing clothes	5. Paving road with asphalt	5. Paving road with asphalt
6. Paving road with asphalt	6. Installation of health post	6. Improvement of school facilities
7. Mini-irrigation	7. Installation of potable water supply system	7. Vocational training for productive activities
8. Installation of health post	8. Provision of medical service	8. Strengthening community organization
9. Health training program	9. Establishment of communal pharmacy	9. Education program
10. Disposition of medical staff and medicine	10. Health education program	10. Installation of health post
11. Strengthening community organization	11. Strengthening community organization	11. Medical assistance
12. Vocational training for productive activities	12. Vocational training for productive activities	12. Establishment of communal pharmacy
13. Education program	13. Education program	13. Training on management of agro-chemicals.
14. Forest management	14. Adequate management of agro-chemicals	14. Soil conservation
15. Soil conservation	15. Soil conservation	15. Adequate forest management
16. Management of agro-chemicals	16. Reforestation	

Note: Results of Public Meeting V: Los Perez: 11 September, 2000,  
Los Diaz/Sector I: 12 September 2000,  
Los Cabrera/Morales : 13 September, 2000

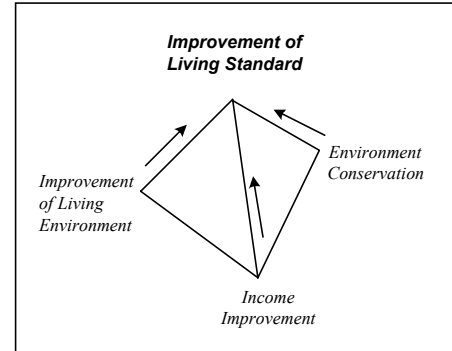


## 7. SUSTAINABLE RURAL DEVELOPMENT PLANS FOR THE REDUCTION OF POVERTY

### 7.1 Basic Development Concept

#### (1) Basic Concept

The living standards in the selected four micro-basins are still low in all aspects. Hence, it is necessary to improve the living standards from three aspects, a) Improvement of income level, b) Upgrading the living environment, and c) Conservation of natural resource. These three aspects have to be



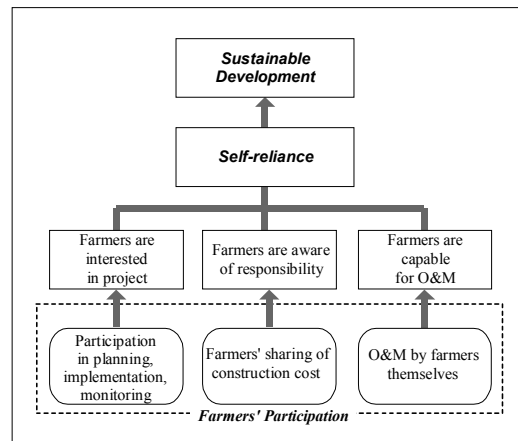
approached simultaneously, because approaching only one aspect will not be sustainable. Take the case of water supply system as example, construction of the system will improve the living environment. However, if people do not have enough income to pay water charge, necessary maintenance and repair cannot be made and, soon or later, the system will be unusable. On the other hand, if no attention is paid to water quality or forest (which is a requisite for keeping water in soil), the amount of available drinking water would be affected. Therefore, it is necessary to combine these three approaches as one package for upgrading of the living standards.

#### (2) Farmers' Participation

Aside from the concept of development approaches, "farmers' participation" is another important factor for the improvement of living standards, since sustainability will not be attained without farmers' participation. The basic concept for farmers' participation consists of following three components.

- 1) Participation in project implementation
- 2) Farmers' sharing of construction cost
- 3) Operation and maintenance of project by farmer themselves

Sustainability will be attained by farmers' awareness of self-reliance, which can be achieved when farmers are a) interested in the project, b) aware of their responsibility and c) capable of operating and maintaining the project structures by themselves. Farmers will be interested in a project when it matches their needs. Then, their interest would be developed by being one of the members of the team for project implementation. Practically, farmers can participate in the construction of facilities or in the process of organization establishment, etc.



Awareness of responsibility would be developed by sharing necessary cost. For example, by paying a certain amount of cost for construction of a facility, people will inevitably pay attention to the facility. If it is not utilized, people will try to find a way to utilize it since there is investment from them. Therefore sharing cost will be necessary to give people a kind of responsibility. Cost sharing could be made by paying cash, by offering materials, or offering his/her labor force.

Besides, it is compulsory for farmers to operate and maintain the system or organization by themselves in order to be capable of managing it without relying on others. Therefore, participation in operation and maintenance from the first stage, i.e. the stage when technical assistance is easily available, is quite important.

Through these activities, farmer will develop an awareness of self-reliance and, ultimately, achieve take-off for sustainable development process.

### (3) Gender Equality

The importance of gender equality should be underlined in rural development, especially in a male-dominated society such as Guatemala's, and special attention to it should be paid through over the study period. For instance, the opinions of women in terms of gender-specific issues should be obtained through the exclusive gender meetings for women, and be reflected on the overall rural development plans so as not to generate negative impacts on women. And the development approaches (project components) which orient women's direct benefits, i.e. a plan for improved stoves, a hand weaving project, layer-chicken

project, and so on, should be taken into consideration for formulation of the development plans.

## 7.2 Needs and Approach to the Development

Through the series of participatory survey activities, the needs of communities were extracted as summarized in the following table.

Aspect	Needs
Income generation	<p><i>Agriculture</i></p> <ul style="list-style-type: none"> <li>• Technical assistance on farming practice</li> <li>• Mini-irrigation system</li> <li>• Commercialization of produce</li> <li>• Direct marketing</li> <li>• Storage and processing facilities</li> <li>• Establishment of organization or cooperation</li> <li>• Credit assistance</li> </ul> <p><i>Non-agriculture</i></p> <ul style="list-style-type: none"> <li>• Vocational training for non-agricultural work such as textile production, handicrafts, carpentry, and so on.</li> <li>• Credit assistance</li> </ul>
Living condition	<p><i>Education</i></p> <ul style="list-style-type: none"> <li>• Improvement of school facility</li> <li>• Provision of formal and informal education</li> </ul> <p><i>Infrastructure</i></p> <ul style="list-style-type: none"> <li>• Improvement of road condition</li> <li>• Installation of potable water supply system</li> <li>• Enhancement of electricity supply system</li> <li>• Construction of drainage</li> <li>• Installation of improved stove</li> </ul> <p><i>Health</i></p> <ul style="list-style-type: none"> <li>• Establishment of health post/unit with permanent staff and sufficient medicines</li> <li>• Betterment of nutrition condition</li> <li>• Promotion of health program</li> <li>• Provision of emergency transportation (ambulance)</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• Proper management of forest</li> <li>• Reduction of firewood use</li> <li>• Proper use of agro-chemicals to avoid contamination</li> <li>• Conservation of soil fertility</li> <li>• Proper treatment of inorganic garbage</li> </ul>

Considering these needs, it can be said that the living standards in the selected micro-basin are low in all aspects and people have a strong desire to improve the situation. However, from the needs presented here and the behavior of community people during the participatory survey, it is necessary to consider the following points.

- (1) **Shortsighted view**  
 People in the communities are basically thinking about short-term return, and attention is less paid to long-term effect on living condition. Therefore, their focus tends to concentrate on facilities such as “*construction of irrigation system*”, “*construction of water supply system*” and so on. Because of this tendency, less attention was paid to long term improvement such as environmental issues and educational issues.
- (2) **Imperfect understanding of the project**  
 As it is mentioned above, farmers’ focus is concentrated on *getting facilities*, and less attention is paid to the *after-project stage*. Accordingly, the sustainability of the project will be doubtful when it comes to the operation stage, especially on maintenance of the facilities, collection of fee, or repayment of loan. Therefore, it would be necessary to develop people’s understanding on the operation stage rather than just giving what they need. Also, though restoration of the sledged lands and severely eroded lands is a very important factor for conservation of the environment and agricultural production in the long run, they perceive that these facts are less important.
- (3) **Limited perception of the living condition**  
 Since they are already accustomed to their present living condition, sometimes they don’t notice what kind of needs they actually have. In the community, for example, farmers have to transport firewood by shouldering, which is quite a heavy workload for people especially for women and children. However, since they take it as usual daily work, they do not think it needs improvement. In this context, it would be necessary to give some another perception to the farmers. Similarly they could not make proper assessment of the quality of drinking water even if bacteria and coliform contaminate drinking water. Also they don’t make proper assessment of improved sauna baths system to be introduced for great reduction of firewood because the preset system of sauna baths is good and is not necessary to be improved.
- (4) **Lack of technical knowledge**  
 Needless to say, farmers do not have technical knowledge for realization of projects. Because of this, farmers cannot come up with concrete idea for development approach. People have only a vague idea on what should be done but do not have a clear idea on what kind of project components to be implemented. In line with this, assistance from technical viewpoints would be necessary.

Basically, the development plan and community needs must be matched with each other. Based on the needs (approach to the development) of communities and the above 4 considerations to be taken into account in development, possible alternative approaches to the development of the model areas were prepared as shown in the following table.

No / Alternative approaches (project component)	Name of model areas <sup>1)</sup>				Impact <sup>2)</sup>			
	Xeatzán Bajo (Chimaltenango)	Panyebar (Sololá)	Pachum (Totonicapán)	Palestina (Quezaltenango)	Environmental Conservation	Increase of Income	Improvement living condition	
<b>Environmental and Conservation Plan</b>								
a-1	Restoration plan for the collapsed lands	×	×	○	×	1	2	3
a-2	Soil conservation plan for steep farm lands	○	○	○	○	2	1	3
a-3	Reforestation plan	○	○	○	○	2	2	3
a-4	Agro-forestry development plan	○	○	○	○	2	1	3
a-5	Management plan of water quality	○	○	○	○	1	2	3
a-6	Solid wastes treatment plan	○	○	○	○	1	2	3
<b>Plans for Increasing Income Generation</b>								
b-1	Plan for making composts	○	○	○	○	3	2	2
b-2	Plan of model farm on potato production	×	×	×	○	3	1	2
b-3	Potato storage plan	×	×	×	○	3	1	1
b-4	Potato processing plan	×	×	×	○	3	1	1
b-5	Mini-irrigation plan	○	○	○	○	3	1	1
b-6	Layer-chicken raising plan for women's group	○	○	○	○	3	1	1
b-7	Coffee production improvement plan	×	○	×	×	3	1	1
b-8	Coffee processing plan	×	○	×	×	3	1	1
b-9	Agro-processing development plan	○	×	×	×	3	1	1
b-10	Plan of direct sale of vegetables	○	×	×	×	3	1	1
b-11	Improvement plan for maize thrashing	○	○	○	○	3	1	1
b-12	Institutional plan for fostering nucleus farmers	○	○	○	○	3	1	2
b-13	Plan of revolving fund for hand weaving thread	○	○	○	○	3	1	1
<b>Improvement plan for living environments</b>								
c-1	Rehabilitation plan of roads in the village	○	○	○	○	2	3	1
c-2	Rehabilitation plan of regional roads	○	○	○	○	2	3	1
c-3	Plan of rural electricity	○	○	○	○	2	3	1
c-4	Rehabilitation plan for drinking water system	○	○	○	○	1	3	1
c-5	Water quality improvement plan for the existing drinking water supply	○	○	○	○	1	3	1
c-6	Plan of extension use of improved cooking stoves and of sauna bath "Temascal"	○	○	○	○	1	3	2
c-7	Plan of provision toilette facilities	○	○	○	○	1	3	1
c-8	Plan of night time health education	○	○	○	○	1	3	1
c-9	Plan medicine growing plan	○	○	○	○	1	3	1
c-10	Improvement plan of service quality given to comadronas	○	○	○	○	1	3	1
c-11	Plan for installation of minimal pharmacy unit (MPU)	○	○	○	×	1	3	1
c-12	Municipality community health activity plan	×	×	×	○	1	3	1
c-13	Plan for migrant people to the coastal areas	×	×	×	○	1	3	1
c-14	Coffee processing plan for workload reduction in mountainous area	×	○	×	×	2	3	2
	Total number of possible alternative approach in the model area	24	25	23	26			

Remarks: 1) ○: there is a possible alternative approach ×: there is not possible alternative approach

2) 3: High degree of impact is expected

2: Some degree of impact is expected as its secondary effect

1: Very little impact or no impact is expected

## 7.3 Development Plan

### 7.3.1 Criteria for Selection of Project Components

In section 7.2, 24 possible approaches to the development (project component)

were clarified for Xeatzán Bajo, 25 for Panyebar, 23 for Pachum and 26 for Palestina. In order to formulate the optimum development plans for the model areas, these possible approaches (project components) in each model area were assessed from the three factors:

- (1) Degree of farmers' desire and perception for implementation of projects;
- (2) Degree of contribution to reduction of poverty by implementation of projects; and
- (3) Possibility of materialization of project in view of capability of farmers

The evaluation of project components was made by giving weighted points to each evaluation factor. and the selection was made based on the total of weighted points. The evaluation criteria are shown below.

Evaluation factor	Grade	Description	Point	Weighted point (*2)
Degree of farmers' perception	1	No(there is no perception according to the participatory survey results)	1	0.4
	2	Strong (less than 6th rank of prioritized development approaches in the participatory survey results)	2	0.8
	3	Very strong (1st-5th ranks of prioritized development approaches in the participatory survey results)	3	1.2
Degree of contribution to poverty reduction (*1)	1	Small (contribution to poverty reduction is small)	1	0.4
	2	Medium (contribution to poverty reduction is indirect and/or partial)	2	0.8
	3	Large (contribution to poverty reduction is direct and large)	3	1.2
Possibility of materialization	1	Low (no organization at present, considerable time necessary for setting up of organization)	1	0.2
	2	Medium (though there is no organization at present, an early setting up organization can be expected due to high capability and intention of farmers)	2	0.4
	3	High (There is farmer's organization (s) at preset that can be used for early implementation of projects)	3	0.8

(\*1): The degree of contribution for poverty reduction is graded considering 3 viewpoints, environmental conservation, income increase and improvement of living condition.

(\*2): weighted points are calculated based on the following assumption.

Item	Weight (%)
Degree of farmers' perception	40
Degree of contribution to poverty reduction	40
Possibility of materialization	20

The total weighted points evaluated by the three evaluation factors assess the possible approaches (project components) in each model area. In this study, the possible approaches (project components) that have more than 2.0 points were adopted as project components for rural development plans in the model area.

### 7.3.2 Xeatzán Bajo Model Area

The results of evaluation are shown below; according to which eleven approaches (project components) were selected. As mentioned previously, the rural development for the Xeatzán Bajo model area should be formulated for upgrading the living standards from three aspects, a) improvement of income level, b) upgrading the living environment and c) conservation of natural resources. Then these project components should be taken up as one package for rural development in the Xeatzán Bajo model area. Project design matrixes of each project component are shown in the attachment -PDM.

No	Alternative Approaches (project components)	Farmers' perception	Contribution to poverty reduction	Possibility of materialization	Total points	Adoption
	<i>Environmental and Conservation Plan</i>					
a-2	Soil conservation plan for steep farm lands	1,(0.4)*	2,(0.8)	2,(0.4)	1.6	
a-3	<b>Reforestation plan</b>	<b>1,(0.4)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.0</b>	○
a-4	Agro-forestry development plan	1,(0.4)	2,(0.8)	2,(0.4)	1.6	
a-5	Management plan of water quality	1,(0.4)	2,(0.8)	2,(0.4)	1.6	
a-6	Solid wastes treatment plan	1,(0.4)	2,(0.8)	1,(0.2)	1.4	
	<i>Plan for increasing income generation</i>					
b-1	<b>Plan for making composts</b>	<b>1,(0.4)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.0</b>	○
b-5	<b>Mini-irrigation plan</b>	<b>3,(1.2)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.8</b>	○
b-6	Layer-chicken raising plan for women's group	1,(0.4)	2,(0.8)	2,(0.4)	1.6	
b-9	<b>Agro-processing development plan</b>	<b>3,(1.2)</b>	<b>3,(1.2)</b>	<b>1,(0.2)</b>	<b>2.6</b>	○
b-10	<b>Plan of direct sale of vegetables</b>	<b>2,(0.8)</b>	<b>3,(1.2)</b>	<b>1,(0.2)</b>	<b>2.2</b>	○
b-11	Improvement plan for maize thrashing	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
b-12	<b>Institutional plan for fostering nucleus farmers</b>	<b>1,(0.4)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.0</b>	○
b-13	<b>Plan of revolving fund for hand weaving thread</b>	<b>3,(1.2)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.8</b>	○
	<i>Improvement plan for living environments</i>					
c-1	<b>Rehabilitation plan of roads in the village</b>	<b>3,(1.2)</b>	<b>2,(0.8)</b>	<b>2,(0.4)</b>	<b>2.4</b>	○
c-2	<b>Rehabilitation plan of regional roads</b>	<b>3,(1.2)</b>	<b>2,(0.8)</b>	<b>2,(0.4)</b>	<b>2.4</b>	○
c-3	Plan of rural electricity	1,(0.4)	2,(0.8)	2,(0.4)	1.6	
c-4	Rehabilitation plan for drinking water system	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
c-5	<b>Water quality improvement plan for the existing drinking water supply</b>	<b>1,(0.4)</b>	<b>3,(1.2)</b>	<b>3,(0.6)</b>	<b>2.2</b>	○
c-6	Plan of extension use of improved cooking stoves and of sauna bath "Temascal"	1,(0.4)	2,(0.8)	2,(0.4)	1.6	
c-7	Plan of provision toilette facilities	1,(0.4)	2,(0.8)	2,(0.4)	1.6	
c-8	Plan of night time health education	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
c-9	Plan medicine growing plan	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
c-10	Improvement plan of service quality given to comadronas	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
c-11	<b>Plan for installation of minimal pharmacy unit (MPU)</b>	<b>1,(0.4)</b>	<b>3,(1.2)</b>	<b>3,(0.6)</b>	<b>2.2</b>	○

Remark: (\*): 1 means grade 1 and 0.4 (1x0.4) is weighted point.

### 7.3.3 Panyebar Model Area

The results of evaluation are shown below; according to which fourteen approaches (project components) were selected. As mentioned previously, the rural development for the Panyebar model area should be formulated for upgrading the living standards from three aspects, a) improvement of income level, b) upgrading the living environment and c) conservation of natural resources. Then these project components should be taken up as one package for rural development in the Panyebar model area. Project design matrixes of each project component are shown in the Attachment of PDM.

No	Alternative Approaches (Project components)	Farmer's perception	Contribution to poverty reduction	Possibility of materialization	Total points	Adoption
	<i>Environmental and Conservation Plan</i>					
a-2	<b>Soil conservation plan for steep farm lands</b>	<b>2,(0.8)*</b>	<b>2,(0.8)</b>	<b>2,(0.4)</b>	<b>2.0</b>	○
a-3	<b>Reforestation plan</b>	<b>2,(0.8)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.4</b>	○
a-4	<b>Agro-forestry development plan</b>	<b>2,(0.8)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.4</b>	○
a-5	Management plan of water quality	1,(0.4)	2,(0.8)	1,(0.2)	1.4	
a-6	Solid wastes treatment plan	1,(0.4)	2,(0.8)	1,(0.2)	1.4	
	<i>Plan for increasing income generation</i>					
b-1	<b>Plan for making composts</b>	<b>2,(0.8)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.4</b>	○
b-5	Mini-irrigation plan	2,(0.8)	2,(0.8)	1,(0.2)	1.8	
b-6	<b>Layer-chicken raising plan for women's group</b>	<b>3,(1.2)</b>	<b>2,(0.8)</b>	<b>2,(0.4)</b>	<b>2.4</b>	○
b-7	<b>Coffee production improvement plan</b>	<b>3,(1.2)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.8</b>	○
b-8	<b>Coffee processing plan</b>	<b>3,(1.2)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.8</b>	○
b-11	Improvement plan for maize thrashing	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
b-12	<b>Institutional plan for fostering nucleus farmers</b>	<b>2,(0.8)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.4</b>	○
b-13	Plan of revolving fund for hand weaving thread	1,(0.4)	2,(0.8)	1,(0.2)	1.4	
	<i>Improvement plan for living environments</i>					
c-1	Rehabilitation plan of roads in the village	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
c-2	<b>Rehabilitation plan of regional roads</b>	<b>3,(1.2)</b>	<b>2,(0.8)</b>	<b>3,(0.6)</b>	<b>2.6</b>	○
c-3	Plan of rural electricity	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
c-4	<b>Rehabilitation plan for drinking water system</b>	<b>3,(0.4)</b>	<b>3,(1.2)</b>	<b>3,(0.6)</b>	<b>3.0</b>	○
c-5	<b>Water quality improvement plan for the existing drinking water supply</b>	<b>1,(0.4)</b>	<b>3,(1.2)</b>	<b>3,(0.6)</b>	<b>2.2</b>	○
c-6	Plan of extension use of improved cooking stoves and of sauna bath "Temascal"	1,(0.4)	1,(0.4)	2,(0.4)	1.2	
c-7	Plan of provision toilette facilities	2,(0.8)	1,(0.4)	3,(0.6)	1.8	
c-8	Plan of night time health education	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
c-9	<b>Plan medicine growing plan</b>	<b>2,(0.8)</b>	<b>3,(1.2)</b>	<b>3,(0.6)</b>	<b>2.6</b>	○
c-10	Improvement plan of service quality given to comadronas	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
c-11	<b>Plan for installation of minimal pharmacy unit (MPU)</b>	<b>2,(0.8)</b>	<b>2,(0.8)</b>	<b>3,(0.6)</b>	<b>2.2</b>	○
c-14	<b>Coffee processing plan for workload reduction in mountainous area</b>	<b>1,(0.4)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.0</b>	○

Remark: (\*): 1 means grade 1 and 0.4 (1x0.4) is weighted point.



### 7.3.4 Pachum Model Area

The results of evaluation are shown below; according to which sixteen approaches (project components) were selected. As mentioned previously, the rural development for the Panyebar model area should be formulated for upgrading the living standards from three aspects, a) improvement of income level, b) upgrading the living environment, and c) conservation of natural resources. Then these project components should be taken up as one package for rural development in the Panyebar model area. Project design matrixes of each project component are shown in the Attachment-PDM.

No	Alternative Approaches (Project components)	Farmer's perception	Contribution to poverty reduction	Possibility of materialization	Total points	Adoption
	<i>Environmental and Conservation Plan</i>					
a-1	<b>Restoration plan of the collapsed lands</b>	<b>2,(0.8)*</b>	<b>2,(0.8)</b>	<b>2,(0.4)</b>	<b>2.0</b>	○
a-2	<b>Soil conservation plan for steep farm lands</b>	<b>2,(0.8)</b>	<b>2,(0.8)</b>	<b>2,(0.4)</b>	<b>2.0</b>	○
a-3	<b>Reforestation plan</b>	<b>2,(0.8)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.4</b>	○
a-4	<b>Agro-forestry development plan</b>	<b>2,(0.8)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.4</b>	○
a-5	Management plan of water quality	2,(0.8)	1,(0.4)	1,(0.2)	1.4	
a-6	Solid wastes treatment plan	2,(0.8)	2,(0.8)	1,(0.2)	1.8	
	<i>Plan for increasing income generation</i>					
b-1	Plan for making composts	1,(0.4)	3,(1.2)	1,(0.2)	1.8	
b-5	<b>Mini-irrigation plan</b>	<b>3,(1.2)</b>	<b>3,(1.2)</b>	<b>1,(0.2)</b>	<b>2.6</b>	○
b-6	<b>Layer-chicken raising plan for women's group</b>	<b>3,(1.2)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.8</b>	○
b-11	Improvement plan for maize thrashing	1,(0.4)	2,(0.8)	3,(1.2)	1.8	
b-12	<b>Institutional plan for fostering nucleus farmers</b>	<b>3,(1.2)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.8</b>	○
b-13	Plan of revolving fund for hand weaving thread	1,(0.4)	2,(0.8)	1,(0.2)	1.4	
	<i>Improvement plan for living environments</i>					
c-1	<b>Rehabilitation plan of reads in the village</b>	<b>3,(1.2)</b>	<b>3,(1.2)</b>	<b>3,(0.6)</b>	<b>3.0</b>	○
c-2	<b>Rehabilitation plan of regional roads</b>	<b>3,(1.2)</b>	<b>3,(1.2)</b>	<b>3,(0.6)</b>	<b>3.0</b>	○
c-3	<b>Plan of rural electricity</b>	<b>2,(0.8)</b>	<b>3,(1.2)</b>	<b>2,(0.4)</b>	<b>2.4</b>	○
c-4	Rehabilitation plan for drinking water system	2,(0.8)	1,(0.4)	3,(0.6)	1.8	
c-5	<b>Water quality improvement plan for the existing drinking water supply</b>	<b>1,(0.4)</b>	<b>3,(1.2)</b>	<b>3,(0.6)</b>	<b>2.2</b>	○
c-6	<b>Plan of extension use of improved cooking stoves and of sauna bath "Temascal"</b>	<b>2,(0.8)</b>	<b>3,(1.2)</b>	<b>3,(0.6)</b>	<b>2.6</b>	○
c-7	<b>Plan of provision toilette facilities</b>	<b>2,(0.8)</b>	<b>2,(0.8)</b>	<b>3,(0.6)</b>	<b>2.2</b>	○
c-8	<b>Plan of night time health education</b>	<b>3,(1.2)</b>	<b>2,(0.8)</b>	<b>3,(0.6)</b>	<b>2.6</b>	○
c-9	Plan medicine growing plan	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
c-10	<b>Improvement plan of service quality given to comadronas</b>	<b>3,(1.2)</b>	<b>2,(0.8)</b>	<b>3,(0.6)</b>	<b>2.6</b>	○
c-11	<b>Plan for installation of minimal pharmacy unit (MPU)</b>	<b>3,(1.2)</b>	<b>3,(1.2)</b>	<b>3,(0.6)</b>	<b>3.0</b>	○

Remark: (\*): 1 means grade 1 and 0.4 (1x0.4) is weighted point.

### 7.3.5 Palestina Model Area

The results of evaluation are shown below; according to which eighteen approaches (project components) were selected. As mentioned previously, the rural development for the Palestina model area should be formulated for upgrading the living standards from three aspects, a) improvement of income level, b) upgrading the living environment and c) conservation of natural resources. Then these project components should taken up as one package for rural development in the Palestina model area. Project design matrixes of each project component are shown in the Attachment-PDM.

No	Alternative Approaches (Project components)	Farmer's perception	Contribution to poverty reduction	Possibility of materialization	Total points	Adoption
	<i>Environmental and Conservation Plan</i>					
a-2	Soil conservation plan for steep farm lands	2,(0.8)*	2,(0.8)	2,(0.4)	2.0	○
a-3	Reforestation plan	2,(0.8)	2,(0.8)	2,(0.4)	2.0	○
a-4	Agro-forestry development plan	2,(0.8)	2,(0.8)	1,(0.2)	1.8	
a-5	Management plan of water quality	2,(0.4)	3,(1.2)	1,(0.2)	2.2	○
a-6	Solid wastes treatment plan	1,(0.4)	3,(1.2)	2,(0.2)	2.0	○
	<i>Plan for increasing income generation</i>					
b-1	Plan for making composts	1,(0.4)	3,(1.2)	2,(0.4)	2.0	○
b-2	Plan of model farm on potato production	3,(1.2)	3,(1.2)	2,(0.4)	2.8	○
b-3	Potato storage plan	3,(1.2)	3,(1.2)	2,(0.4)	2.8	○
b-4	Potato processing plan	3,(1.2)	3,(1.2)	1,(0.2)	2.2	○
b-5	Mini-irrigation plan	3,(1.2)	3,(1.2)	2,(0.4)	2.8	○
b-6	Layer-chicken raising plan for women's group	1,(0.4)	3,(1.2)	2,(0.4)	2.0	○
b-11	Improvement plan for maize thrashing	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
b-12	Institutional plan for fostering nucleus farmers	3,(1.2)	3,(1.2)	2,(0.4)	2.8	○
b-13	Plan of revolving fund for hand weaving thread	1,(0.4)	2,(0.8)	2,(0.2)	1.6	
	<i>Improvement plan for living environments</i>					
c-1	Rehabilitation plan of roads in the village	3,(1.2)	2,(0.8)	2,(0.4)	2.4	○
c-2	Rehabilitation plan of regional roads	1,(0.4)	1,(0.4)	1,(0.2)	1.0	
c-3	Plan of rural electricity	1,(0.4)	2,(0.8)	1,(0.2)	1.4	
c-4	Rehabilitation plan for drinking water system	2,(0.4)	3,(1.2)	3,(0.6)	2.2	○
c-5	Water quality improvement plan for the existing drinking water supply	1,(0.4)	3,(1.2)	3,(0.6)	2.2	○
c-6	Plan of extension use of improved cooking stoves and of sauna bath "Temascal"	1,(0.4)	2,(0.8)	2,(0.4)	1.6	
c-7	Plan of provision toilette facilities	1,(0.4)	2,(0.8)	3,(0.6)	1.8	
c-8	Plan of night time health education	2,(0.8)	2,(0.8)	3,(0.6)	2.2	○
c-9	Plan medicine growing plan	1,(0.8)	2,(0.8)	3,(0.6)	1.8	
c-10	Improvement plan of service quality given to comadronas	2,(0.8)	2,(0.8)	3,(0.6)	2.2	○
c-12	Municipality community health activity plan	2,(0.8)	3,(1.2)	3,(0.6)	2.6	○
c-13	Plan for migrant people to the coastal areas	2,(0.8)	3,(1.2)	3,(0.6)	2.6	○

Remark: (\*): 1 means grade 1 and 0.4 (1x0.4) is weighted point

## **7.4. Organization and Implementation**

### **7.4.1 Basic Concept**

Implementation of the project on the sustainable rural development for the reduction of poverty was studied for the whole area of 4 provinces with a total area of 6,000 km<sup>2</sup>.

Though the objective areas are as large as 6,000 km<sup>2</sup>, priority for project development should be given to the poor micro-basins that are classified as extreme poverty (a), severe poverty (b) and regular poverty (c) defined by FIS.

The formulated rural development projects in 4 model areas were 59 in total. These cover various development fields for (i) environmental and conservation (6 kinds), (ii) increasing income generation (13 kinds), and (iii) improvement for living conditions (14 kinds). It was planned that these types of the projects would be applied to the four provinces as much as possible.

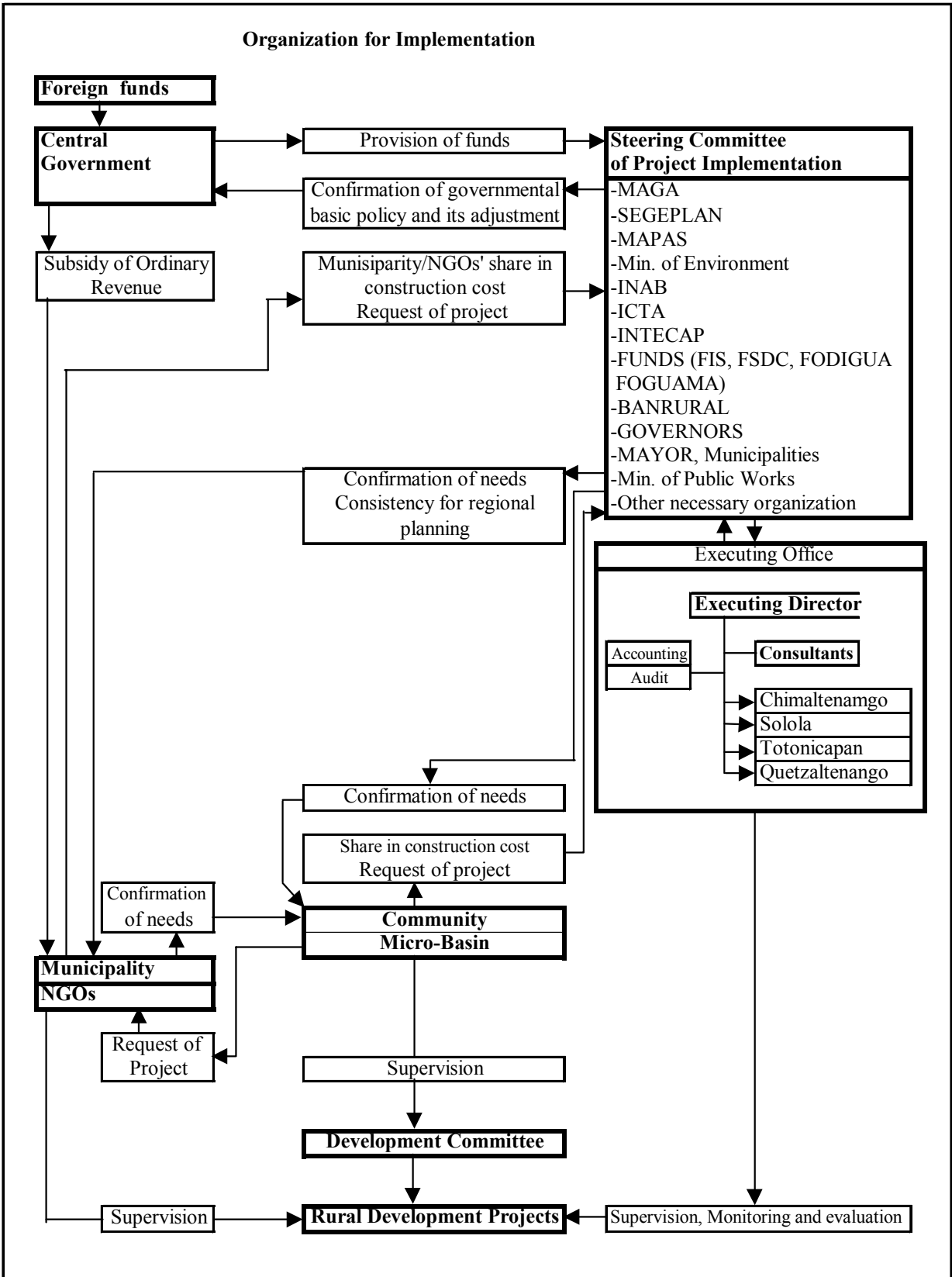
The sustainable rural development project in an area of four provinces is not a top-down project but a bottom-up project. In principle, the project should be formulated entirely based on problems and needs of the community and farmers. Also the project should be executed by farmers' participation.

The development of the project in an area of four provinces will be made based on methodology for sustainable development of micro-basins that was created in this study. A special attention was paid on rapid development of the project by simple methodology and the motivation to farmers' participation to the project. For this purpose, appropriate candidate micro-basins should be adequately and rapidly screened and listed based on evaluation factors. It is also essential to make participatory survey in the community.

In order to implement these projects comprehensively and efficiently, it is considered necessary that an institution with the function of coordination should be established, taking into consideration that implementation of rural development projects are in charge of various existing organizations at present administration system. Also under the committee, an executing office will be instituted and consultants will provide services of supervision and advice of project implementation with an executing office.

#### 7.4.2 Organization

A new steering committee for project implementation headed by the representative of MAGA headquarters will be established in Guatemala City. It will consist of the members from MAGA, SEGEPLAN, MAPAS, Ministry of Environment, Ministry Public Works, INAB, ICTA, INTECAP, Governors of the related provinces, and other organization if necessary. In addition, representatives of organizations for supporting fund and credit such as FIS, FONAPAZ, FSDC, INFROM, FODIGUA, FOGUAMA, BANRURAL should become the members of committee. Under a Steering Committee of Project Implementation, an Executing Office that supervises monitors and evaluate projects will be instituted. Consultants will provide services of supervision and advice to implementation of projects with an Executing Office. A proposed organization for implementation of projects is shown below:



### 7.4.3 Selection of Projects

Projects for implementation will be selected based on the following procedures:

(1) To select micro-basins for an area of four provinces

Micro-basins in an area of four provinces (6,000 km<sup>2</sup>) are delineated with about 5 km<sup>2</sup> by use of 1/50,000 topographic maps. And community or communities in the micro-basin will be identified. Poverty class of the communities is checked based on the poverty criteria defined by FIS. Micro-basins that do not belong to class poverty “a”, “b”, and “c” in FIS criteria will be excluded from candidate micro-basins for the project based on the FIS data.

(2) To make potential surveys for micro-basins and selection of micro-basins

The screened micro-basins mentioned above are evaluated based on the following five factors: For evaluation, potential survey of all evaluation items except No.2 will be carried out by an executing office.

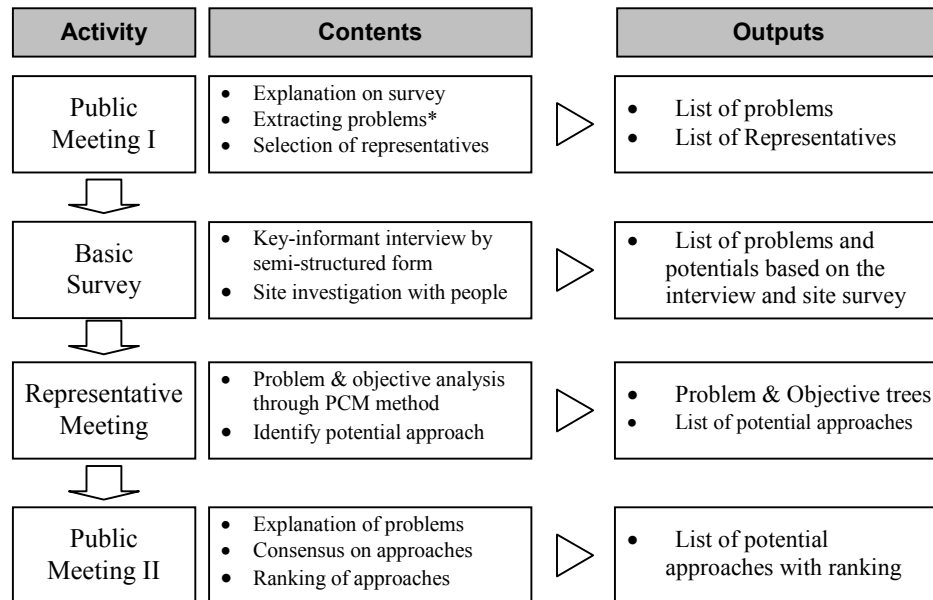
No. of evaluation factors	Evaluation factors	Criteria for community and/or micro-basin
No.1	Number of households in community	Should be between 50 and 250 in number
No.2	Area of river basin (micro-basin )	Should be between 3 to 15 km <sup>2</sup>
No.3	Overlapped by other projects	Not overlapped by other projects that other agencies have conducted and/or are carrying out
No 4	Social problems	No serious social problems for implementation of the project
No 5	Overlapping other municipality	Micro-basin does not cover the area of other municipality

(3) Participatory Survey

In order to extract problems and needs of the selected communities from the community people mentioned above, simple participatory survey shall be conducted. The survey itself could be conducted by NGOs or local consultants considering human-resource constraints of governmental organizations.

The survey will be made in 3 steps, identification of problems and potentials, analysis of problems and objectives, and finding potential development approaches. To identify problems and potentials, public meeting will be held together with key-informant interview and site investigation. Identified problems will be analyzed among the community representatives and potential development approach will be formed through the Project Cycle Management

(PCM) method. Then, in the general public meeting, community people will approve the formed approaches and decide their ranking according to the community's needs and urgency. As the final out put, list of potential development approaches with ranking will be prepared. The list will be utilized as the input for formation of micro-basin development plan. The procedure of the survey is shown below.



\*: For extracting problems, participants will be divided into group by gender in order for them to feel free to discuss especially for women.

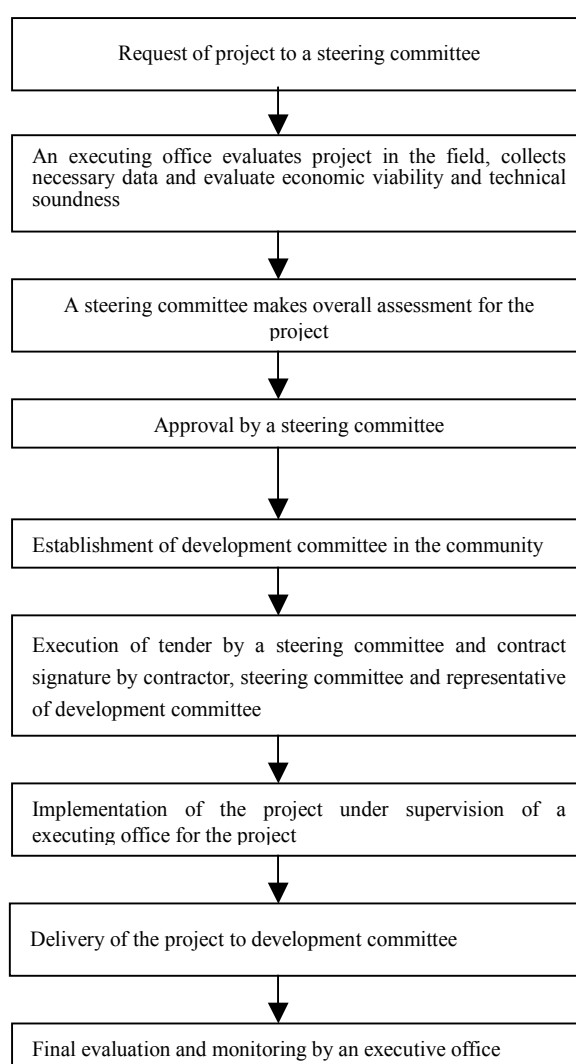
#### (4) Selection of the Project

List of potential development approaches (projects) with ranking obtained from participatory survey will be assessed based on the following three evaluation factors and weighted points as shown in section 7.3.1. Projects are listed in order. In principle, implementation of projects will be performed based on priority order. If the projects are in the level of the same rank, project for increasing income generation should be in first priority, improvement plan for living environments in secondary priority and environment and conservation plan in third priority. In addition, final selection of the project should be made based on the following screening factors.

No. of evaluation fact	Criteria
1.	Beneficiaries should agree to share construction costs of the project.
2	Lands necessary for project facilities are not private.
3	The project is not legally categorized as private sector's project.
4	Project cost should be in the range predetermined by the related organizations.
5	O&M of the project should be surely conducted by a development committee.

## (5) Implementation of Projects

General flow of implementation of projects is shown below;



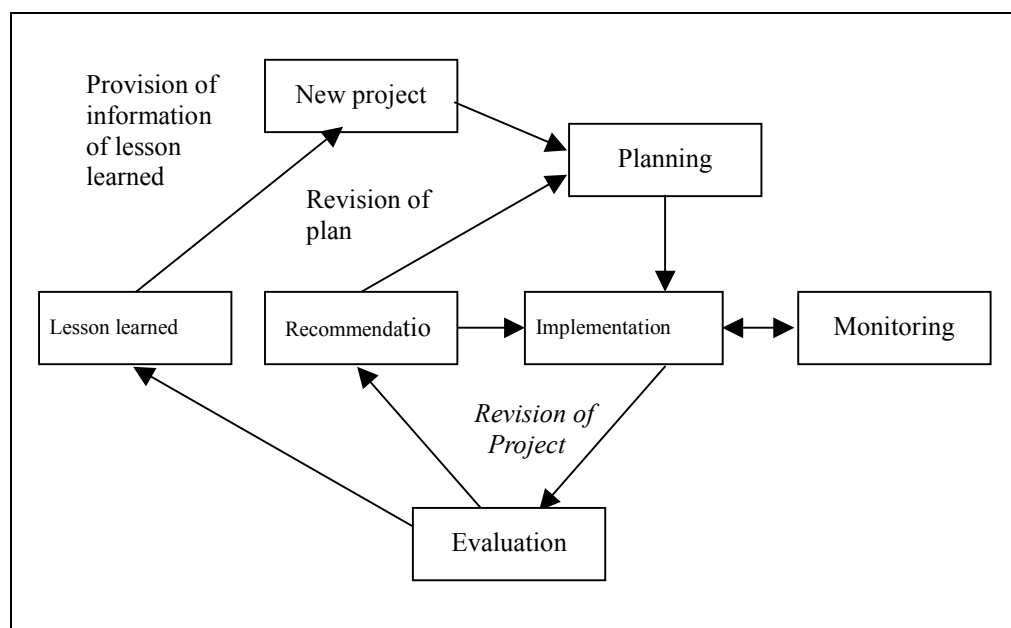
If an average micro-basin has 5 km<sup>2</sup>, it is estimated that there are about 1,200 basins in four provinces. While according to FIS data, it is estimated that there are about 210 communities in four provinces that belong to class poverty 'a', 'b', and



‘c’, and evaluation factor No.1 (the number of households in community: 30 to 250) that mentioned in selection criteria of micro-basins. Regardless, it is expected that a lot of micro-basins will be selected for project implementation. Implementation of the projects would be performed stepwise and the same numbers of micro-basins selected by each province would be executed provincial-wise.

## 7.5 Monitoring and Evaluation of Projects

The general concept and flow chart for monitoring and evaluation of projects is illustrated below:



Evaluation for monitoring will be done to grasp 1) progress of the activities, 2) status of attainment of the work and 3) target of the project. Monitoring will be carried out stepwise: Before the implementation of the project and after the implement of the project. The monitoring indicators to be used should be easy for monitoring work.

The executing office that is proposed in section 7.4.2 principally undertakes monitoring. Evaluation of these items should be carried out by the third party including the representative farmers to participate in assessment of the projects.

Monitoring indicators and organizations for implementation and management of the proposed projects are shown in Table 7.5 (1).

# ***TABLES***

**Table 1.3.1 List of Counterpart Personnel and JICA Study Team**

Name	Official Position
<b><u>Counterparts</u></b>	
Roberto Chávez	Chief Counterpart, MAGA
Juan José Cano	MAGA Coordinator, Chimaltenango province
Mario Roberto Gomez	MAGA Coordinator, Chimaltenango province
Rafael Raúl Rodríguez Cojólón	MAGA Coordinator, Chimaltenango province
Carlos Rolando Santos Girón	MAGA Coordinator, Chimaltenango province
Juan Gerardo Mendez G.	MAGA Coordinator, Sololá province
Cristobal Antonio Márquez Artero	MAGA Coordinator, Sololá province
Orlan Rodas de León	MAGA Coordinator, Totonicapán province
Jorge Guevara Santos	MAGA Coordinator, Quetzaltenango province
Oliverio B. Portillo Méndez	MAGA, Development management Division
Oscar César López Maldonado	PLAMAR
Mario Norberto López Rodríguez	PLAMAR
<b><u>JICA Experts</u></b>	
Kenjiro Onaka	Team leader
Koh Watanabe	Expert for participatory development
Yuji Hatakeyama	Environmental expert
Toru Ide	Environmental expert
Yusuke Goto	Environmental expert
Yasuo Aonishi	Sociologist
Luis Rosado	Agronomist
Makoto Yamada	Marketing and agricultural processing expert
Fumiaki Murakami	Infrastructure engineer
Katsuya Kamisato	Infrastructure engineer
Junichi Usami	Infrastructure engineer
Saeko Ichikawa	Health expert
Minako Kakuma	Health expert
Ronald Castellanos	Health expert
Ayako Nishiwaki	Expert for participatory development and gender
Michinori Yoshino	Logistic coordinator

Table 3.1.4 (1) Distribution of Area According to Land Elevation by Province

Rango de Elevacion	Chimaltenango	Solola	Totonicapan	Quetzaltenango
0 a 1000	10	5	0	40
1000 a 1500	16	10	0	8
1500 a 2000	35	34	25	5
2000 a 2500	34	31	34	19
2 500 o mas	5	20	41	28
<b>Total (%)</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

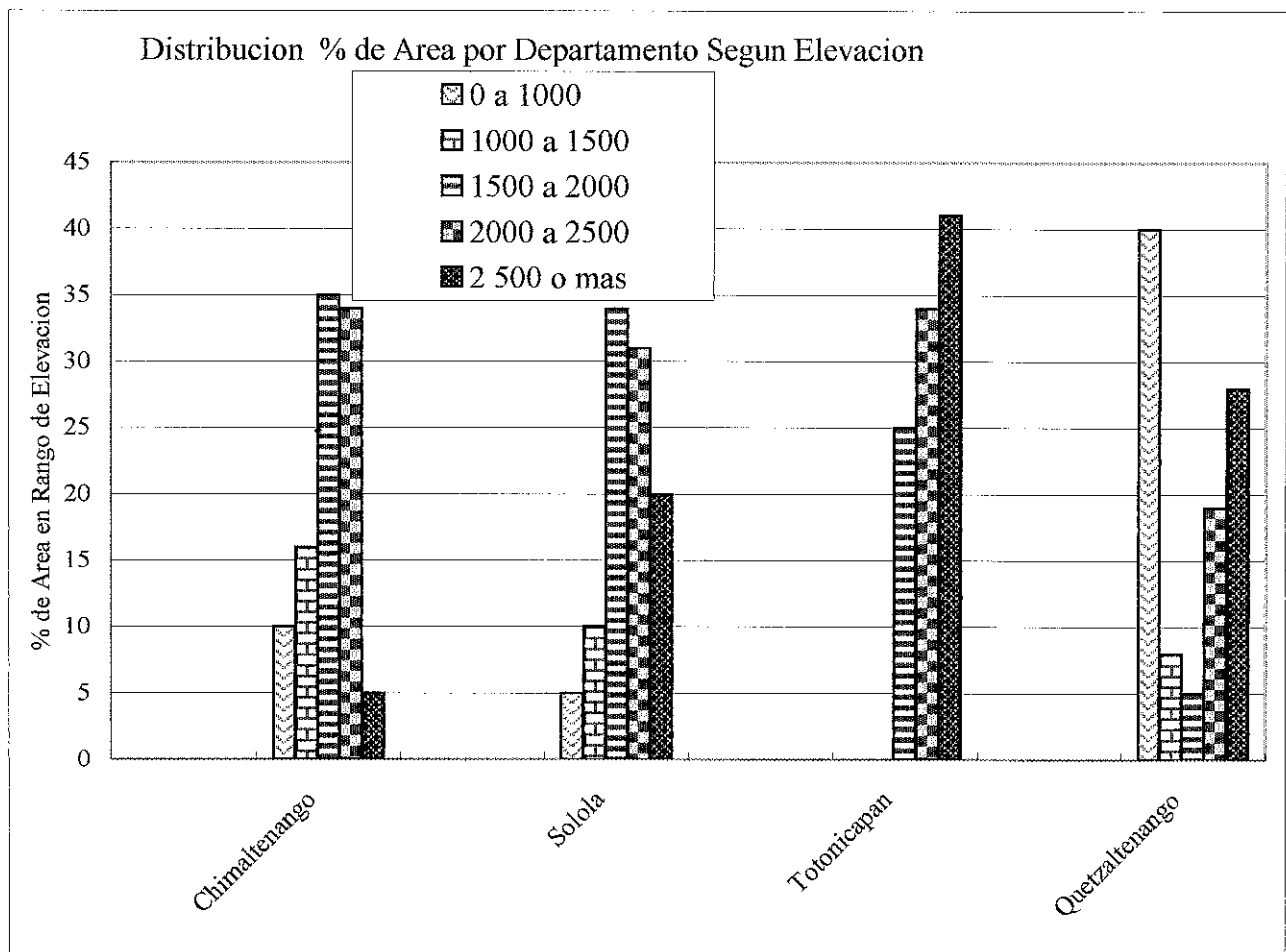


Table 3.1.4 (2) Variation of Temperature According to Land Elevation

**Departamento Chimaltenango**

Municipio Santa Cruz Balanya (2,080 m.s.n.m)												
	Ene.	Feb.	Mar.	Abr.	May	Jun.	Jul.	Ago.	Sep.	Oct.	Nov.	Dic.
Promedio Maxima Temp.	26.1	27.6	28	29.5	27.1	27.8	27.9	28.5	27.2	27	26.6	25.3
Promedio Minima Temp.	2.4	1.9	2.3	5.4	5.7	9	7.1	8.4	7.5	7.4	2.9	0

San Martin Jilotepeque (1,800 m)												
Promedio Maxima Temp.	22.3	22.8	23.4	23.6	23.3	23	23	22.9	22.6	22.5	22.5	22.6
Promedio Minima Temp.	6.7	7.9	7.5	9.4	9.5	9.6	9.3	9.8	10.1	9.8	7	9.4

Alameda (1,766 m)												
Promedio Maxima Temp.	23.1	24.2	25.3	25.8	24.5	23.8	23.2	23.3	23.1	22.9	22	21.4
Promedio Minima Temp.	7.5	8.2	8.7	10.8	11.5	13	13.4	13.1	13.9	12.7	11.5	9.6

Acatenango (1,370 m)												
Promedio Maxima Temp.	32.2	32.2	32.3	30.8	30.8	30.5	30.1	30.4	29.6	29.6	31.4	32.3
Promedio Minima Temp.	13.7	13.4	14.7	15	14.8	15	14.8	14.8	13.8	14.6	14	13.4

**Departamento Solola**

San Lucas Toliman ( m)												
Promedio Maxima Temp.	28.4	28.9	28.4	29	27.9	28.2	28.5	28.4	28.3	27.5	28.6	28.4
Promedio Minima Temp.	6.5	6.3	7.5	10.7	12.1	12.9	11.6	10.9	10.8	9.1	8	6.3

Santiago Atitlan ( 1,580 m)												
Promedio Maxima Temp.	27.6	28.8	29.3	29.5	27.9	28.2	28.6	28.1	27.8	27.2	27.6	27.9
Promedio Minima Temp.	6.5	6.2	7	10.9	11.3	12.2	11.2	11.4	11.7	10.6	8.6	6.2

**Departamento Quetzaltenango**

El Palmar ( 900 m)												
Promedio Maxima Temp.	29	29.7	30	29.5	28.7	29	29.4	29.1	28.5	29	28.5	28.9
Promedio Minima Temp.	13	13.6	14.2	14.2	15.5	15.6	15.3	15	15.6	15	14.7	14.2

Colomba ( 1,371 m)												
Promedio Maxima Temp.	29.2	28.2	27.9	27.6	27.8	27	22.4	28	26.7	26.8	27.8	29
Promedio Minima Temp.	9.6	9.5	10.2	11.2	10.8	12.9	12.5	12.6	12	11.7	10.5	10.3

Quetzaltenango ( 2,380 m)												
Promedio Maxima Temp.	19.1	20.1	22.3	24.5	25.5	23.7	23	22.7	22.1	20.8	20.6	19.4
Promedio Minima Temp.	0.3	0.9	2.9	6.6	9.9	10.1	9	8.9	9.9	8.8	6.6	2.5

Olintepeque ( 2,380 m)												
Promedio Maxima Temp.	25.4	26.8	27.8	26.8	26.1	24.4	23.7	23.8	23.2	23.6	23.8	24.8
Promedio Minima Temp.	-6	-6.6	-5.2	0.6	3.6	4	3.1	2.9	3.6	1.9	-1.3	-6.1

Fuente: Equipo de Estudio de JICA, Usando datos de INSIVUMEH y de Informe de Clasificación de Suelo

Table 3.1.4 (3) Mean Rainfall in Different Regions of Chimaltenango Province

Muni. El Tejar (1,100 m.s.n.m)	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	11	7	55	95	325	449	296	335	614	307	47	31	2572
Evapotranspiracion (mm)	97	116	109	110	75	72	95	95	70	71	82	102	1094

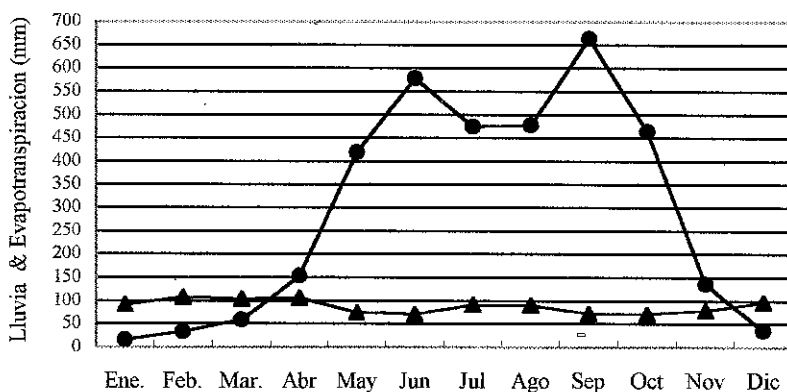
  

Muni. San Martin Jilotepeque	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	4	6	16	26	107	242	197	187	254	158	33	6	1236
Evapotranspiracion (mm)	99	109	141	137	132	108	116	122	105	105	90	95	1359

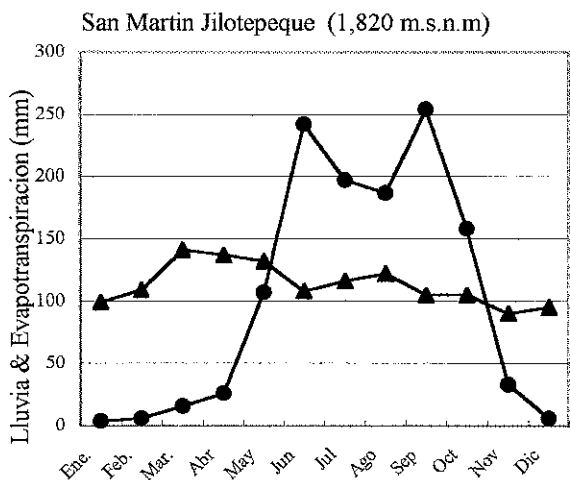
  

Muni. Yepocapa (620 m.s.n.m)	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	16	33	58	154	419	579	474	478	665	464	136	36	3512
Evapotranspiracion (mm)	92	108	104	106	75	71	92	91	72	71	79	97	1058

Yepocapa (620 m.s.n.m.)



● Lluvia (mm)  
▲ Evapotranspiracion (mm)



El Tejar (1,100 m.s.n.m)

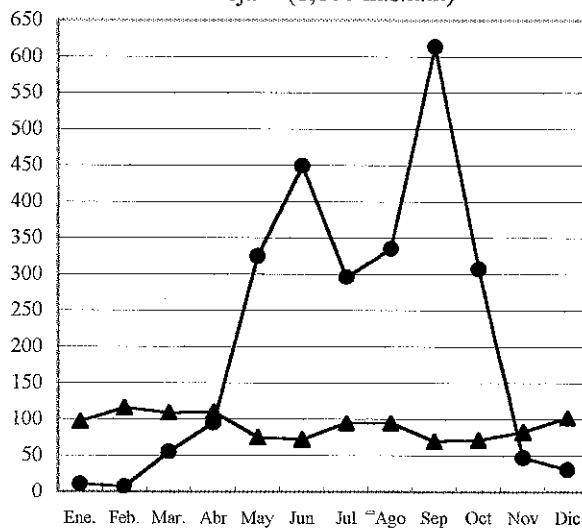


Table 3.1.4 (4) Mean Rainfall in Different Regions of Solola Province

Muni. San Lucas Toliman	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	9	24	31	72	232	520	343	322	554	334	80	15	2536
Evapotranspiracion (mm)	110	129	132	165	120	96	136	123	113	110	100	107	1441

Muni. Santa Catarina Ixtahucan	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	4	14	16	34	139	264	149	216	311	143	24	5	1319
Evapotranspiracion (mm)	92	103	132	129	126	104	110	115	101	101	86	90	1289

Muni. Santa Clara la Laguna	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	5	11	22	51	197	306	186	221	341	166	25	0	1531
Evapotranspiracion (mm)	81	88	87	100	92	85	97	96	82	88	78	81	1055

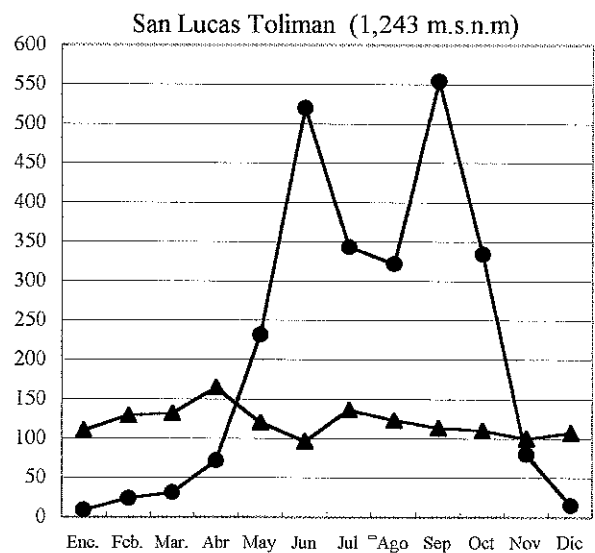
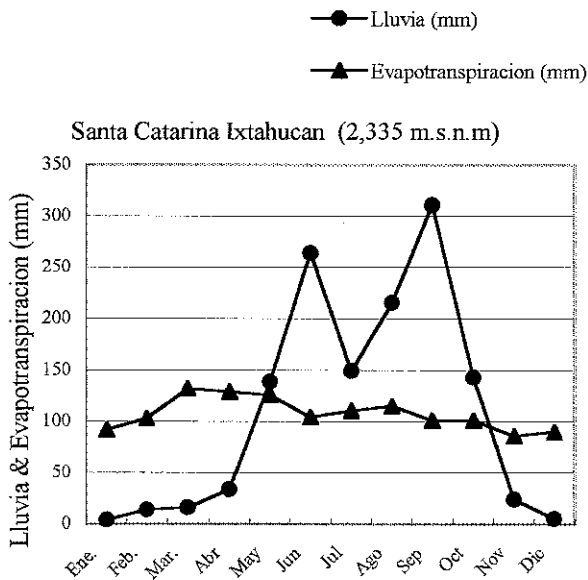
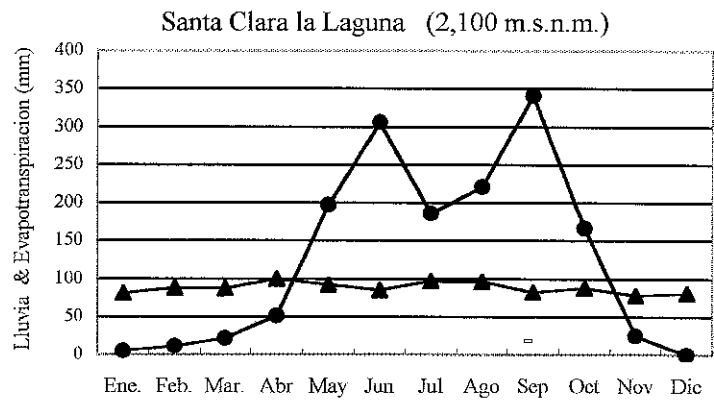


Table 3.1.4 (5) Mean Rainfall In Different Regions of Toticapán Province

Muni. Santa Lucia la Reforma	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	1	5	8	47	100	193	110	131	164	78	16	2	855
Evapotranspiracion (mm)	101	111	140	134	128	106	116	123	111	111	94	98	1373

Muni. Totonicapán (2,500 m.)	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	3	6	14	50	153	204	144	150	188	122	28	9	1071
Evapotranspiracion (mm)	92	103	132	129	126	104	110	115	101	101	86	90	1289

Muni. San Bartolo (2,180 m.)	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	4	4	23	38	128	232	173	146	163	96	38	6	1051
Evapotranspiracion (mm)	92	103	132	129	126	104	110	115	101	101	86	90	1289

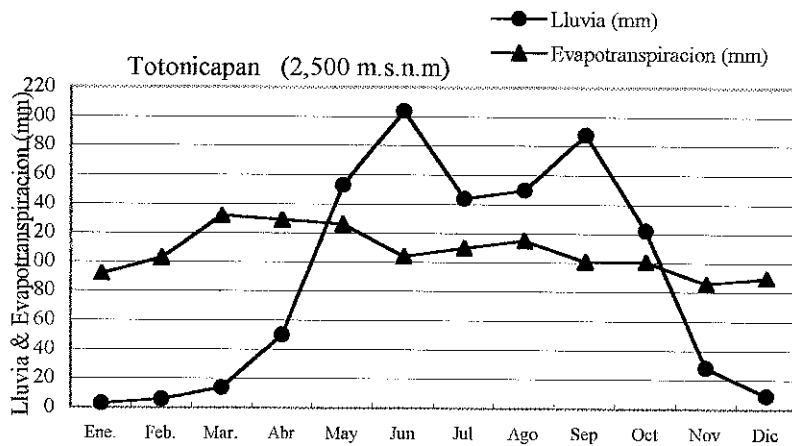
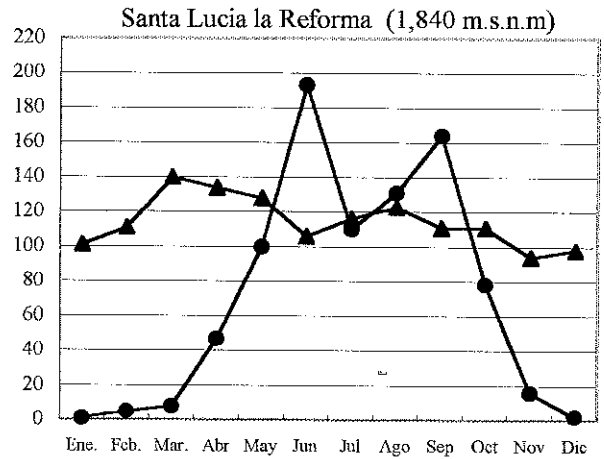
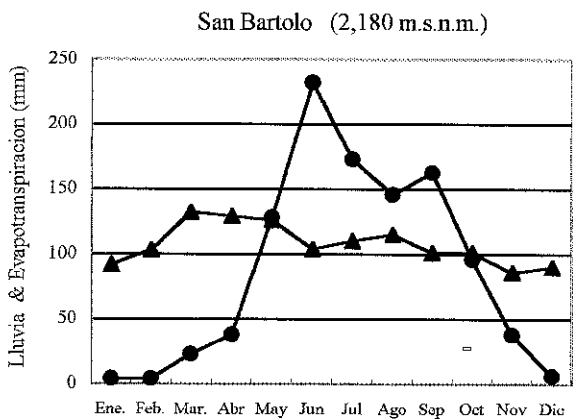




Table 3.1.4 (6) Mean Rainfall in Different Regions of Quetzaltenango Province

Muni. San Carlos Sija (2,760 m.)	Jan.	Feb.	Mar.	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainfall (mm)	2	13	16	39	145	187	145	125	212	109	23	2	1018
Evapotranspiration (mm)	89	96	120	113	109	93	100	104	92	93	77	84	1170

Muni. Olimtepeque (2,400 m.)	Jan.	Feb.	Mar.	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainfall (mm)	1	9	9	31	104	157	111	120	153	102	27	4	828
Evapotranspiration (mm)	81	88	87	100	92	85	97	96	82	88	78	81	1055

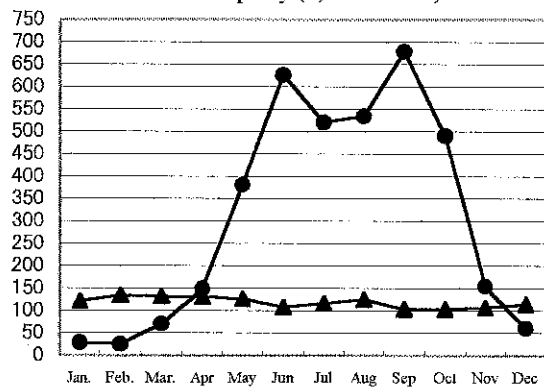
  

Muni. Zunil (1,500 m.)	Jan.	Feb.	Mar.	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainfall (mm)	30	46	9	31	104	157	111	120	153	102	27	4	894
Evapotranspiration (mm)	81	88	87	100	92	85	97	96	82	88	78	81	1055

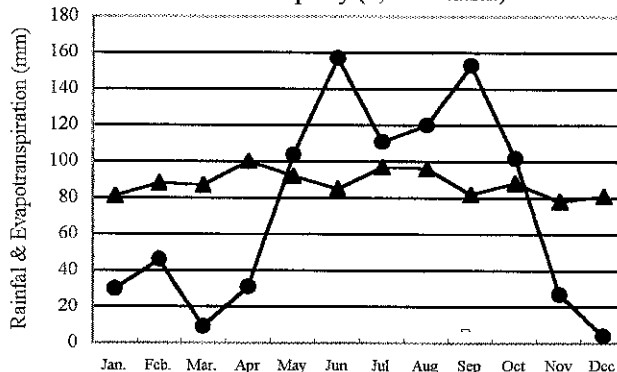
  

Municip. Colomba (1,400)	Jan.	Feb.	Mar.	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainfall (mm)	28	25	70	149	381	626	520	534	679	490	155	61	3718
Evapotranspiration (mm)	121	134	132	131	126	108	117	125	103	103	107	114	1421

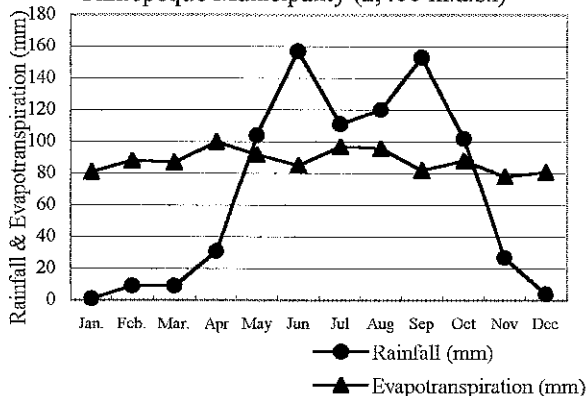
Colomba Municipality (1,400 m.a.s.l.)



Zunil Municipality (1,500 m.a.s.l.)



Olimtepeque Municipality (2,400 m.a.s.l.)



San Carlos Sija Municipality (2,760 m.a.s.l.)

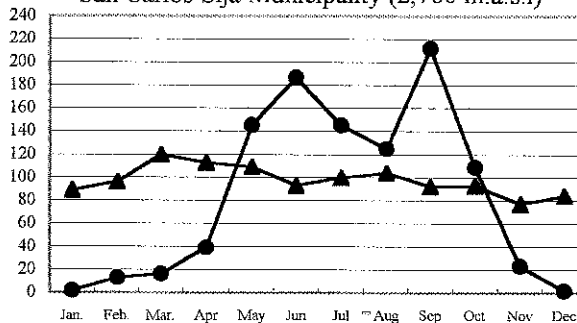


Table 3.1.4 (7) Area and Characteristics of Soil Series in Chimaltenango Province

Nombre de la Serie	Simbolo en Mapa	Area (ha)	% del Area	Material Parental	Relieve	Pendiente Dominante (%)	Textura y Consistencia	Profundidad (cm)	Limitacion a Penetracion de Raices	Peligro de Erosion	Problema Especial de Manejo
1 Alotenango	AF	8,670	4.38								
2 Balanjuyu	Al	13,600	6.87	Ceniza volcanica mafica	Inclinado a muy inclinado	12 a 30	Franca, suelta	25 a 40	Ninguna	Alto	Erosion
3 Cauque	Ba	2,800	1.41	Ceniza volcanica mafica	Fuertemente ondulado	12 a 15	Franca, friable	25 a 40	Ninguna	Alto	Erosion, Altura
4 Camancha	Cq	25,660	12.97	Ceniza volcanica mafica	Fuertemente ondulado	10 a 15	Franca, friable	20 a 40	Ninguna	Alto	Erosion, M.O.
5 Cutzan	Cm	17,060	8.62	Ceniza volcanica mafica	Ondulado/Fuertemente Ondul.	10	Franca, friable	50	Ninguna	Regular	Elevacion
6 Chinautla	Cj	1,370	0.69	Ceniza volcanica cementada	Fuertemente ondulado	10 a 25	Franco arenoso, friable	10 a 20	Ceniza cementada	Muy alto	Erosion
7 Chupo	Chn	4,040	2.04	Granito, gneis	Inclinado	20 a 50	Franco, friable	10 a 20	Roca a 40 - 50 cm	Muy alto	Erosion
8 Chocola	Chi	6,600	3.34	Granito y cenizas volcanicas	Inclinado	50 a 60	Franco, friable	15 a 30	Roca a 40 - 50 cm	Muy alto	Erosion
9 Chol	Cho	2,020	1.02	Ceniza volcanica pomacea	Suavemente inclinado	3 a 6	Franco limoso, friable	30 a 50	Ninguna	Regular	Erosion
10 Cimas Volcanicas	Chg	3,530	1.78	Esquisto	Inclinado	30 a 60	Franco arenoso, friable	10 a 15	Roca a 20 - 50 cm	Alto	Erosion, Fertilidad
11 Guatemala	CV	1,200	0.61	Cenizas y rocas volcanicas	Muy inclinado						
12 Guatemala, Fase pendien.	Gt	3,660	1.85	Ceniza volcanica pomacea	Casi plano	0 a 6	Franco, friable	30 a 50	Ninguna	Bajo	Materia Organica
13 Osuna	Gtp	7,260	3.67	Ceniza volcanica pomacea	Inclinado	27	Franco, friable				
14 Panan	Ou	7,230	3.65	Ceniza volcanica pomacea	Inclinado a muy inclinado	15 a 20	Franco arenoso, pedregoso	20 a 30	Ninguna	Alto	Erosion
15 Patzite	Pn	930	0.47	Cinza volcanica cementada	Inclinado	10	Franco arenoso, pedregoso	20 a 30	Ceniza cementada	Muy alto	Erosion, pedregos.
16 Poaquil	Pz	1,800	0.91	Ceniza volcanica pomacea	Inclinado	50	Franco arenoso, friable	20 a 30	Ninguna	Muy alto	Erosion
17 Quitche	Po	9,530	4.82	Ceniza volcanica	Fuertemente ondulado a inclin	15 a 25	Franco arenoso, friable	15 a 30	Caliza a 5 cm	Muy alto	Erosion
18 Salama	Qi	19,660	9.93	Cenizas volcanicas cementada	Muy ondulado a inclinado	10 a 30	Franco-arcillo-arenoso, friab.	15 a 30	Toba a 50 cm	Muy alto	Erosion, Fertilidad
19 Suchitepequez	SI	180	0.09	Ceniza volcanica	Casi plano a fuertemente ondu	0 a 5	Franco arenoso, friable	15 a 25	Ninguna	Regular	Sequia
20 Teapan	Sx	2,270	1.15	Ceniza volcanica	Suavemente inclinado a inclin.	4 a 8	Franco limoso, friable	40 a 60	Ninguna	Regular/baja	Erosion
21 Toliman	Te	19,400	9.80	Ceniza volcanica	Casi plano a ondulado	1 a 5	Franco arenoso, friable	30 a 50	Ninguna	Bajo	Fertilidad
22 Totonicapan	Tn	4,970	2.51	Ceniza volcanica	Fuertemente ondulado. Inclina	15 a 30	Franco arenoso, friable	20 a 30	Ninguna	Muy alto	Erosion
23 Yepocapa	Yc	18,530	9.36	Ceniza volcanica/rocas claras	Suavemente ondulado	5 a 25	Franco turboso, friable	30 a 70	Ninguna	Alto	Altitud, Erosion
24 Zacualpa	Ye	12,860	6.50	Ceniza volc., escoria mafica	Inclinado a muy inclinado	10 a 25	Franco gravoso, suelto	40 a 60	Ninguna	Alto	Erosion
25 Total	Zc	197,900	100	Ceniza volcanica	Muy inclinado, barrancos	25 a 60	Franco arenoso, suelto	5 a 20	Ninguna	Muy alto	Erosion

Fuente: Clasificacion de Reconocimiento de los Suelos de Guatemala, Ministerio de Agricultura, 1959

Table 3.1.4 (8) Area and Characteristics of Soil Series in Solola Province

Nombre de la Serie	Simbolo en Mapa	Area (ha)	% del Area	Material Parental	Relieve	Pendiente Dominante (%)	Textura y Consistencia	Profundidad (cm)	Limitacion a Penetracion de Raices	Peligro de Erosion	Problema Especial de Manejo
1 Atitlan	At	7,980	7.52	Lahar o Lodo mafico	Muy escarpado	30 a 40	Franco arenoso, suelta	40	Cementado a 75 cm.	Muy Alto	Erosion, pedregos
2 Camancha	Cm	13,460	12.69	Ceniza volcanica	Ondulado/Fuertemente Ondulado	10	Franca, friable	50	Ninguna	Regular	Elevacion
3 Camancha, Quebrada erosionada	Cme	15,110	14.24	Ceniza volcanica mafica	Fuertemente ondulado	50 a 60	Franca, friable	20 a 40		Muy alto	Erosion, M.O.
4 Chipso	Chi	4,390	4.14	Ceniza volcanica cementada	Escarpado	50 a 60	Franco, friable	15 a 30	Roca a 40 - 50 cm	Muy alto	Erosion
5 Cimas Volcanicas	CV	2,740	2.58	Granito, gneis	Escarpado	50 a 60	Franco, friable	40 a 50	Roca a 40 - 50 cm	Muy alto	Erosion
6 Moea	Mo	790	0.74	Ceniza volcanica	Escarpado	10	Franco arenoso, suelto	40 a 50	Roca a 40 - 50 cm	Muy alto	Erosion
7 Parán	Pn	190	0.18	Ceniza volcanica cementada	Inclinado	20 a 25	Franco arenoso, suelto	40 a 50	Ceniza cementada a 50 cm	Alto	Erosion, pedregos
8 Patzite	Pz	15,510	14.62	Ceniza volcanica pomacea	Escarpado		Franco arenoso, suelto	15 a 25	Ninguna	Alto	Erosion
9 Suelo Aluvial no diferenciado	SA	380	0.36								
10 Suchitepequez	Sx	4,940	4.66	Ceniza volcanica	Suavemente inclinado	4 a 10	Franco limoso, friable	40 a 60	Ninguna	Moderada	Erosion
11 Samayac	Sm	3,610	3.40	Lodo volcanico cementado	Suavemente inclinado	6 a 10	Franco limoso, friable	20 a 30	Capa cementada a 50 cm	Alto	Erosion, pedregos
12 Toliman	Tn	10,340	9.75	Ceniza volcanica	Fuertemente ondulado	15 a 30	Franco arenoso, friable	20 a 30	Ninguna	Alto	Erosion
13 Totonicapan	Tip	13,700	12.91	Ceniza y roca volcanica	Suavemente ondulado	5 a 25	Franco turbosa, friable	30 a 70	Ninguna	Regular	Altitud, Erosion
14 Zacualpa	Zc	460	0.43	Ceniza volcanica	Muy escarpado	50 a 60	Franco arcilloso, friable	25	Ninguna	Muy alto	Erosion
<b>Lago Atitlan</b>		<b>12,500</b>	<b>11.78</b>								
<b>Total</b>		<b>106,100</b>	<b>100</b>								

Fuente: Clasificación de Reconocimiento de los Suelos de Guatemala, Ministerio de Agricultura, 1959

Table 3.1.4 (9) Area and Characteristics of Soil Series in Totonicapan Province

Nombre de la Serie	Símbolo en Mapa	Area (ha)	% del Total	Material Parental	Relieve	Pendiente Dominante (%)	Textura y Consistencia	Profundidad (cm)	Limitación a Penetración de Raíces	Peligro de Erosión	Problema Especial de Manejo
1 Camancha	Cm	9,520	8.97	Ceniza volcánica	Ondulado/Fuertemente Ondulado	10	Franca, friable	50	Ninguna	Regular	Elevación
2 Camancha, Fase quebrada	Cme	6,585	6.21	Lahar o Lodo mafico	Muy escarpado	50				Muy Alto	Erosion, pedregos.
3 Suelo Aluvial no diferenciado	SA	580	0.55								
4 Quetzaltenango	Qe	3,085	2.91	Ceniza volcánica	Casi plano	0 a 3	Franco arenoso, firme	50 a 75	Ninguna	Ligera	Materia Organica
5 Patzite	Pz	21,500	20.26	Ceniza volcánica pomacea	Escarpado	20 a 25	Franco arenoso, suelto	15 a 25	Ninguna	Alto	Erosion
6 Quiche	Qi	24,500	23.09	Ceniza volcánica comentada	Muy ondulado/Escarpado	10 a 20	Franco arcillo arenoso	15 a 30	Capa dura a 70 cm	Alto	Erosion/M.O.
7 Sinache	Si	13,540	12.76	Ceniza volcánica	Fuertemente ondulado	5 a 12	Franco arcilloso, friable	30	Ninguna	Alto	Erosion
8 Totonicapan	Tp	26,790	25.25	Ceniza y roca volcánica	Suavemente ondulado	5 a 25	Franco turbosa, friable	30 a 70	Ninguna	Regular	Altitud, Erosion
<b>Total</b>		<b>106,100</b>	<b>100.00</b>								

Fuente: Clasificación de Reconocimiento de los Suelos de Guatemala, Ministerio de Agricultura, 1959

Table 3.1.4 (10) Area and Characteristics of Soil Series in Quetzaltenango Province

Nombre de la Serie	Simbolo en Mapa	Area (ha)	% del Area	Material Parental	Relieve	Pendiente (%)	Textura y Consistencia	Profundidad (cm)	Limitacion a Penetracion de Raices	Peligro de Erosion	Problema Especial de Manejo
1 Alotenango	Al	4,800	2.46	Ceniza volcanica, mafica	Inclinado a escarpado	12 a 30	Franco arenoso, suelto	25 a 40	ninguna	Alto	Erosion
2 Bucul	Bu	527	0.27	Ceniza volcanica, aluvion	Casi plano, depresional	0 a 2	Franco arcilloso, friable	40 a 60	ninguna	Leve	Drenaje
3 Camancha	Cm	9,616	4.93	Ceniza volcanica	Ondulado	10	Franco, friable	50	ninguna	Regular	Elevacion
4 Camancha, Fase quebrada erosionada	Cme	8,301	4.25								Elevacion
5 Chosola	Cho	15,926	8.16	Ceniza volcanica micacea	Suavemente inclinado	3 a 6	Franco limosa, friable	30 a 50	ninguna	Regular	Erosion
6 Chuva	Chv	29,093	14.91	Ceniza volcanica suelta	Inclinado a escarpado	10 a 20	arena franca, suelta	10 a 15	ninguna	Muy alto	Erosion
7 Cimas Volcanicas	CV	2,492	1.28								Erosion
8 Ixtan	Ix	31,356	16.07	Ceniza volcanica, cement.	Casi plano	1 a 3	Arcilla plastica	10	ninguna	Leve	Sequia, arcilla plastica
9 Ostunco	Os	24,762	12.69	Ceniza volcanica	Fuertemente ondulado	10 a 20	arena franca, suelta	10	ninguna	muy alto	Erosion
10 Palin	Pl	3,763	1.93	Toba volcanica	Muy inclinado	40 a 60	Franco arenoso, friable	20 a 30	ninguna	muy alto	Erosion, pedregoso
11 Patzite	Pz	3,763	1.93	Ceniza volcanica, pomasea	Inclinado	20 a 25	Franco arenoso, friable	15 a 25	ninguna	Alto	Erosion
12 Quetzaltenango	Qe	8,374	4.29	Ceniza volcanica	Casi Plano	0 a 3	Franco arenoso, firme	50 a 75	ninguna	Leve	Materia Organica
13 Quetzaltenango fase quebrada	Qeq	7,634	3.91	Ceniza volcanica						Regular	M.O. y Erosion
14 Quiche	Qi	762	0.39	Ceniza volcanica cementada	Muy ondulado/inclinado	10 a 20	Franco arcillo arenoso	20 a 30	Capa dura a 70 cm	Alto	Erosion/M.O.
15 Retalhuleu	Re	15,789	8.09	Ceniza Volcanica Intemperiz.	Suavemente inclinado	2 a 3	Franco arcillo limoso	25	ninguna	Leve	Fertilidad
16 Sinache	Si	6,965	3.57	Ceniza volcanica	Fuertemente ondulado	5 a 12	Franco arcilloso, friable	30	ninguna	Alto	Erosion
17 Samayac	Sm	2,248	1.15	Lodo volcanico cementado	Inclinado	4 a 10	Franco limosa, friable	20 a 30	Capa Cem. a 50 cm	Regular	Pedregosidad
18 Suchitepequez	Sx	7,392	3.79	Ceniza volcanica	Suavemente inclinado	4 a 8	Franco limoso, friable	40 a 60	Ninguna	Moderada	Erosion
19 Suelo Aluvial no diferenciado	SA	992	0.51								
20 Frguisate franco arenoso	Ti	2,254	1.16	Ceniza volc./Aluvial	Casi plano	0 a 2	Franco arenoso fina	30 a 40	ninguna	Baja	Materia Organica
21 Totonicapan	Tp	8,291	4.25	Ceniza y roca volcanica	Suavemente ondulado	5 a 25	Franco turbosa, friable	30 a 70	Ninguna	Regular	Altitud, Erosion
<b>Total</b>		<b>195,100</b>	<b>100</b>								

Fuente: Clasificación de Reconocimiento de los Suelos de Guatemala, Ministerio de Agricultura, 1959

Table 3.1.4 (11) Definitions of Land Capability Classes

Land capability classification	Definition of class
Class I	Class I lands can be used continuously for intensive crop production with minimum attention other than good farming practices.
Class II	Class II lands have more limitation than Class-I soils for intensive crop production, such as moderately steep slopes (2-5%).
Class III	Class III lands have severe limitations and require more special conservation practices than Class-II soils to keep them continuously productive. They have shallow soil, steep slopes of about 6-10% or shallow water tables.
Class IV	Class IV lands have severe limitations and need a greater intensity of conservation practices for cultivated crops than Class III soils. Most of the time these soils should be in "permanent" crops, such as pastures
Class V	Class V lands are not likely to erode but have other limitations, such as boulders or wetness, which are impractical to correct and thus cannot be cultivated. They should be used for pasture, range, woodland, or wildlife habitat.
Class VI	Class VI lands are suitable for the same uses as Class V lands, but they have a greater need for good management to maintain production because of such limitations as steep slopes or shallow soils.
Class VII	Class VII lands have very severe limitations and require extreme care to protect the soil, even with low intensity use for grazing, wildlife, or timber
Class VIII	Class VIII lands have such severe limitations (steep slopes, rock lands, swamps, delicate plant cover) that they can be wisely used only for wildlife, recreation, watersheds, and esthetic appreciation.

Table 3.1.4 (12) Life Zones in the Study Area

Name	Warm Subtropic Forests	Very humid	Bosque humedo montano bajo	Bosque muy humedo montano bajo	Bosque muy humedo montano	Bosque humedo subtropical templado
Code	bmh-©		bh-MB	bmh-MB	bmh-M	bh-s(t)
Elevation	60 a 1,600m		1,500 a 2,400m	1,800 a 3,000m		650 a 1,700m
Temperature	21 a 25C		15 a 23C	13 a 19C	11C	
Rainfall	2,100 a 4,200mm		1,000 a 1,600mm	2,000 a 3,900mm	2500mm	
Zones	Coatepeque, Flores Costa Cuca, Colomba, Génova (Quetzaltenango), South of Sololá and Pochuta, Yepocapa (Chimaltenango)	Central area of Chimaltenango, lands around lake Atiplan in Sololá, northern area of Totonicapán and center orient of Quetzaltenango	Patzún and Tecpán in Chimaltenango, north of Sololá, center of Totonicapán and center-north of Quetzaltenango	Northern area of Sololá and south of Totonicapán	Norther area of San José Poaquil, south-east and northern part of San Martí n Jilotepeque in Chimaltenango	
Vegetation	scheelea preussii, terminalia oblonga, enterpbium cyclocarpum, trplaris melaenodendron	quercus spp., pinus pseudostrobus, pinus montezumae	pinus pseudostrobus, cuprsson lusitanica, alnus jorullensis	abies religiosa, pinus hartwegii, pinus pseudostrobus, baccharis sp., bocconia vulcania	quercus spp., pinus oocarpa, byrsonima crassifolia, curatella americana	
Comments	Recent deforestation is not intense and the erosion in this zone is small	In this zone the population is growing and the agricultural lands is expanding. Erosion problem is latent	High density of the population and growing of agriculture lands. This is the most erosion risk zone. This zone is rivers recharge zone	Area with traditional forest management, deforestation is small and the risk of erosion is small		

Table 3.1.5 (1) Employment of Rural Population by Economic Activity

Departamento	Agricultura %	Industria %	Construccion %	Comercio %	Servicios %	Administ. Publica %	No Determido %
1 Promedio del Pais	73.9	8.0	4.7	5.0	6.1	1.6	0.7
2 Guatemala	23.2	25.1	15.9	10.4	21.5	3.4	0.5
3 Zacapa	76.3	4.8	4.0	5.3	6.4	2.7	0.5
4 Sacatepequez	44.6	21.5	11.5	6.7	13.4	1.8	0.5
5 El Progreso	72.5	9.2	4.8	4.3	6.1	2.4	0.7
6 Retalhuleu	78.6	4.9	4.4	3.9	6.0	1.3	0.9
7 Izabal	76.6	3.3	3.2	6.4	4.8	4.6	1.1
8 Santa Rosa	84.8	2.8	4.9	2.3	4.0	0.8	0.4
9 <b>Quetzaltenango</b>	<b>76.1</b>	<b>8.2</b>	<b>5.2</b>	<b>4.4</b>	<b>4.6</b>	<b>1.0</b>	0.5
10 Peten	93.1	0.9	0.9	1.6	2.3	0.8	<b>0.4</b>
11 Escuintla	69.7	10.8	5.5	4.8	7.2	1.3	0.7
12 Jutiapa	88.3	1.5	2.8	2.1	3.1	1.9	0.3
13 Baja Verapaz	85.7	2.5	3.0	2.8	3.2	2.8	0.0
14 Chiquimula	88.7	1.5	2.8	2.4	2.9	1.5	0.2
15 Jalapa	90.4	1.4	3.0	1.3	3.1	0.7	0.1
16 Suchitepequez	76.7	7.6	3.7	4.2	5.6	1.3	0.9
17 <b>Chimaltenango</b>	<b>85.1</b>	<b>5.0</b>	<b>3.7</b>	<b>1.6</b>	<b>3.3</b>	<b>0.8</b>	0.5
18 San Marcos	86.3	3.0	2.7	2.9	3.3	1.0	<b>0.8</b>
19 Huehuetenango	85.4	3.6	3.3	2.4	3.5	1.1	0.7
20 <b>Solola</b>	<b>79.4</b>	<b>8.0</b>	<b>2.9</b>	<b>4.3</b>	<b>4.1</b>	<b>0.9</b>	0.4
21 <b>Totonicapan</b>	<b>40.8</b>	<b>29.5</b>	<b>2.9</b>	<b>20.8</b>	<b>4.9</b>	<b>0.5</b>	<b>0.6</b>
22 Quiche	82.2	5.4	1.8	5.2	3.4	0.9	<b>1.1</b>
23 Alta Verapaz	89.4	1.8	1.4	2.6	2.5	1.5	0.8

Fuente: La Productividad y Empleo Agrícola y No Agrícola en Área Rural; Sistema de Naciones Unidas en Guatemala, 1999, basado en Censo 1994



**Table 3.1.5 (2) Number of Farmers and Area Planted to Maize by Range of Farm Size**

Region y Departamento	Total	Menores de 7 ha.		De 7 a 45 ha.		Mayores de 45 has.	
		Numero Parcelas	%	Num. Parcelas	%	Num. Parcelas	%
Total República.	677,449	625,414	92.32	31,528	4.65	20,507	3.03
Región I:	16,396	15,276	93.17	796	4.85	324	1.98
Guatemala.	16,396	15,276	93.17	796	4.85	324	1.98
Región II:	66,503	60,037	90.28	3,625	5.45	2,841	4.27
Alta Verapaz.	50,892	45,623	89.65	2,887	5.67	2,382	4.68
Baja Verapaz.	15,611	14,414	92.33	738	4.73	459	2.94
Región III:	44,951	38,104	84.77	3,785	8.42	3,062	6.81
El Progreso.	8,021	6,926	86.35	600	7.48	495	6.17
Izabal.	13,003	9,936	76.41	1,585	12.19	1,482	11.40
Zacapa.	6,016	4,687	77.91	814	13.53	515	8.56
Chiquimula.	17,911	16,555	92.43	786	4.39	570	3.18
Región IV:	67,682	61,028	90.17	4,160	6.15	2,494	3.68
Santa Rosa.	16,342	14,542	88.99	576	3.52	1,224	7.49
Jalapa.	24,902	22,694	91.13	1,561	6.27	647	2.60
Jutiapa.	26,438	23,792	89.99	2,023	7.65	623	2.36
Región V:	72,351	68,471	94.64	3,259	4.50	621	0.86
Sacatepéquez.	12,530	10,475	83.60	2,055	16.40	0	0.00
<b>Chimaltenango.</b>	<b>50,376</b>	<b>50,247</b>	<b>99.74</b>	<b>0</b>	<b>0.00</b>	<b>129</b>	<b>0.26</b>
Excuintla.	9,445	7,749	82.04	1,204	12.75	492	5.21
Región VI:	241,025	238,841	99.09	1,955	0.81	229	0.10
<b>Sololá.</b>	<b>17,347</b>	<b>17,340</b>	<b>99.96</b>	<b>7</b>	<b>0.04</b>	<b>0</b>	<b>0.00</b>
<b>Totonicapán.</b>	<b>30,574</b>	<b>30,574</b>	<b>100.00</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0.00</b>
<b>Quetzaltenango.</b>	<b>74,813</b>	<b>74,576</b>	<b>99.68</b>	<b>229</b>	<b>0.31</b>	<b>8</b>	<b>0.01</b>
Suchitepéquez.	9,184	8,373	91.17	754	8.21	57	0.62
Retalhulcu.	10,544	9,474	89.85	926	8.78	144	1.37
San Marcos.	98,563	98,504	99.94	39	0.04	20	0.02
Región VII:	144,265	135,247	93.75	8,311	5.76	707	0.49
Huehuetenango.	81,132	73,296	90.34	7,378	9.09	458	0.56
Quiché.	63,133	61,951	98.13	933	1.48	249	0.39
Región VIII:	24,276	8,410	34.64	5,637	23.22	10,229	42.14
Petén.	24,276	8,410	34.64	5,637	23.22	10,229	42.14

Fuente: MAGA, 1998 basado en Encuestas nacionales Agropecuarias, 1,995-1,996, USPADA.

Table 3.1.5 (3) Average Size of Farm Plots Planted to Maize in Guatemala

	Area Total (ha)	Numero de Parcelas	Area Promedio (ha/parcela)	Rendimiento Promedio (kg/ha)
<b>Total del Pais</b>	<b>593,123</b>	<b>667,476</b>	<b>0.89</b>	<b>1,631</b>
Región I:	15,797	16,396	0.96	1,667
Guatemala.	15,797	16,396	0.96	1,667
Región II:	61,026	66,503	0.92	1,152
Alta Verapaz.	47,924	50,892	0.94	1,105
Baja Verapaz.	13,102	15,611	0.84	1,324
Región III:	57,129	44,897	1.27	1,438
El Progreso.	8,663	8,021	1.08	888
Izabal.	21,440	12,949	1.66	1,667
Zacapa.	8,427	6,016	1.40	1,371
Chiquimula.	18,598	17,911	1.04	1,461
Región IV:	91,567	67,683	1.35	1,919
Santa Rosa.	28,158	16,342	1.72	2,898
Jalapa.	31,933	24,903	1.28	1,082
Jutiapa.	31,475	26,438	1.19	1,893
Región V:	46,899	72,431	0.65	1,702
Sacatepéquez.	8,480	12,510	0.68	1,255
<b>Chimaltenango.</b>	<b>18,982</b>	<b>50,376</b>	<b>0.38</b>	1,416
Excuintla.	19,436	9,545	2.04	2,176
Región VI:	136,793	241,025	0.57	1,996
<b>Sololá.</b>	<b>5,559</b>	<b>17,347</b>	<b>0.32</b>	1,254
<b>Totonicapán.</b>	<b>8,825</b>	<b>30,574</b>	<b>0.29</b>	2,072
<b>Quetzaltenango.</b>	<b>50,931</b>	<b>74,813</b>	<b>0.68</b>	2,148
Suchitepéquez.	12,565	9,184	1.37	2,464
Retalhuleu.	16,649	10,544	1.58	2,330
San Marcos.	42,263	98,563	0.43	1,624
Región VII:	87,640	134,265	0.65	1,111
Huehuetenango.	47,054	71,132	0.66	1,034
Quiché.	40,586	63,133	0.64	1,200
Región VIII:	96,275	24,276	3.97	1,689
Petén.	96,275	24,276	3.97	1,689

Fuente: MAGA, Encuestas nacionales Agropecuarias, 1995-1996, USPADA.

Table 3.1.5 (4) Annual Variation of Area Planted and Production of Maize, Frijol, Rice, and Wheat

Unidades: Área (ha), Producción (ton)

AÑO	Maiz		Frijol		Arroz		Trigo	
	Área (ha)	Producción (ton)	Área (ha)	Producción (ton)	Área (ha)	Producción (ton)	Área (ha)	Producción (ton)
1985	659,610	1,088,400	170,240	117,560	14,560	38,440	26,390	53,490
1986	677,390	1,077,340	173,390	110,610	14,350	33,920	22,680	46,060
1987	764,260	1,216,720	172,060	86,140	23,310	58,940	24,990	50,550
1988	644,210	1,323,710	140,420	93,690	26,888	69,400	22,120	50,600
1989	600,390	1,246,780	97,090	90,610	15,120	44,900	16,030	23,000
1990	634,480	1,292,570	129,990	119,600	14,280	44,960	11,270	23,000
1991	668,710	1,248,050	144,130	113,640	16,520	48,060	11,340	23,030
1992	725,620	1,382,780	140,000	115,940	15,540	40,920	12,180	24,630
1993	699,650	1,326,020	120,890	100,890	17,430	48,220	11,270	23,000
1994	535,859	957,254	93,828	51,805	6,278	11,677	12,390	26,000
1995	593,124	967,319	134,243	71,253	8,265	25,988	11,270	23,690
<b>Diferencia entre 1985 y 1995</b>	<b>-66,486</b> <b>-10.1%</b>	<b>-121,081</b> <b>-11.1%</b>	<b>-35,997</b> <b>-21.1%</b>	<b>-46,307</b> <b>-39.4%</b>	<b>-6,295</b> <b>-43.2%</b>	<b>-12,452</b> <b>-32.4%</b>	<b>-15,120</b> <b>-57.3%</b>	<b>-29,800</b> <b>-55.7%</b>

Fuente: MAGA, Encuesta Nacional Agropecuaria, USPADA, 1995-96.

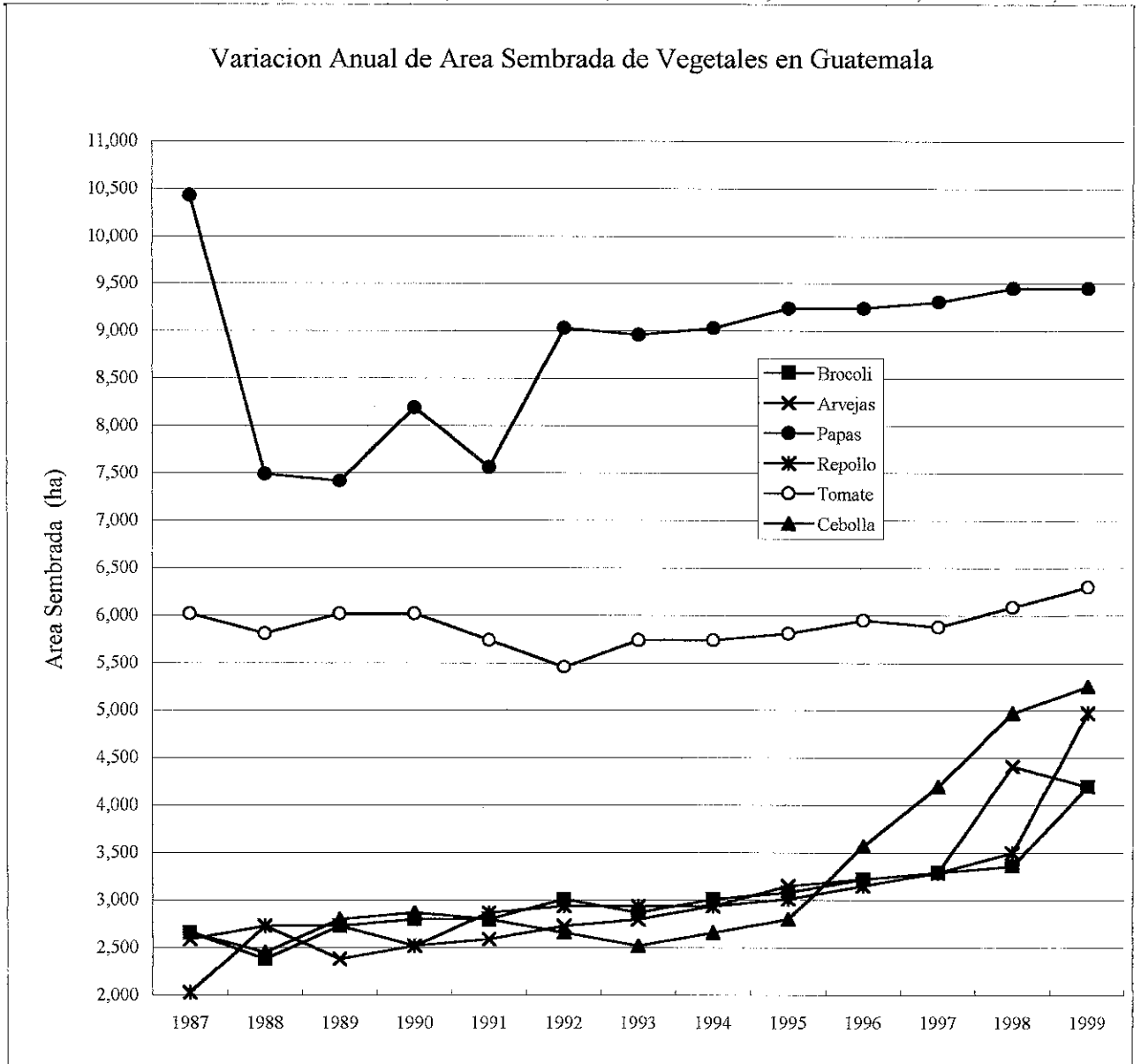
Table 3.1.5 (5) Planted Area and Production of Maize and Frijol in the Study Area

Departamento	Maiz				Frijol Asociado con Maiz				Frijol en Monocultivo			
	Area Sembrada (ha)	Numero de Parcelas	Area Promedio (ha/parcela)	Rendimiento (ton/ha)	Area Sembrada (ha)	Numero de Parcelas	Area Promedio (ha/parcela)	Rendimiento (ton/ha)	Area Sembrada (ha)	Numero de Parcelas	Area Promedio (ha/parcela)	Rendimiento (ton/ha)
Chimaltenango	18,980	50,380	0.38	1.42	2,464	6,300	0.39	0.123	181	1,045	0.17	0.82
Solola	5,560	17,350	0.32	1.25	1,360	5,780	0.24	0.066	0	0	0	0
Totonicapan	8,825	30,570	0.29	2.07	1,240	3,230	0.38	0.12	0	0	0	0
Quetzaltenango	50,930	74,810	0.68	2.15	1,060	1,550	0.68	0.232	0	0	0	0

Fuente: MAGA, 1998, Basado en Encuesta Nacional Agropecuaria de 1995-96, USPADAS, MAGA

Table 3.1.5 (6) Annual Variation of Area Planted to Vegetables in Guatemala

Año	Brocoli	Arvejas	Papas	Repollo	Tomate	Cebolla	Total
	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)
1987	2,660	2,590	10,430	2,030	6,020	2,660	26,390
1988	2,380	2,730	7,490	2,730	5,810	2,450	23,590
1989	2,730	2,380	7,420	2,730	6,020	2,800	24,080
1990	2,800	2,520	8,190	2,520	6,020	2,870	24,920
1991	2,800	2,590	7,560	2,870	5,740	2,800	24,360
1992	3,010	2,730	9,030	2,940	5,460	2,660	25,830
1993	2,870	2,800	8,960	2,940	5,740	2,520	25,830
1994	3,010	2,940	9,030	2,940	5,740	2,660	26,320
1995	3,080	3,150	9,240	3,010	5,810	2,800	27,090
1996	3,220	3,220	9,240	3,150	5,950	3,570	28,350
1997	3,290	3,290	9,310	3,290	5,880	4,200	29,260
1998	3,360	4,410	9,450	3,500	6,090	4,970	31,780
1999	4,200	4,200	9,450	4,970	6,300	5,250	34,370



Fuente: Asociacion Gremial de Exportadores de Productos No Tradicionales (AGEXPRONT) y Banco de Guatemala

Table 3.1.5 (7) Area Planted to Vegetable in Guatemala by Province

		Unidad : Area en Manzanas									
Departamento	Coliflor	Brocoli	Arvejas	Guicoy	Ejote F.	Repollo	Zanahoria	Suchini	Tomate	Cebolla	
1	Total en el Pais	2,363	19,233	13,930	2,316	1,991	3,112	3,133	1,437	6,657	759
2	Guatemala	11				55	86	7		161	55
3	Zacapa								2,857	143	
4	Sacatepequez			1,197	274		286	357	200		
5	El Progreso										
6	Retalhuleu										
7	Izabal										
8	Santa Rosa										
9	<b>Quetzaltenango</b>										
10	Peten										
11	Escuintla										
12	Jutiapa								1,169	425	
13	Baja Verapaz								466		
14	Chiquimula										
15	Jalapa										
16	Suchitepequez										
17	<b>Chimaltenango</b>	<b>2,075</b>	<b>17,231</b>	<b>12,456</b>	1,681	1,916	2,396	2,156	1,437	1,597	
18	San Marcos										
19	Huehuetenango	277	1,563	277				379	36	93	
20	<b>Solola</b>		422		361	20	344	234		43	
21	<b>Totonicapan</b>										
22	Quiche										
23	Alta Verapaz		17						171		

Fuente: MAGA, Encuesta Nacional Agropecuaria, 1995-96, USPADA

**Table 3.1.5 (8) Area Planted to Coffee by Municipality in the Study Area**

<b>Departamento de Chimaltenango</b>		<b>Departamento de Solola</b>	
<b>Municipios</b>	<b>Area de Café (ha)</b>	<b>Municipios</b>	<b>Area de Café (ha)</b>
1 Acatenango	5,308	1 Concepción	0
2 Chimaltenango	533	2 Nahuala	3,250
3 El Tejar	0	3 Panajachel	45
4 Parramos	124	4 San Andres Semetabaj	0
5 Patzicia	88	5 San Antonio Palopo	825
6 Patzun	63	6 San José Chacaya	0
7 San Miguel Pochuta	3,706	7 San Juan La Laguna	775
8 San Andrés Itzapa	24	8 San Lucas Toliman	2,350
9 San José Poaquil	0	9 San Marcos La Laguna	40
10 San Juan Comalapa	0	10 San Pedro La Laguna	1,900
11 San Martín Jilotepeque	844	11 San Pablo La Laguna	225
12 San Pedro Yepocapa	3,592	12 Santa Catarina Ixtahucan	2,250
13 Santa Apolonia	0	13 Santa Catarina Palopo	0
14 Santa Cruz Balanya	0	14 Santa Cruz La Laguna	474
15 Tecpán Guatemala	0	15 Santa Clara La Laguna	185
16 Zaragoza	0	16 Santa Lucía Utatlan	0
<b>TOTAL</b>	<b>14,281</b>	17 Santa Maria Visitación	1,250
		18 Santiago Atitlan	2,279
		19 Solola	4
		<b>TOTAL</b>	<b>15,852</b>
<b>Departamento de Totonicapan</b>		<b>Departamento de Quetzaltenango</b>	
<b>Municipios</b>	<b>Area de Café (ha)</b>	<b>Municipios</b>	<b>Area de Café (ha)</b>
1 Momostenango	0	1 Quetzaltenango	81
2 San Andres Xecul	0	2 Salcaja	0
3 S. Bartolo Aguas Calientes	0	3 Olinstepeque	0
4 San Cristobal Totonicapan	0	4 San Carlos Sija	0
5 San Francisco El Alto	0	5 Sibilia	0
6 Santa Lucia La Reforma	0	6 Cabrican	0
7 Santa Maria Chiquimula	0	7 Almolonga	0
8 Totonicapan	0	8 Cantel	0
<b>TOTAL</b>	<b>0</b>	9 Huitan	0
		10 Zuinil	123
		11 Colomba	12,307
		12 San Francisco La Unión	0
		13 San Martin Sacatepequez	1,065
		14 Cajola	0
		15 San Miguel Signila	0
		16 San Juan Ostuncalco	484
		17 San Mateo	0
		18 Concepción Chiquirichapa	0
		19 El Palmar	3,459
		20 Caotepeque	2,246
		21 Genova	1,266
		22 Flores Costa Cuca	179
		23 La Esperanza	0
		24 Palestina de Los Altos	0
		<b>TOTAL</b>	<b>21,209</b>

Fuentes: 1) ANACAFE para Departamentos Chimaltenango, Totonicapan, y Quetzaltenango. 2) MAGA para Solola

Table 3.1.5 (9) Total Annual Coffee Production and Value of Guatemalan Coffee Export

Año	Area cosechada (000 de ha)	Producción (000 de ton)	Rendimiento Café Oro (ton/ha)	Exportación		
				(000 de ton)	(000 US \$)	Precio Unitario (US \$/ton)
1984	232	194	1.2	126	360,700	130
1985	229	179	1.3	175	411,401	107
1986	236	194	1.2	142	522,339	167
1987	266	191	1.4	151	370,890	112
1988	266	177	1.5	141	349,569	113
1989	266	191	1.4	200	373,004	85
1990	266	194	1.4	201	323,413	73
1991	263	204	1.3	174	286,543	75
1992	263	209	1.3	195	248,955	58
1993	263	209	1.3	221	267,431	55
1994	263	211	1.2	188	317,917	77
1995	266	214	1.2	207	539,288	118
1996	269	219	1.2	238	472,433	90
1997	271	222	1.2	247	589,455	108
1998	273	228	1.2	211	586,549	127
1999	273	234	1.2	245	520,168	97

Fuente: Asociación Nacional del Café (ANACAFÉ) y Banco de Guatemala.



**TABLE 3.1.6 (1) LAWS AND REGULATIONS RELATED TO THE USE OF WATER**

<b>FUNDAMENTAL LAW</b>			
<b>ITEMS</b>			
Name	CONSTITUTION ART. 119 (LETTER C)	CONSTITUTION ART. 121 (LETTER C)	CONSTITUTION ART. 128
Object	As fundamental obligations of the State, adopting the necessary measures for the conservation, development and taking advantages of the natural resources in an efficient way, with conformity to the law.	Establishes as the States rights, between others the subterranean waters, and the waters that haven't been used, according to the law.	The use of waters, lakes and rivers is at the communities service and not at any particular persons'.
Others	There is no specific law	There is no specific law	There is no specific law
<b>ITEMS</b>	<b>EXECUTION OF POLICIES FOR THE USE OF WATERS</b>		
Name	LAW OF THE EXECUTIVE ORGANISM, DECREE NO. 114-97	MUNICIPAL CODE, DECREE NO. 58-88 HEALTH CODE, DECREE NO. 90-97	CIVIL CODE
Object	Defines the fundamental functions of the ministries and other executive organisms. MAGA is in charge of formulating and executing the policies of the sustainable use of the renewable natural resources. MEM is in charge of the study and fostering of electricity which is declared a national urgency.	Obligation to give services of drinkable water to the neighbors.	Definition of the private control. The rain water, continuous and discontinuous water that are born and flow in private properties, as well as subterranean waters obtained by artificial ways that are of private domination.
Basis	Constitution Art. 119, 128	Constitution Art. 253	Constitution Art. 39
Organism in charge of its application	Unit of Rules and Regulations, MAGA	Municipalities with the cooperation of INFOM	Judicial Power, Land Registry
Mechanism	Authorization for the use of waters	Execution and operation of projects for potable water	Land Registry or Public Deed
Others	There is no specific law for the right of the use of waters. The control and monitoring of the water quality is done by MSPAS and CONAMA.	There is not much coordination with other organisms of the State.	There is no clarity respecting the interpretation of Art. 127 of the Constitution and this Civil Code

TABLE 3.1.6 (2) LAWS AND REGULATIONS RELATED TO THE ENVIRONMENT-1

ITEMS	FUNDAMENTAL LAW	RELATED LAWS AND REGULATIONS, IN SPECIFIC ITEMS
NAME	Law of protection and improvement of the environment, Decree No. 68-86	Law of protected areas, Decree No. 4-89 and its reserves, Decree No. 126-97
OBJECT	Protection of the Atmosphere, lithic/soil, visual, noise, diversity and biological environment.	Regulate the forest exploitation
BASIS	Constitution Art. 97	Constitution Art. 119
ORGANISM IN CHARGE OF ITS APPLICATION	CONAMA of the Presidency Republic	INAB
MECHANISM	Application of environment impact assessment	Concession in the forests of state property. Forest management licenses. Give reforestation incentives
PUNISHMENTS	CONAMA applies	Doesn't specify, only demands the guarantee of reforestation given
OTHERS	There are several specific laws of the creation of protected areas	Fines and closing down

TABLE 3.1.6 (2) LAWS AND REGULATIONS RELATED TO THE ENVIRONMENT-2

FUNDAMENTAL LAW						
ITEMS	Health Code, Decree No. 90-97	Regulations for the prevention of the Atmosphere Contamination	Regulations of the Residue waters	of Regulation Municipal Solid Waste	of Regulation Hospital waste	Regulation for the Prevention and Promotion of Health and Environment
OBJECT	Formulate policies of preventive health and the hygienic preservation of the environment					
BASIS	Constitution Art. 93, 94, 95 and 96.			Health Code, Chap. IV, Section IV		Health Code Chapter V
ORGANISM IN CHARGE OF ITS APPLICATION	IN MSPAS in coordination with CONAMA and municipalities			MSPAS, CONAMA and Municipalities		MSPAS, CONAMA and municipalities
MECHANISM	Regulations and Sanitary rules					
PUNISHMENTS						
OTHERS		In revision	In revision	In revision	In revision	In revision

TABLE 3.1.6 (2) LAWS AND REGULATIONS RELATED TO THE ENVIRONMENT-3

ITEMS	PESTICIDE CONTROL				
	Population's health	Control of establishments	Pesticide law	Registration of home use insecticides and repellents	forbiddances
OBJECT	The MSPAS, formulates and supervises the actions for the prevention and control of acute and chronic poisoning pesticides and chemical substances.	Control of in-seams for agriculture and registration, supervision and control of establishments that import, produce, sell, according to the Health Code	Regulate the control for the use and handling of pesticides prohibits in five years DDT.		Forbid DDT, use of 2,4-D ester, Aldrin, dieldrin, endrin, canfenchloride (Toxafeno), chloride, clordimeform, etil parathion, heptachlor, BHC (hexaclorobenceno) and linden (HCH).
BASIS	Health Code. Decree 90-97, Art. 67	Law of Vegetable and Animal Sanitation, Decree 36-98	Law for the regulation of the importation, storage, transportation, selling and use of pesticides Decree 43-74		Decree 43-74, Government Agree 8.6.82, Ministerial Agree MAGA 3-88.
ORGANISM IN CHARGE OF ITS APPLICATION MECHANISM	MSPAS	MAGA, UNR	MAGA and MSPAS	MSPAP	
PUNISHMENTS			Regulation about the registration, marketing use and control of agriculture pesticides Government Agree no. 377-90		

Table 4.2.1 (1) Land Use and Classification of Poverty Based on the FIS Criteria for Chimaltenango Province

No.	Name of Municipality	Indicator of Poverty	Classification of Poverty.*	Evaluation for Poverty	Land Use	Evaluation for Land Use	Limitation of Uptake of Water**	Evaluation for Uptake Water	Overall Evaluation
1	Chimaltenango	12.83	d	No	Maize, Frijol, Vegetables	Yes	No	Yes	No
2	San Jose Poaquil	12.74	d	No	Maize, Frijol, Vegetables, Coffee	Yes	No	Yes	No
3	San Martin Jitotepeque	16.74	c	Yes	Coffee, Maize, Frijol	No	No	Yes	No
4	Comalapa	19.8	c	Yes	Maize, Frijol, Vegetables	Yes	Yes	No	No
5	Santa Apollonia	13.65	d	No	Maize, Frijol, Vegetables	Yes	No	Yes	No
6	Tecpan Guatemala	12.8	d	No	Maize, Frijol, Vegetables	Yes	Parcialy	Yes	No
7	<b>Patzun</b>	<b>17.95</b>	<b>c</b>	<b>Yes</b>	<b>Maize, Frijol, Vegetables</b>	<b>Yes</b>	<b>Parcialy</b>		<b>Yes</b>
8	Pochuta	16.91	c	Yes	Coffee, Maize, Frijol	No	No	Yes	No
9	Patzia	29.59	b	No	Maize, Frijol, Vegetables	Yes	Yes	No	No
10	Santa Cruz de Balanya	21.75	b	No	Maize, Frijol, Vegetables	Yes	Yes	No	No
11	Acatenango	16.66	c	Yes	Coffee, Maize, Frijol	No	No	Yes	No
12	Yepocapa	14.15	d	No	Coffee, Maize, Frijol	No	No	Yes	No
13	San Andres Itzapa	20.46	b	No	Maize, Frijol, vegetables	Yes	Parcialy	Yes	No
14	Parramos	26.73	b	No	Maize, Frijol, Vegetables	Yes	No	Yes	No
15	Zaragoza	17.52	c	Yes	Maize, Frijol, Vegetables	Yes	Yes	No	No
16	El Tejar	10.97	d	No	Maize, Frijol, Vegetables	Yes	No	Yes	No

\*: Poverty Classification

a: Extreme poverty, above 30

b: Severe poverty, 20-29.99

c: Regular poverty, 15-19.99

d: Relative poverty, 10- 14.99

e: Low poverty, below10

\*\* : Chimaltenango province plays an important role in the provision of drinking water to Guatemala city.

Especially water from the basin of the Pixcaya river is the most important. It is considered that adjustment and coordination of water

use for drinking water in Guatemala city and agricultural water use in Chimaltenango province are very difficult and municipalities

where cover the Pixcaya river basin should be excluded for selection of model microcuencia.

Table 4.2.1 (2) List of Micro-basins in Patzun Municipality

Name of River Basin	Number	Name of Microcuenca	Area of Microcuenca (km2)	Name of aldeas or caserios
Los Chocoyos	C-1	El Llano	4.8	Los Pinos, El Llano, Pacaman
	C-2	Los Pinos	6	Cruz de Santiago
	C-3	Xeoj	3.7	Xeoj
	C-4	Los Idolos	8.7	Patzun, Saquiya, Mocolixot Alto, Mocolixot Bajo
	C-5	Chuiquel	5.3	Chisal, Chuiquel, Mocolixot Alto, Mocolixot Bajo
	C-6	Sabalpop	1.2	Sabalpop
	C-8	Pacacquix Bajo	4	Chichoy Alto Paraíso
	C-8	Pacacquix Alto	9.3	Xepatan, Finca Patoquer, Chuchuca Alto, Chuchuca Bajo, Finca Chuiquel, Xeatzan Alto, Xeatzan Bajo
Madre Vieja	M-1	Chichoy	2.7	Chichoy , Chichoy Bajo
	M-2	Paxula	3.1	Chichoy Alto Paraiso,
	M-3	Panibaj	1.6	Chipiactal, Panimaquim
	M-4	Panimaquim	5.2	Panibaj, Chipiactal,
	M-5	Chinimachicaj	8.1	Panimaquim, Chinimachicaj, Chuaquenum
San Jorge	S-1	Xejolon	8.4	Chinimachicaj, Chuaquenum
	S-2	La Vega	14	Xejolon, Popobaj
	S-3	Chicap	4.6	Finca San Rafael la Vega, Finca San Jose Panimache, Finca San Antonio Panimaquim
Nican	N-1	Xetzisi	8.4	Finca Chicap
	N-2	Los Encuentros	2.1	Xetzisi, Xepatan
	N-3		9.2	Los Encuentros
Xaya	X-1	Xaya Alto	8.1	
	X-2	Villa Linda	8.3	Finca San Jorge
	X-3	La Vega	3.6	Villa Linda, Nimaya, Pacoc, Chuchupate, Finca Las
	X-4	Cojobal	2.5	La Vega
	X-5	Las Canoas	4.2	Finca La Sierra, Cojobal
	X-6	La Trompeta	7.2	Las Camalias, Los
	X-7	Las Flores	4	Encuentritos, Finca San
	X-8	Zaren	3.9	Finca San Antonio las Odilias,
	X-9	Pachumulin	2.7	La Trompeta, Trompetilla, La
	X-10	La Pila	1.5	Cienaga, San Lorenzo, Joya de
	X-11	Pena Colorada	3.8	la Ramona

Table 4.2.1 (3) Evaluation of Community for Selection of Micro-basins in Chimaltenango Province

Name of Municipality	Name of Community	Indicators for Poverty		Number of Households in Community		Area of River Basin (km <sup>2</sup> )		Land Use		Access (length from main road)		Legal Uptake of Water Source	Overlapped by Another Projects		Social Problems		Overlap Another Municipality		Intention for the Cooperation for the Survey by head of Municipality		Intention for the Survey by heads of Adlea or Caserio		Overall Assessment	
		(no)	Assessment	(km2)	Assessment	Kind of crops	Assessment	(km)	Assessment	Yes or No	Assessment	Yes or No	Assessment	Yes or No	Assessment	Yes or No	Assessment	Yes or No	Assessment	Yes or No	Assessment	Yes or No		
Patzun	1 Caserio La Trompetilla	19.35	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	
	2 Caserio El Garabato	18.95	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	
	3 Caserio Pachut	18.70	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	
	4 Caserio Popabaj	16.63	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	
	5 Caserio Chicomán, Villa Patzún	21.00	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	
	6 Caserio Xetzii, Xepatan	20.61	Yes	8.4	Yes	basic crops+vegetable	Yes	7.4	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	7 Aldea Xcatzan Bajo	14.76	Yes	9.3	Yes	basic crops+vegetable	Yes	8.2	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	8 Caserio Pachumulin	14.47	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
	9 Adlea Panibaj, Panibaj	14.05	Yes	1.6	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
	10 Aldea San Jose Xepatan	14.02	Yes	9.3	Yes	basic crops+vegetable	Yes	5.4	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	11 Caserio Chaquenum	13.85	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
	12 Caserio Mocolixot Bajo	13.80	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
	13 Aldea Chichoy	13.64	Yes	2.7	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No

\*: not identify this location

Table 4.2.2 (1) Land Use and Classification of Poverty Based on the FIS Criteria for Solola Province

No.	Name of Municipality	Indicator of Poverty	Classification of Poverty*	Evaluation for Poverty	Land Use	Evaluation for Land Use	Overall Evaluation
1	Solola	9.67	e	No	Vegetables, Potato, Maize	No	No
2	San Jose Chacaya	12.12	d	No	Potato, Vegetables, Maize	No	No
3	Santa Maria Visitacion	9.07	e	No	<b>Coffee</b> , Potato, Maize	Yes	No
4	Santa Lucia Utatlan	8.09	e	No	Potato, Vegetables, Maize	No	No
5	Nahuala	11.05	d	No	<b>Coffee</b> , Maize, Vegetables, Potato	Yes	No
6	Santa Catarina Ixtahuacan	12.01	d	No	<b>Coffee</b> , Banana, Maize	Yes	No
7	Santa Clara La Laguna	24.76	b	No	<b>Coffee</b> , Maize	Yes	No
8	Conception	45.74	a	No	Vegetables, Potato, Maize	No	No
9	San Andres Semetabaj	14.07	d	No	Maize, Vegetables, Flowers	No	No
10	Panjachel	11.25	d	No	Maize, Vegetables	No	No
11	Santa Catarina Palopo	29.65	b	No	Maize	No	No
12	San Antonio Palopo	31.08	a	No	<b>Coffee</b> , Vegetables	Yes	No
13	San Lucas Tomliman	26.75	b	No	<b>Coffee</b> , Maize, Frejol	Yes	No
14	Santa Cruz La Laguna	23.31	b	No	<b>Coffee</b> , Vegetable, Maize	Yes	No
15	San Pablo La Laguna	39.45	a	No	<b>Coffee</b> , Maize, Vegetables	Yes	No
16	San Marcos La Laguna	36.62	a	No	Maize, Vegetables	No	No
17	<b>San Juan La Laguna</b>	<b>15.16</b>	<b>c</b>	<b>Yes</b>	<b>Coffee</b> , Maize, Vegetables	<b>Yes</b>	<b>Yes</b>
18	San Pedro La Laguna	13.4	d	No	<b>Coffee</b> , Maize, Vegetables	Yes	No
19	Santiago Atitlan	41.9	a	No	<b>Coffee</b> , Maize, Frejol	Yes	No

\*: Poverty Classification

a: Exstreme poverty, above 30

b: Severe poverty, 20-29.99

c: Regular poverty , 15-19.99

d: Relative poverty, 10- 14.99

e: Low poverty, below10



Table 4.2.2 (2) List of Micro-basins in San Juan La Laguna Municipality

Name of River Basin	Number	Name of Microcuenca	Area of Microcuenca (km2)	Name of aldeas or caserios
Quebrada Seca	Q-1	San Juan La Laguna	9.9	Pueblo San Juan La Laguna
Yatza	Y-1	Paquib/Palestina	2.8	Part of Paqub and Palestina
	Y-2	Palestina	3.2	Palestina
	Y-3	Panyevar	5.7	Aldea Panyevar
	Y-4	Pasajquim	5.8	Pasajquim
	Y-5	right of Yatza	3.2	-

Table 4.2.2 (3) Evaluation of Community for Selection of Micro-basins in Solola Province

Name of Municipality	Name of Community	Indicators for Poverty		Number of Households in Community		Area of River Basin (km <sup>2</sup> )		Land Use		Access (length from main road)		Legal Uptake of Water Source	Overrapped by Another Projects		Social Problems		Overrapped Another Municipality		Intention foro Cooperation for the Survey by head of Municipality		Intention for Cooperation for the Survey by heads of Adlea or Caserio		Overall Assessment			
		(no)	Assess ment	(km2)	Assess ment	Kind of crops	Assess ment (km)	(length from main road)	Assess ment	Yes or No	Yes or no	Assess ment	Yes or no	Yes or no	Yes or no	Yes or no	Yes or no	Yes or no	Yes or no	Yes or no	Yes or no	Yes or no	Yes or no	No	Yes	
1 San Juan La Laguna	1 Pueblo San Juan La Lagur	585	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	Yes
	2 Panyeyar	206	Yes	5.8	Yes	Coffee +Basic crops	6	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Table 4.2.3 (1) Land Use and Classification of Poverty Based on the FIS Criteria for Totonicapan Province

No.	Name of Municipality	Indicator of Poverty	Classification of Poverty*	Evaluation for Poverty	Land Use (%) and Rank**	Overall Evaluation
1	Totonicapan	7.6	e	No	54% (4)	No
2	<b>San Cristobal Totonicapan</b>	<b>16.15</b>	<b>c</b>	<b>Yes</b>	27% (7)	No
3	San Francisco El Alto	14.35	d	No	28% (6)	No
4	<b>San Andres Xecul</b>	<b>15.81</b>	<b>c</b>	<b>Yes</b>	15% (8)	No
5	<b>Momostenango</b>	<b>15.24</b>	<b>c</b>	<b>Yes</b>	45% (5)	No
6	<b>Santa Maria Chiquimula</b>	<b>18.02</b>	<b>c</b>	<b>Yes</b>	61% (3)	<b>Yes</b>
7	Santa Lucia La Reforma	37.45	a	No	66% (2)	No
8	San Bartolo	13.11	d	No	70% (1)	No

\*: Poverty Classification

a: Extreme poverty, above 30

b: Severe poverty, 20-29.99

c: Regular poverty, 15-19.99

d: Relative poverty, 10- 14.99

e: Low poverty, below 10

\*\* : Rate of coverage by forests and ranks

Table 4.2.3 (2) List of Micro-basins in Santa Maria Chiquimu Municipality (1/2)

Name of River Basin	Number	Name of Microcuenca	Area of Microcuenca (km2)	Name of aldeas or caserios
Alajsimier	A-1	No	7.1	No
Pacaranat*	P-1	Chiaj	9.9	Chiaj
	P-2	No	1.9	No
	P-3	Chicastro	6.9	Chicastro
	P-4	Patzam	4.2	Patzam Chipu
Tzancorral	T-1	Chuijom	5.2	Chuijom
Sajcoclaj	S-1	No	2.7	No
	S-2	Pamesabal	1.9	Pamesabal
Pachac	PC-1		7.7	No
	PC-2	Racana	7.3	Xocol Racana
	PC-3	Camaja	4.9	Camaja Xesuc Cipo
	PC-4	Chicaxul	3.9	Chicaxul Chuicabaj Chuecutinez
	PC-5	Chuiaj	8.1	Chuiaj Part of Santa Maria Chiquimula
	PC-6	El Rancho	5.9	Pamaxcolabaj Chuinatux Patzichaj Chuitacaj
	PC-7	Chuisena	4.5	Chuisena Chuisela Xeabaj
	PC-8	Xesana	9.1	Xesana Sanjuyup Chimisiya
	PC-9	Pachum	10.5	Pachum
	PC-10	Chuitacabaj	5.9	Chuibacabaj Chuanovez

Table 4.2.3 (2) List of Micro-basins in Santa Maria Chiquimu Municipality (2/2)

Name of River Basin	Number	Name of Microcuenca	Area of Microcuenca (km2)	Name of aldeas or caserios
Sacmequena	PC-SAC-1	Chuichipop	1.4	Chuichipop
	PC-SAC-2	Ximulul	5.7	Ximulul Xesiquel Chuichac
	PC-SAC-3	Sacxoc	5.5	Sacxoc
	PC-SAC-3	Pugertinamint	2.8	Pugertinamint
	PC-SAC-4	Chuisiguan	1.9	Chuisiguan
	PC-SAC-5	Chuijoj	1.9	Chuijoj
	PC-SAC-6	Xebe	8.5	Tzansiguan Xetulup Xebe Tuluxan Chilux Patulup
	PC-SAC-7		11.7	Chinibajuyup Xotepe Xecachelaj Carorillo Chileon Tzununux
	PC-SAC-8		10.9	No
Sacbaj	SA-1	Choacorrall	13.1	Pansac Chivisicaja Choacorrall
	SA-2	Xejuyup	0.8	Xejuyup
	SA-3	Chimejia	6	Chimejia
	SA-4	Paxan	7.3	Paxan
Tzununa	TZN-1	Tzununa	5.3	Tzununa Xecaquix
	TZN-2	Pacomontux	4.2	Pacomontux
	TZN-3	Casa Blanca	7.1	Xecaja Xolabix Casa Blanca
	TZN-4	Chuachituj	7	Chuachituj
	TZN-5	Chuiabaj	2.9	Chuiabaj
	TZN-6	Pachoc	7.8	Tzansibiche Pachoc
	TZN-7	Chuijox	9.1	Chuijox Panabesac Papuerta Pachiyut Las Trojadas
	TZN-8	Panimajiox	6.6	Panimajiox
	TZN-9	Chomazan	6.6	Chomazan Aprisco chuipachec

Table 4.2.3 (3) Evaluation of Community for Selection of Micro-basins in Totonicapan Province

Name of Municipality	Name of Community	Indicators for Poverty		Number of Households in Community		Area of River Basin (km <sup>2</sup> )		Land Use		Access (length from main road)	Legal Utlake of Water Source	Overrapped by Another Projects		Social Problems		Overrapped Another Municipality		Intention for Cooperation for the Survey by head of Municipality		Intention for Cooperation for the Survey by heads of Adlea or Caserio		Overall Assessment		
		(no)	Assessment	(km2)	Assessment	Assessment	Assessment	Assessment	Assessment			Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment		Assessment	Assessment
Santa Maria Chiquimula	1 Caserio Chuitacabaj	32	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	2 Caserio Chijoj	61	Yes	1.9	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	3 Caserio Chuirop o Chijoj	57	Yes	1.4	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	4 Caserio Chipu	50	Yes	4.2	Yes	Yes	8	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes		
	5 Caserio Xejujub	83	Yes	0.8	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	6 Caserio Chuisiguan	17.20	198	Yes	2.8	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	7 Aldea Xecaja	16.54	39	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	8 Caserio Pachum	16.32	68	Yes	10.5	Yes	Yes	5.5	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	
	9 Caserio Chicaxul	16.19	63	Yes	3.9	Yes	Yes	4.6	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	
	10 Caserio Paxan	15.73	62(25)	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11 Caserio Pamesabal	15.63	40	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 Caserio Chuisabojo	15.45	44	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13 Caserio Chuitabaj	15.00	30	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4.2.4 (1) Land Use and Classification of Poverty Based on the FIS Criteria for Quetzaltenango Province

No.	Name of Municipality	Indicator of Poverty	Classification of Poverty*	Evaluation for Poverty	Land Use	Evaluation for Land Use	Overall Evaluation
1	Quetzaltenango	11.13	d	No	Maize, Vegetable, Potato	No	No
2	Salcája	12.05	d	No	Maize, Fruits	No	No
3	Ointepeque	12.62	d	No	Maize	No	No
4	San Carlos Sija	7.87	e	No	Maize	No	No
5	Sibilia	4.92	e	No	Maize,	No	No
6	Cabrcan	9.64	e	No	Maize, Fruits	No	No
7	Cajola	42.16	a	No	Maize, Fruits	No	No
8	San Miguel Sigüila	24.57	b	No	Maize	No	No
9	Ostuncalco	14.34	d	No	Maize, Fruits, Potato	No	No
10	San Mateo	22.63	b	No	Maize, Potato, Fruits	No	No
11	Concepcion Chiquirichapa	12.5	d	No	Maize, Potato	No	No
12	San Martín Sacatepequez	14.26	d	No	Potato, Maize, vegetables	No	No
13	Almolonga	12.06	d	No	<b>Vegetables, Maize</b>	No	No
14	Cantel	8.75	e	No	Maize, Fruits	No	No
15	Huitan	11.02	d	No	Maize, Fruits	No	No
16	Zunil	12.81	d	No	Maize, Vegetables	No	No
17	Colomba	24.83	b	No	<b>Coffee, Maize</b>	No	No
18	<b>San Francisco La Unión</b>	<b>16.99</b>	<b>c</b>	<b>Yes</b>	Maize	Yes	No**
19	El Palmar	22.58	b	No	<b>Coffee, Maize</b>	No	No
20	Coatepeque	13.66	d	No	<b>Pasture, Sugar, Maize, Rice, Coffee, Rubber</b>	No	No
21	Genova	30.39	a	No	<b>Pasture, Maize, Coffee, Rice, Oil palm, Rub</b>	No	No
22	<b>Flores Costa Cuca</b>	<b>19.66</b>	<b>c</b>	<b>Yes</b>	<b>Coffee, Maize</b>	No	No
23	La Esperanza	10.49	d	No	Maize, Fruits	No	No
24	<b>Palestina De Los Altos</b>	<b>15.27</b>	<b>c</b>	<b>Yes</b>	Maize	<b>Yes</b>	<b>Yes</b>

\*\* : An average of poverty in San Francisco La Unión municipality indicates "c" and Maize in land use, however, there are no communities having "c" in poverty as shown below: Then this municipality was evaluated as no and eliminated.

Name of Community	Indicator of Poverty	Classification
Pueblo San Francisco la Uni	60.99	a
Pala	9.26	e
Xeaj	8.42	e
Tzanjuju	7.72	e
Chuestancia	6.48	e

\*: Poverty Classification

a: Extreme poverty, above 30

b: Severe poverty, 20-29.99

c: Regular poverty, 15-19.99

d: Relative poverty, 10- 14.99

e: Low poverty, below 10

Table 4.2.4 (2) List of Micro-basins in Palestina de Los Altos Municipality

Name of River Basin	Number	Name of Microcuenca	Area of Microcuenca (km2)	Name of aldeas or caserios
Turbala	T-1	Tuimuj	2.6	Tuimuj
	T-2	El Carmen	2.3	El Carmen El Carmen-2 Altamira
	T-3	San-Ishidro	3.2	San-Ishidro Cabrera Loz Perez
	T-4	El Socorro	1.3	El Socorro Los Marroquiness Buena Vista Roble Grande
	T-5	Los Gonzalez	2.5	Los Gonzalez Pueblo Palestina de Los Alto
	T-6	El Desierto	9.3	El Desierto Los Laureles
Palana	P-1	El Eden	2.7	El Eden Sinai
	P-2	Mira Pena	3.3	Mira Pena
Patzacan	PZ-1	Las Delicias	2.1	Las Delicias Buenos Aires
Ixchol	IX-1	Toj Guabil	4.1	Toj Guabil Toj chol Asuncion



Table 4.2.4 (3) Evaluation of Community for Selection of Micro-basins in Quetzaltenango Province

Name of Municipality	Name of Community	Indicators for Poverty		Number of Households in Community		Area of River Basin (km <sup>2</sup> )		Land Use		Access (length from main road)		Legal Uplake of Water Source		Overlapped by Another Projects		Social Problems		Overlapd Another Municipality		Intention for Cooperation for the Survey by head of Municipality		Intention for Cooperation for the Survey by heads of Adlea or Caserio		Overall Assessment
		(no)	Assessment	(km2)	Assessment	Kind of croiment	Assessment (km)	Assessment	Yes or No	Assessment	Yes or No	Assessment	Yes or No	Assessment	Yes or No	Assessment	Yes or No	Assessment	Yes or No	Assessment	Yes or No	Assessment	Yes or No	
1 Palestina De Los Altos	1 Caserio Tojguabil	19.90	Yes	-	Yes	Yes	less 1	Yes	Yes	No	Yes	No	Yes	No	-	-	-	-	-	-	-	-	No	
	2 Caserio Los Marroquines	19.52	Yes	1.5	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
	3 Caserio El Socorro	15.46	Yes	"	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
	4 Aldea El Carmen	16.58	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
	5 Caserio Los Cabrera o Molinos Los Cal	17.66	Yes	3.2	Yes	basic crops	Yes	less 1	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	6 Caserio SanIsidro o Los Diaz	15.59	"	"	Yes	basic crops	Yes	less 1	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	7 Caserio Los Perez	18.75	"	"	Yes	basic crops	Yes	less 1	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes