

AGRICULTURAL EXTENSION
AND TRAINING NEEDS
OF FARMERS IN THE SMALL ISLAND
COUNTRIES:
a case study from Samoa



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**Extension, Education and Communication Service
Research, Extension and Training Division
Sustainable Development Department**

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PREFACE

Geographical location of farmers is one of the factors under consideration when strategies for client-oriented agricultural extension approaches are being outlined. A large number of men and women are engaged in farming in thousands of small, medium and large islands, and they need extension advice according to their unique situation. FAO has conducted several studies to identify extension and training needs of farmers living in different geographical locations such as mountains, desert and small islands.

This publication is based on a study that was conducted in the island country Samoa, located in the Pacific Ocean. We hope this will help in understanding the general agricultural situation in small islands, and how extension services are trying to meet the extension needs of farmers. One of the annexes to the publication is the questionnaire that was used in collecting necessary information for the study, and may be useful in conducting similar studies in other island countries, albeit with necessary modification in line with specific situation.



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FOLLOW-UP IN THE FIELD

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TITLE COVER PHOTO

Heiko Bammann

BACKGROUND

The objective of this study was to identify the special agricultural extension and training needs of farmers living in small island countries, using Samoa as a specific case. The study was conducted in July 2003.

GEOGRAPHY

Samoa is an island group situated in the Pacific Ocean about 4 235 km southwest of Hawaii and 2 500 km northeast of New Zealand. The country's geographic position is between 171 23° and 172 49° west longitude and 13 25° and 14 10° south latitude; thus, it is situated close to the international date line.

The islands are of volcanic origin with most of the coastal area surrounded by coral reefs. Samoa's two major islands are Upolu, where the capital Apia is located, and Savai'i, which is the largest island. The central areas of these two islands are high, rugged lands, with Upolu's highest point being about 1 097 m above sea level, and Savai'i's about 1 859 m. Samoa covers a total land area of about 2 830.8 km², with Upolu accounting for about 1 123 km² and Savai'i about 1 707.8 km².

The climate of Samoa is tropical, with a wet season that runs from November to April and a relatively drier season from May to October. Rainfall varies considerably according to location and season. The annual rainfall in northwestern parts of the country is about 2 300 mm, while in the highlands of Savai'i it sometimes exceeds 6 000 mm. The country was hit by two strong cyclones in 1990 and 1991, which had a serious effect on the economy.

Samoa is made up of 330 villages grouped into 41 districts for administrative purposes. In the 1999 census, the population was estimated at 170 000. Although most of these people are Polynesians, there are also some of European, Chinese and other Pacific island origins. Village populations range from a few hundred to more than a thousand, depending on the territory and distance from towns – villages near towns tend to be larger. Most villages maintain their traditional laws and customs alongside the State's political system.

SOCIO-POLITICAL STRUCTURE AND CUSTOMARY LAND TENURE¹

The social unit of Samoan life is the aiga or extended family. Each aiga is headed by a matai or titleholder who is elected by consensus among the aiga. There are two types of matai titles: alii, or chief, and tulafale. Each type plays a different role within the fono (the village council) and within the village social structure and organization. The main features and roles shared by both titles are custodianship of the family and village lands, and maintenance of family status and dignity within the village, as well as at the district and national levels.

It is important to note that control over land is obtained indirectly by acquiring the title that has the pule or authority over that land. Access to the title itself is gained primarily by descent from a previous titleholder – or occasionally through providing service to the present titleholder – rather than by descent from those who actually occupy the land.

It should be noted that not all matai have access to pule or authority over the disposition of family land. In fact, usually a senior matai transfers certain rights over part of the family land to a lesser ranking matai. Overlaps in the control and management of lands and houses often arise where there are closely related titles of different ranks. Such overlaps also occur in circumstances where a resident subordinate matai has immediate pule over his own lands and house sites, while a senior matai of the same descent group theoretically has the overriding authority. Regardless of the normative arrangements, residence and the direct use of and control over titled lands carry great weight in the continuation of arrangements (O'Meara 1990, 1993).

Many researchers have concluded that land tenure is a hindrance to development, especially agricultural development, in Samoa. However, O'Meara (1993) challenges this view by stating that “like other aspects of Samoan culture, the apparent conservatism of the land tenure system is more superficial than fundamental”. Samoan land tenure has undergone some major changes. Most land is now held by the individuals whose parents worked it in the past, and inheritance rights are assigned exclusively to these individuals. However, for reasons of security in cases when land disputes arise among the titleholders, the land is still under the custodianship of the family member with the most senior title. This type of arrangement, which maintains features of customary land tenure despite the negative views expressed by many agricultural development researchers, shows that Samoans are adapting to changing economic circumstances. The security of tenure of this modified system should therefore not be seen used as an excuse for low productivity from village agriculture.

¹ See Lämata, 1998; and O'Meara, 1986, 1987, 1990, 1993, 1994.

Instead, the major cause of agricultural stagnation in villages is the low economic return to agriculture.

THE ECONOMY

Samoa's economy is predominantly village-based agriculture, with the major crops being copra, cocoa, banana and taro. Remittances from family members working overseas and external aid also play important roles. The 1999 population census indicated that 70 percent of the economically active population was engaged in agriculture and fishing. Most of the rest were in the service sector, especially the government bureaucracy. Semi-subsistence agriculture and fishing at the village and household levels remain the main source of villagers' livelihoods.

The introduction of modern farming techniques and methods has increased agricultural production. However, plant diseases and pests have made it difficult to maintain and augment these improvements. An outbreak of a taro virus, and the weak performance of coconut oil in world markets have both hurt agricultural exports. On the other hand, the majority of the rural population still utilizes traditional planting methods for taro and other food crops, and these have shielded farmers from the risk and high cost of using inputs associated with unpredictable diseases and from unstable overseas markets.



FAO PHOTO/17091/M. Marzot

Fishmonger carrying the fish on her head, Cape Verde

The agriculture sector's contribution to gross domestic product (GDP) has declined since the two cyclones of 1990 and 1991 and the devastating effects of the taro leaf blight during the 1990s. According to the Government of Samoa's Statement of Economic Strategy 2000–2001, "... in 1998, agriculture contributed 12.2 percent of the GDP. This had fallen to 11.9 percent in the first half of 1999. More generally the subsistence sector of the economy contributed 16.8 percent in 1998 and 16.3 percent in 1999. Fisheries by contrast have been increasing their contribution to GDP, rising from 4.4 percent in 1994 to 6.1 and 6.9 percent in 1998 and the first half of 1999, respectively".

However, the government has put in place strategies to enhance agricultural opportunities through revitalizing village and subsistence agriculture by strengthening extension services, establishing more farmer groups, encouraging community-based marketing and facilitating credit access (Government of Samoa, 2001).

FARMING SYSTEMS

As already mentioned, agriculture is a key sector in the economy and important to the lives of most people in Samoa, especially those living in rural areas. The Statistics Department defines a household as an "agricultural holding", which is "an economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form or size. Single management may be exercised by an individual or household,² jointly by two or more individuals or households by a clan, or tribe or by a juridical person such as a corporation, cooperative or government agency. The holding's land may consist of one or more parcels, located in one or more separate areas or in one or more enumeration areas, provided the parcels share the same production means utilized by the holding such as labour, farm, buildings or machinery" (Government of Samoa, 2002).

The production base of agriculture in Samoa is comprised of closely interrelated but independent production activities in the crops, livestock, fisheries and forestry subsectors. Root crop production dominates the food crops sector, with small quantities of vegetables and fruit being grown, and coconuts and cocoa

2 A household is defined as one or more persons who live together and have their meals together (Government of Samoa, 2002). These people contribute to farming activities, i.e. planting, cultivation, weeding and harvesting. The head of household is always a titled or non-titled male. In Savai'i, 96 percent of households were considered agriculturally active (producing for home consumption only, or mainly for home consumption with some commercial), while in Upolu 65 percent were classified as such (Government of Samoa, 2002).

mainly as cash crops. Semi-subsistence is still the dominant management system, with most agricultural activities being carried out partly for home consumption and partly for sale.

Tree crops subsector

Coconut, cocoa and small areas of kava and coffee are the main tree crops of commercial significance. Other minor tree crops are oranges, avocados, breadfruit, lemons, limes, mangoes and pawpaws.

The agricultural census of 1999 (Government of Samoa, 1999) recorded that 94 percent of holdings were growing coconut, and the total area under coconut was 46 300 acres (about 18 750 ha). Regarding coconut within mixed cropping systems, the combination of coconut and cocoa covered the greatest land area, but other crops such as banana, taro and taamu (giant taro) were also commonly grown with coconut.

Food crops subsector

Taro is the preferred staple crop. Conditions of well-distributed rainfall are required to ensure a continuous supply of this starchy staple throughout the year. Taro takes about seven to nine months to mature, and the second crop takes about four months. Taro production is hampered during the dry season in areas with limited rainfall. According to the agricultural censuses of 1989 and 1999, the area under taro declined from 36 600 to 10 500³ acres (14 800 to 4 259 ha) over the ten-year period. Taro leaf blight disease was the main cause of this decrease. The area under taro is all in the household sector, and it is nearly always planted as a single crop, although some farmers mix it with taamu or *Alocasia*.

Taro production was greatly damaged by the two cyclones of 1990 and 1991, as were the other major crops coconut, cocoa and banana. Taro was also severely devastated by taro leaf blight virus in 1993, which resulted in the complete destruction of the taro industry – the country's main export and domestic crop. However, the crop has since shown a slight recovery.

In the past, banana was a major export and commercial crop. However, the many diseases that attack banana, together with the high costs of the pesticides required to counter these, has resulted in this crop now being grown predominantly by small farmers for home consumption and domestic sales. Recently, however, the decline of the taro industry is leading small farmers to return to banana production; between 1989 and 1999, the area given over to banana increased from 5 600 to 10 600 acres (2 250 to 4 300 ha), according to the agricultural censuses.

3 This figure also includes *Taro palagi*

Taamu (*Alocasia macrorhiza*) or giant taro, is also grown. This crop provides a degree of food security in a fragile food system that is based on continuous supply and no storage facilities. When supplies of the main staple taro were inadequate, taamu was the most important substitute owing to its disease-free status and good growth performance in local conditions. Yam was another important substitute during the taro blight, despite its high labour cost per unit of yield.

Vegetables and fruits

Some farmers grow small quantities of vegetables, mainly for own consumption with small surpluses being sold in the market. The main vegetables are cabbages, peas, pumpkins, green capsicums and eggplants. Taro leaf petioles are also sold at the market as vegetables. Because of the high cost of chemicals for vegetable gardens, small farmers carry out only minimal maintenance activities.

Villagers on the drier western areas of the two main islands used to grow large quantities of oranges and mandarins, mainly for sale at the main market in town. However, following the devastating effects of the two cyclones, these crops are now grown for home consumption and are of very little economic importance to small farmers.



FAO PHOTO/12374/F. Mattioli

Young farmer on tractor, Antigua and Barbuda

CROPS ADVISORY SECTION

Under its current organizational reform, the Ministry of Agriculture, Forests, Fisheries and Meteorology (MAFFM) has renamed its Extension Section the Crops Advisory Section. As its name implies, this section provides specifically crop-related advisory services to farmers, and is separate from the other extension services offered by the ministry's livestock, fisheries and other divisions.

As shown in the organizational plan in Annex 2, the Crops Advisory Section is headed by the Principal Crops Officer, under the umbrella of the Assistant Director of Crops Division, who reports directly to the Director of MAFFM. There are four senior crops officers: two for Upolu and two for Savai'i, with 21 advisory officers under their supervision – ten for Savai'i and 11 for Upolu. At present, not all these positions have been occupied and there are vacancies for two senior advisory officers (one each for Savai'i and Upolu), as well as for two crops advisory officers in Savai'i and two in Upolu.

EDUCATION LEVELS OF ADVISORY OFFICERS

The level of education within the advisory section is below average in terms of the number of officers to have completed secondary tertiary education (see Table 1). According to information provided by MAFFM's administration officer, there are only three degree holders within the advisory section.

Table 1. Level of education of crops advisory officers

	M. Agr.	B. Agr.	Dip. Agr.	Cert. Agr.	Form 5	< Form 5*	Total
Number	1	2	1	2	9	5	20
%	5	10	5	10	45	25	100

* < Form 5 indicates that respondents abandoned education before reaching Form 5.

Table 1 shows that most advisory officers (about 75 percent) reached at least Form 5 in their education, while 25 percent did not. Those advisory officers with degrees or diplomas completed their studies at the University of the South Pacific (USP) School of Agriculture, while those with Certificates in Agriculture studied at Samoa Polytechnic, majoring in crops husbandry.

The level of education within the advisory section clearly needs to be increased, especially regarding officers who have completed neither formal schooling nor agricultural training. MAFFM and agricultural donor agencies need to address the issue of underqualified personnel in the advisory section, because crops advisory officers are the only link between the ministry and farmers.

The success or failure of the Crops Division's programmes to improve conditions for farmers depends to a large extent on the education level of advisory officers. Most farmers in Samoa are conservative and follow traditional methods of growing and maintaining crops. Advisory officers therefore have to learn and thoroughly understand all aspects of new technologies, such as those for crop propagation, preparation and maintenance, before they can confidently introduce them to farmers. Well-educated and trained advisory officers find it far easier to introduce new methods and technologies.

GENDER

In the past, it was normally expected that all extension officers would be male. This goes back to the traditional Samoan perception of crop cultivation and propagation as being activities for men, because they involve hard physical work such as clearing, planting and harvesting. Women assist only with weeding. However, this view is no longer appropriate, because although men in Samoa still monopolize major farming activities, many women now also work the land.



FAO PHOTO/17424/H. Wagner

Fisherman in shore fishing with a pirogue, Comoros

As a result of these views, MAFFM preferred to employ only male extension officers, giving men preference over women applicants. This practice was also in line with the traditional Samoan view that it is much easier for officers to deal with their own than with the opposite sex. MAFFM records confirm that there were no women in the advisory services for the past two decades, despite the high number of female farmers in existence at the time. Another argument for not employing women extension officers was related to the low, “unfeminine” status of extension work.

Now, however, two women are employed in the advisory section, one as an advisory officer and the other as the Principal Advisory Officer (which is equivalent to the post of Chief Extension Officer and divisional head in the organizational structure prior to the current government reforms). This indicates that some attention is being paid to the issue of gender equity in employment and – more important – that women regard extension work as valuable. The female advisory officer works with both male and female farmers in the locality she works in, while the Principal Advisory Officer is in charge of the entire advisory section.

RESOURCES

Each extension district in Samoa has an extension centre or station, which is a meeting place for demonstrations, agricultural training and consultations with the advisory officer. Extension centres also provide accommodation for extension officers and for the advisory officer with his or her family. In addition, each advisory officer in charge of an extension centre is provided with a vehicle (usually a Suzuki four-wheel-drive jeep) for farm visits and other activities pertaining to the job, while the other extension officers have motorcycles for the same purpose.

Most extension centres have not been used for some time, and although some are still in relatively good condition and need only minor repairs, most require major refurbishment before they can be used to accommodate advisory officers.

Currently, about 30 percent of the advisory officers are over 30 years of age. Most of the younger are unmarried, and prefer not to be stationed in the extension centres but to live with their families in nearby villages. MAFFM has not given this issue much consideration because, according to the Principal Advisory Officer, it is more important that advisory officers maintain quarterly targets and outputs to demonstrate that they are doing their jobs.

According to the Principal Advisory Officer, the section used to own more than ten jeeps and motorcycles, with each advisory officer having either a motorcycle or a Suzuki jeep. At present, however, the advisory section’s fleet has been

reduced to only five Suzuki jeeps, one Hilux four-wheel-drive utility truck and one motorcycle, all of which are approximately eight years old. This is creating transport problems for advisory officers' farm visits and deliveries of planting materials. Nevertheless, advisory officers are still achieving the quarterly targets set by MAFFM.

PARTICIPATORY RURAL APPRAISAL APPROACH

The crops advisory section now utilizes the participatory rural appraisal (PRA) methodology in its work with Samoan farmers. MAFFM first introduced and adopted this methodology in 1996, according to the Principal Advisory Officer. In 1997, after crops advisory officers had undertaken numerous training sessions and PRA familiarization programmes with selected farmers, MAFFM introduced the PRA methodology to village farmers in Samoa. PRA's main purpose is to identify the constraints, problems and objectives that face farm households in the village, as well as the resources that are available to them. Based on this information, it is possible to develop a framework for selecting and supplying technology to help households. MAFFM and the Samoan farming community in general agree that PRA is a more effective extension approach compared with those used in the past (training and visit, farm visits, farming systems, etc.) in terms of targeting and identifying farmers' needs, constraints and problems. PRA is now the main route for improving technology and delivering extension advice and services to Samoa's farming communities.

The following is a summary of the PRA methodology as it is applied by the Crops Advisory Section:

- Crops advisory officers meet with village farmers and encourage them to form groups. Some villages have more than one farmers' group.
- Advisory officers meet with farmers' groups to identify their needs and problems. Farmers' groups are divided into smaller subgroups of four to five farmers each.
- Advisory officers work with members of each group to make a matrix that ranks and scores⁴ the problems raised by farmers under five headings: 1) problem, 2) importance, 3) effects, 4) severity, and 5) ranking.

4 The objective of matrix scoring and ranking is to show participants and extensionists the diverse perceptions that different social or farming groups in a community have of the advantages and disadvantages of a particular issue, and to produce a scored and/or ranked list of criteria, qualities and problems regarding the topics of interest (PRAP, 1996).

- According to the Principal Advisory Officer, the ranking of the problems reflects the priorities of the farmers.
- Regarding the major pests and diseases faced by farmers, not only are these recorded on a ranking matrix, but the farmers also provide their causes and potential solutions, which are also recorded by the advisory officer.
- By giving farmers the opportunity to provide the causes of and potential solutions to pests and diseases, the advisory officer is able to assess their levels of understanding and experience and to check whether these are in line with his or her own knowledge.
- After each PRA session, the advisory officer holds training and demonstrations in the problem areas mentioned by farmers, such as pruning, spraying, chemical mixing, planting methods for specific vegetables and fruits, and the control of specific pests and diseases. Among the problems that are likely to be dealt with are pink disease, banana leaf spot, taro leaf blight, fruit piercing moth, corm rot of taro, and caterpillars on cabbages.
- Advisory officers have a target of at least six PRA sessions and 15 farmer training sessions per year.
- Individual farmers who are not involved in farmers' groups may seek the advisory officers' assistance on their own.

According to the advisory officers, the main advantage of the PRA approach compared with other extension methods is the major contribution made by the farmers themselves. Farmers are provided with pens and paper to write down the major problems that they face, and all are involved in each stage of the PRA, from start to finish. Every farmer is therefore able to participate, regardless of group dynamics or gender. Advisory officers also give equal consideration to the feedback received from each farmer. This is different from other approaches, in which only a few farmers dominate discussions, and the rest just observe.

In some villages, one of the problems encountered by advisory officers was that the so-called "established farmers" (i.e. those with far larger than average landholdings) did not want to be involved in farmers' groups or to seek assistance from advisory officers. These farmers preferred to rely on their own experience and sought agricultural assistance directly from MAFFM's main office in town and from the Nu'u Research Station.⁵ In most villages, there are only a few such

5 Nu'u Research Station is the MAFFM Crops Division research station where all crop research activities are conducted. The Crops Advisory Section is also located near this station, along with all other sections of the Crops Division.

farmers, who focus primarily on growing crops for cash. These major growers are also the least likely to adopt new agricultural approaches, particularly those involving improved varieties and new technological methodologies. They prefer conventional methods of growing crops and consider agricultural extension officers to be too theoretical and lacking in practical agricultural experience.

ADVISORY OFFICERS' OTHER ACTIVITIES

Field trips

As well as the six PRAs and 15 training sessions mentioned in the previous section, advisory officers are also expected to undertake eight field trips per year. These involve farmers' groups visiting Nu'u Research Station, Nafanua Nursery Station⁶ and progressive farmers in major food crops (such as taro and cocoa) within the advisory officer's district or in other districts. According to advisory officers, progressive farmers provide a model and a challenge to smaller growers.

Training

One of the objectives of the advisory section is to train advisory officers in all technical aspects of their work, including crop production and pests and diseases. The Research Unit of the Crop Division holds extensive technical training sessions at the end of each month, which are designed for different levels. Other training is provided by the Research Unit and is based on the advice of the Principal Advisory Officer and the needs identified during PRA.

According to the Principal Advisory Officer, the level of understanding in training depends on the education level of the advisory officer concerned. This creates problems, because many advisory officers find it difficult to understand the technical language used, and this makes them uncomfortable about relaying training messages to farmers. The advisory section is looking for ways of solving this issue.

Farm visits

Advisory officers conduct regular farm visits to the individual farmers involved in farmers' groups, giving encouragement, establishing close working relationship and identifying the problems faced. The distribution of planting materials to farmers is another major activity for advisory officers, but there have been problems in this area as a result of shortages and the poor transport facilities that are available for advisory officers for carrying planting materials to farmers.

⁶ Nafanua Nursery Station is a vegetable and fruit nursery working with cabbage, tomato, cucumber, mango, orange, lime, papaya, pineapple, etc., as well as varieties of fruit trees from other tropical countries.

An advisory officer can visit an individual farm only when that farmer has sought assistance from the advisory officer. Planting materials too can only be distributed when a farmer has specifically asked for them at the extension centre. Advisory officers advise individual farmers who are not already in farmers' groups to become members of existing groups within the village, as these are the major contact points between MAFF and farmers.

Extension centre competition

MAFFM holds an annual competition for extension stations. The competition judges the management of the station and the crop demonstration activities undertaken within the station compound (e.g. taro nurseries, vegetable gardens, and the intercropping of banana, taro and other staple crops).

Issuing of Gramoxone permits

The Government of Samoa has placed restrictions on the buying of Gramoxone weed killer as a way of preventing people from using it to commit suicide. Pro-life groups claim that easy access to Gramoxone is the major cause of a large increase in Samoa's suicide rate. Despite much campaigning and political lobbying, MAFFM was unable to prevent restrictions on its sale, even though Gramoxone is very important to agricultural production and is the preferred weed killer for Samoan farmers.

Farmers wishing to procure Gramoxone require permits. Before acquiring a permit, the farmer has to apply to the advisory officer for an identification card, which is granted on condition that the farmer has a safety box with a lock for storing the weed killer. The farmer has to pay \$5 to the Quarantine Division for registration, and supply a passport photo for the identification card. A farmer can acquire Gramoxone only by showing the identification card at the agricultural store. Such restrictions on Gramoxone, along with its high price (which is another control mechanism), have had a negative impact on agricultural production, according to advisory officers.

CONSTRAINTS AND PROBLEMS FACING ADVISORY OFFICERS

The following is a summary of the problems that are encountered by advisory officers in the field:

- Samoan culture and customs emphasize the need to address people correctly according to their formal titles, especially in meetings of village chiefs and on occasions where people are gathered, such as at farmers' group meetings, which involve chiefs and other strata of the community. The majority of advisory officers are school leavers, who do not have sufficient language skills for such occasions and who are uncomfortable when addressing older farmers. The Principal Advisory Officer reported that she has consulted lecturers in

agricultural extension at the University of the South Pacific to inquire about courses in sociology to bridge this important cultural gap. According to senior advisory officers, a related constraint is that young advisory officers are very nervous of speaking in public.

- The advisory section's vehicles are inadequate, as is the weekly limit of 30 litres of fuel for each advisory officer. Monthly output targets are often not achieved, especially by advisory officers stationed in remote districts and where there are poor roads to farms.
- Advisory officers do not have the knowledge and skills, nor the proper audiovisual materials and communication capacity needed to address the training needs of farmers in Samoa, despite consistent technical training and MAFFM's intention to upgrade its advisory section. This too, is related to the advisory officers' low level of education. MAFFM should take care to select personnel with adequate and appropriate skills. The minimal budget allocated to the advisory section within the Crops Division has resulted in poor equipment and materials being available for advisory officers' important role in assisting farmers.
- Most Samoan farmers operate full time on smallholdings (some with several scattered plots), which are their sole sources of food and income. They do not have secondary sources of income. Farmers also face problems relating to tools, equipment and chemicals to sustain their farms. Advisory officers' work can be impeded and stagnate as a result of this lack of basic farm resources.



FAO PHOTO/12481/F. Mattioli

Woman farmer placing yams in a basket, Jamaica

DATA ANALYSIS AND RESULTS

The two sites selected for this study were Aleisa, on the main island of Upolu, and Sakalafai, a subvillage of the main village of Salelologa on the large island of Savai'i. These sites were selected for the following reasons:

- They are situated in two very different geographic locations.
- Their land tenure systems are very different from each other.
- Different types of crops are grown on the two sites.
- One community is more liberal than the other when dealing with village traditional issues and *fa'asamoa*⁷.
- The objectives and purposes of agricultural activities are not the same in the two villages.

The data was collected from a field survey using structured questionnaire (see Annex 3), and formal interviews with farmers in the two communities. PRA and its use in farmers' focus groups is very relevant to this study. The discussion and analysis are based on observations made by MAFFM advisory officers regarding the ministry's PRA programmes on the main island of Savai'i.

ALEISA SITE

Aleisa is situated inland and towards the west of the main island of Upolu. It is in the Tuamasaga district. Because of its high inland location about 300 m above sea level, it has annual rainfall of 380 to 450 cm. Wright (1963) describes Aleisa soils as: "soils of moderate to high natural fertility, very stony soils with many boulders, steep land soils with very little scope for mechanization".

During colonization, the area around Aleisa was government land, which was first settled by Chinese indentured labourers under leasehold arrangement.

⁷ *Fa'asamoa* literally means "Samoan way of life". It is very complicated and perplexing to outsiders because it encompasses all aspects of the Samoan culture. It reinforces social obligations and commitments, adhering to traditional values and norms that run counter to modernity and commercialism.

According to the data collected, current landownership is either leasehold or freehold. Aleisa differs from other Samoan villages in that it has no hierarchical structure of chieftainship, nor does it have a system for maintaining customary law and order that is based on the authority and traditional protocols of chiefs.

Aleisa is a farming community, specializing in a wide variety of tropical crops, especially vegetables. Despite its stony soils, which could hinder and limit agricultural development, the Aleisa farming community consistently makes a major contribution to the economy of Samoa through agricultural production.

Age and gender of farmers

Out of 37 farmers interviewed at Aleisa, 27 are men and ten women. This proportion of women farmers is fairly high for farming communities in Samoa where, in spite of women's important roles in agricultural activities, the man is always the head of household and considered to be the owner of farming operations. Women in Aleisa are involved and active in agricultural activities as their main source of income.

Some 81 percent of the farmers are under 50 years of age; 13 percent are aged between 50 and 60 years, and only 6 percent (or two farmers) are in the 60 to 65

years age group. Most of the female farmers are under 45 years of age. The youngest farmer is a woman in the 21 to 25 years age group, while the youngest male is in the 31 to 35 years age group. Eight male farmers are in this age bracket.

In Sakalafai village in Savai'i, farmers tend to be older: seven are over the age of 65, and none is under 36 years of age.

Education levels: Table 2 shows that the majority of farmers in Aleisa reached level 2 of education, i.e. secondary school. Eight percent (all women) have tertiary education, while only 14 percent (all men) completed only basic primary school education. These education levels are higher than those for farmers in Sakalafai.



FAO PHOTO/1798

Cooperative farm worker in a banana plantation, Grenada

Table 2: Education levels of farmers in Aleisa

	Education Level of	Number of women	Number of men	Number of farmers	Percentage
Level 1	Primary		5	5	14
Level 2	Secondary	7	21	28	76
Level 3	Tertiary	3		3	8
Level 4	Others		1*	1	3

Types and areas of land

There are three types of land tenure in Samoa: government land, leasehold land and – the most common – customary land. In Aleisa, female farmers operate solely on government leased and freehold land, with average areas of 8.6 ha (21.3 acres) for the former and 2.3 ha (5.75 acres) for the latter, as indicated in Table 3. The table also shows that most male farmers operate on leased lands, followed by freehold at 30 percent. Only 4 percent (or one farmer) claimed to use customary land, although this claim is highly questionable.

Figure 1 illustrates the overall proportions of farmers working on each of the three tenure categories of land.

Table 3: Land tenure in Aleisa

	Government leased	Freehold	Customary
Women Farmers (number)	6	4	
Total area (acres)	128	23	
Area per farmer (acres)	21.3	5.8	
Percentage of farmers	60	40	
Men farmers (number)	18	8	1
Total area (acres)	266.5	152	50
Area per farmer (acres)	14.8	19	50
Percentage of farmers	67	30	4
Women and men farmers (number)	24	12	1
Total area (acres)	394.5	175	50
Area per farmer (acres)	16.4	14.6	50
Percentage of farmers	65	32	3

* 1 acre = approximately 0.405 ha.

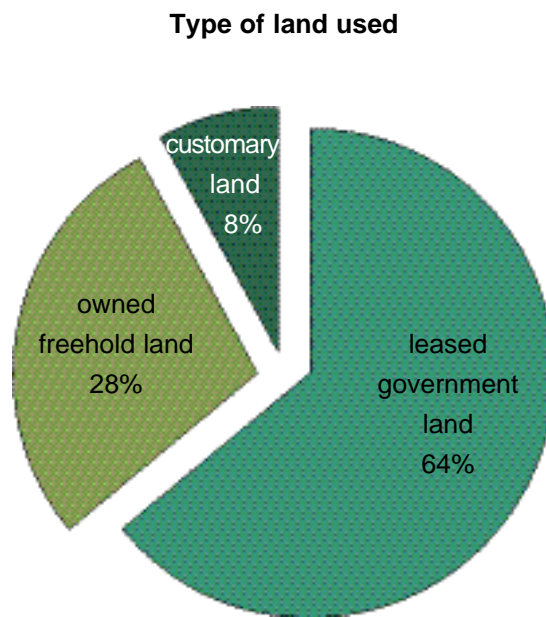


Figure 1: Tenureship system of the land used by farmers

Agricultural activities

Main crops: Table 4 shows the different crops grown by farmers. All ten female farmers grow cocoa. Taro and banana are also major crops, with *Taro palagi* substituting for taro when taro leaf blight devastated the Samoan taro crop. Since the taro industry recovered, this same crop has been processed into chips. The high area per crop of coconut is due to one farmer listing 20 acres (8.1 ha) of coconut plantation.

It is interesting to note the differences in crops between female and male farmers, with men growing more taro, banana, taamu (giant taro) and cocoa than women. One male farmer cultivated 10 acres (4 ha) of breadfruit and 10 acres (4 ha) of cocoa, which is far more than normal and increased the average areas per farmer for these crops. Overall, the most important crops for farmers are taro, cocoa, banana and taamu.

Table 4: Farmers' main crops in Aleisa

Type of crop	Number of farmers	Total area (acres)*	% of farmers growing each crop	Average area per farmer (acres)*
Women farmers				
Taro	8	7.75	80.0	0.97
Taro palagi	8	4.75	80.0	0.59
Banana	8	7.5	80.0	0.94
Taamu	6	5.5	60.0	0.92
Yams	7	4.25	70.0	0.61
Cassava	2	0.75	20.0	0.38
Breadfruit	6	5.5	60.0	0.92
Coconut	2	22	20.0	11.00
Cocoa	10	12.5	100.0	1.25
Others	2	1	20.0	0.50
Total women		71.5		
Men farmers				
Taro	25	49	0.9	1.96
Taro palagi	10	8.5	0.4	0.85
Banana	23	45.75	0.9	1.99
Taamu	22	40.5	0.8	1.84
Yams	10	3	0.4	0.30
Cassava	1	0.25	0.0	0.25
Breadfruit	15	17.25	0.6	1.15
Coconut	17	44	0.6	2.59
Cocoa	23	47.5	0.9	2.07
Others	6	6.75	0.2	1.13
Total men		262.5		
Men and women farmers				
Taro	33	56.75	89.2	1.72
Taro palagi	18	13.25	48.6	0.74
Banana	31	53.25	83.8	1.72
Taamu	28	46	75.7	1.64
Yams	17	7.25	45.9	0.43
Cassava	3	1	8.1	0.33
Breadfruit	21	22.75	56.8	1.08
Coconut	19	66	51.4	3.47
Cocoa	33	60	89.2	1.82
Others	8	7.75	21.6	0.97
Total men and women		334		

* 1 acre = approximately 0.405 ha.

Vegetables: Female farmers grow mostly cucumbers, tomatoes and cabbages, as well as some pumpkin, green pepper and spring onions. However, four out of the ten female farmers interviewed do not grow any vegetables at all. Male farmers also grow mainly tomatoes, cabbages and cucumbers. In addition, one farmer reported growing 0.75 acres (0.3 ha) of eggplant, five listed 2.25 acres (0.9 ha) of beans, two 0.5 acres (0.2 ha) of green peppers, one 0.25 acres (0.1 ha) of maize, and two 2.5 acres (1 ha) of pumpkin. It should be noted that three out of the 27 male farmers do not grow any vegetables.

Table 5: Vegetables grown by farmers in Aleisa

Type of vegetables	Number of farmers	Total area (acres)*	% of farmers/37 growing each vegetable	% of farmers/30 growing each vegetable	Average area per farmer (acres)*
Cabbage	25	9.75	67.6	83.3	0.39
Tomato	27	10.5	73.0	90.0	0.39
Cucumber	25	9.5	67.6	83.3	0.38
Others	11	8.5	29.7	36.7	0.77

* 1 acre = approximately 0.405 ha.

Fruits: Only three female farmers grow fruits: one grows 2 acres (0.8 ha) of oranges and 2 acres (0.8 ha) of avocados, one grows 0.5 acres (0.2 ha) of oranges, and the other has 1 acre (0.4 ha) of pawpaws. Only eight male farmers out of 27 grow fruit; seven grow oranges, while one man reported having 2 acres (0.8 ha) of mangoes, one reported 1 acre (0.4 ha) of avocado, one 1 acre (0.4 ha) of pawpaw, and another 0.5 acres (0.2 ha) of lichee. Overall, oranges are the preferred fruit, with 81.8 percent of farmers growing them.

Main purposes of agricultural activities: All the 37 farmers involved in the study reported that for them the main purposes of agricultural activities is to produce commodities that are partly for home consumption and partly for sale. This is in line with the views of most farming households in Samoa, where surpluses are sold to generate income.

Other sources of household food and income

Seven out of ten female farmers and 11 out of 27 males own livestock. All livestock is kept for household use, and none is sold. Overall, 13 farmers keep cattle, ten keep pigs and 13 chickens.

None of the farmers has planted forest trees, the main reason being that forestry is uneconomical because of the long time it takes for trees to mature for logging.

Constraints to agricultural production

According to the farmers surveyed, the main constraints to increasing agricultural production are:

- lack of capital;
- lack of planting materials;
- poor and insufficient field training in crop husbandry and production;
- lack of tools and equipment;
- pests and diseases;
- the high cost of agricultural chemicals.

Respondents stated that all of these constraints should be handled by the Ministry of Agriculture's extension officer.

Marketing of agricultural produce

All the farmers sell agricultural produce, all but one of them at Fugalei market, which is the main agricultural market in the township of Apia. The remaining farmer has a stall in front of his house, while four others also sell produce on the farm as well as at the market.

All the farmers reported that Samoa has very limited markets for exports of taro, banana, cocoa and coconuts. At present, the country is producing few or no export crops, and farmers felt that it was the government's responsibility to revitalize the agriculture sector as in past decades. Unless overseas markets are available for farmers' produce, production is unlikely to be improved. Aleisa



FAO PHOTO/12359/F. Mattioli

Farmer in his poultry house, Dominica

farmers grow primarily for consumption, and sell surpluses on the local market. They would rather supply the small local businesses that process agricultural by-products (such as taro and banana chips, ground cocoa and coconut oil) than trade on unpredictable overseas markets, because they believe that selling locally will allow them to make better deals.

Sources of extension advice

Farmers' main source of farming advice is other farmers within the community, who share not only technological and extension advice but also tools and equipment – especially when farmers' groups have been formed.

The second most important source of advice is the extension services, whose main agricultural extension method is for crops advisory officers to address specific farming challenges through technical training in crops. Advisory officers and farmers' groups use PRA programmes to identify what technical training is required, and have conducted courses on pests and diseases, crop husbandry, etc. As well as these technical trainings, advisory officers also make regular visits to farmers who need technical assistance.

Six farmers seek direct assistance from Nu'u Research Station. The most common reason for doing so is to obtain taro planting materials and vegetable seedlings, while some farmers go for advice on chemicals and pest control measures.

SAKALAFAI VILLAGE

Sakalafai is a sub-village of Salelologa, one of the largest villages on the island of Savai'i. Salelologa is the main point of entry by ferry to the island, and the location of Samoa's newly established second township. It takes between forty minutes and an hour to reach Salelologa by ferry, a distance of 30 km.

Sakalafai has a well-structured line of authority based on its chieftainship system and strict adherence to the *fa'asamoa* for day-to-day administration. This is very different from Aleisa. Given this situation, it is not surprising that most land tenureship in this village is customary, which is closely related to the social structure and chieftainship of Samoan villages.

Wright (1963) describes the village's soil fertility as: "... originally was very fertile, but it has been farmed intensively in the past and most of it has declined in fertility... this soil will rapidly pass out of use for shifting cultivation. Cocoa or coconuts could still provide a permanent form of land use."

The most common tropical crops in Samoa – taro, banana, yams, cocoa and coconut – are grown on Sakalafai lands, and agriculture is households' main source of food and income.

Age and gender of Sakalafai farmers

Out of Sakalafai's total 40 farmers two farmers are women, which is a much lower proportion than in Aleisa. More than half the farmers are over 50 years age, with two being over 65 years. This is another contrast with Aleisa.

Education level: Most (80 percent) farmers in Sakalafai reached only primary level of education, 17 percent reached secondary level, and 2 percent (one farmer) received informal schooling. This low level of education is likely to have a negative effect on farmers' understanding of the technical aspects of advisory officers' work. It prevents them from applying proper methodologies and appropriate recommended agricultural techniques. Sakalafai's level of education is far lower than that of Aleisa.

Type and area of land

Nearly all (95 percent) farmers use customary land for their agricultural activities, with the remaining 5 percent operating on government leased lands. Those farming customary land have an average of about 2.3 ha each, while those on government leased land have just over 8 ha each. According to the Lands and Survey Department, almost the entire village is located on customary land.

Agricultural activities

Main crops: Table 6 shows the main crops grown by Sakalafai farmers. As expected, these are coconuts, taro and taamu, followed by banana. Despite its vulnerability to diseases, its high input costs and the lack of planting materials,



FAO PHOTO/17428

Father and son collecting grass for cattle, Mauritius

farmers persistently maintain that taro is more economical than its substitutes of taamu and banana.

The fact that coconut is grown by all the farmers indicates its importance as a source of food and income. Coconut is a resilient plant that is less vulnerable to pests and diseases, can be cultivated easily and is economical in mixed planting systems. As coconut is a long-term plant, it is traditional in Samoa to plant coconuts on customary lands as boundary benchmarks and to seal claims to pieces of land. Samoans operating on newly cleared customary lands initially cultivate coconut for these purposes.

The data show that none of the farmers interviewed in Sakalafai grow vegetables or fruits. The main reason that the farmers gave for this was that vegetables and fruits are uneconomical to grow, considering the low demand for such crops on the market and the high costs of the inputs needed to maintain them.

Table 6: Farmers’ main crops in Sakalafai

Type of crop	Number of farmers	Total area (acres)*	% of farmers growing each crop	Average area per farmer (acres)*
Taro	29	54.2	72.5	1.87
Taro palagi	2	0.4	5.0	0.20
Banana	14	8.9	35.0	0.64
Taamu	29	20.5	72.5	0.71
Yams	3	1	7.5	0.33
Cassava	1	0.5	2.5	0.50
Breadfruit	5	2.5	12.5	0.50
Coconut	40	186.3	100.0	4.66
Cocoa	1	0.2	2.5	0.20
Others				
Total		274.5		

* 1 acre = approximately 0.405 ha.

Purposes of agricultural activity: The main purpose of agricultural activities in Sakalafai is home consumption, which was reported by about 78 percent of households. For others, agriculture is partly for consumption and partly for sale. This implies that household subsistence is more important than income generation, as is the case in the majority of Samoan rural agricultural communities. It is also worth noting that because Sakalafai community is involved in the *fa’asamoa* system, the sharing of resources and food among families is an obligation and a greater priority than is selling produce.

Other sources of household food and income

Table 7 shows that all households keep animals, mainly for consumption. In Sakalafai, animals are raised not only for household consumption but also to meet *fa'asamoa* obligations for funerals, weddings, guests and other family and village affairs. As Sakalafai village adheres to Samoan traditional culture, agricultural activities are viewed more as a source of status and consumption than as a means of accruing profit. None of the farmers interviewed keeps livestock to generate income.

All households reported having members who fish. Household members use traditional methods of fishing, and men fish mainly along the reef, while women collect molluscs and shellfish. Again, most produce is for home consumption and to fulfil social obligations. Farmers reported that fish is their main source of protein given the high prices of imported meat.

Regarding the planting of forest trees, all the farmers stated that local forest trees were planted by their ancestors, mainly to supply building materials for family dwellings and guesthouses.

Table 7: Livestock ownership in Sakalafai

Livestock type	Number of owners	Number of animals kept	Number of animals per farmer
Cows and heifers	9	59	7
Bulls and steers (2 years and older)	9	52	6
All other cattle	4	22	6
Pigs	17	266	16
Chickens	15	286	19

Constraints to agricultural production

According to the farmers surveyed, the main constraints to their farming operations are:

- Lack of capital
- Pests and diseases
- Lack of planting materials
- Lack of farming tools and equipment
- High cost of agricultural chemicals
- Difficulty in obtaining permits for weed killer
- Young advisory officers' inadequate agricultural knowledge
- Advisory officers' poor communication skills

The farmers believed that dealing with these constraints should be the responsibility of advisory officers, who are the main link between principal advisory officers and MAFFM. Advisory officers should offer initial assistance to farmers facing any kind of problem or difficulty, and should also advise the ministry on ways to assist farmers. Farmers' major source of capital is agricultural loans, and there is a need to reduce the bureaucracy involved in obtaining these loans and to lower the interest rates charged by the Development Bank. The ministry should also subsidize the costs of agricultural inputs, tools and equipment.

At present, advisory officers do not know enough about local cultural protocols to be able to communicate effectively with the village council. They also need improved skills in simplifying technical agricultural terms during training sessions.

Marketing of agricultural produce

Most (78 percent) farmers in Sakalafai grow crops for home consumption. The remaining 22 percent sell crops – mostly bananas and taro – at the farmgate and at Salelologa market. When asked to suggest ways of increasing the market for their produce, most of these farmers responded that MAFFM should look outside Samoa to create possible overseas markets. They also mentioned the inadequacy of market outlets for farm produce as being the main cause of the agriculture sector's current poor performance.

Sources of extension advice

Nearly all of the farmers (37 out of 39) reported that their main source of technological and extension advice is agricultural advisory officers; the remaining two farmers obtain such advice from NGOs. Sakalafai farmers depend greatly on the advisory officers for all aspects of their agricultural operations. It should be noted that MAFFM's headquarters for Savai'i Island is located in the main village of Salelologa village, hence Sakalafai farmers' easy access to the advisory officer's office whenever the need arises.

PARTICIPATORY RURAL APPRAISAL IN VILLAGES

The purpose of PRA is to reach an understanding of the main constraints, problems, objectives and resources that affect households. The approach has been very useful in identifying farmers' needs and problems. Farmers and advisory officers consider PRA to be the most effective extension approach compared with other methods.

As its name implies, PRA encourages participation and contributions from all kinds of farmers (young, male, female, titleholders and non-titleholders). All the farmers involved in PRA programmes have equal opportunities to contribute by writing their ideas, which are then included in ranking and scoring sessions. Powerful and high-status farmers are therefore less likely to dominate the discussions. However, the Principal Advisory Officer reported that the inception of PRA in Samoa had been hampered by a lack of planting materials (especially for taro, owing to the blight virus), and the recruiting of inexperienced advisory officers.

The following discussion outlines four PRAs that were conducted on the island of Savai'i by the advisory officers. The main objective of these PRAs was to identify the major constraints facing agricultural activities, and the major pests and diseases encountered by farmers. These were organized into categories according to their importance, effects, severity, etc., and were then ranked from 1 (the most important) to 5 (the least important).

SAKALAFAI

Tables 1 and 2 in Annex 2 show the main problems and the main pests and diseases, respectively, as reported by farmers in Sakalafai village. These were then categorized and ranked from most to least important, as summarized in the following subsections.

Major problems

1. No markets
2. Expensive chemicals
3. Shortage of planting materials
4. Pests

5. Diseases
6. Lacking knowledge of chemical application
7. Weeds
8. Poor growth due to pesticides and weed killers

Major pests and diseases

1. Corm rot of taro.
2. Giant mimosa.
3. Black weed.
4. Rhinoceros beetle.
5. Fruit piercing moth.
6. Yellowing of kava leaves.
7. Stunted crop growth due to virus.
8. Cocoa pink disease.
9. Banana black leaf streak.

SASINA

This PRA was unusual in that it involved women farmers only at Sasina village on the island of Savai'i. The women requested the advisory officers to carry out a PRA to gather the views of women involved in farming and vegetable gardening. A total of 19 women formed a farmers' group called the Women's Committee Farmers' Group. Tables 3 and 4 in Annex 2 report the findings of this PRA, which are summarized in the following subsections. It is interesting to note that women farmers' needs are very similar to those of men farmers.

Major problems

1. Lack of appropriate tools
2. Lack of planting materials
3. Lack of markets
4. Lacking knowledge of vegetable production
5. Poor soil fertility
6. Pests and diseases

Major pests and diseases

7. Slugs, snails and fruit piercing moth
8. Armyworm on cabbage
9. Taro leaf blight
10. Rhinoceros beetle
11. Banana black leaf streak
12. Yellowing of taro leaf

MALAE FAGA

The PRA in Malae Faga village on the island of Savai'i involved 15 young farmers between the ages of 18 and 23 years. Tables 5 and 6 in Annex 2 show the findings from that exercise, which are summarized in the following subsections. The problems faced by young farmers in Malae Faga are almost the same as those faced by the older farmers who were surveyed.

Major problems

1. High costs of inputs
2. Weeds
3. Pest and diseases
4. Rodent damage
5. Restricted permits for Gramoxone

Major pests and diseases

1. Corm rot of taro
2. Armyworm
3. White fungus
4. Rodent



FAO PHOTO/12463/F. Mattioli

Training in bud grafting of mango, Jamaica

FAGASA

A total of 35 titled and untitled male farmers were involved in the PRA at Fagasa village on the island of Savai'i. No female farmers were involved. Tables 7 and 8 in Annex 2 show the findings from that exercise, which are summarized in the following subsections.

Major problems

1. Lack of knowledge of how to set up plantations and vegetable gardens
2. Expensive tools and inputs.
3. Pests and diseases
4. Lack of planting materials
5. Giant mimosa

Major pests and diseases

1. Banana leaf streak
2. Taro leaf blight
3. Bunchy top
4. Corm rot of taro
5. White fungus

CONCLUSIONS AND RECOMMENDATIONS

TRAINING AND EDUCATION

Agriculture is an essential sector in Samoa's economy, and the mainstay for Samoan people's livelihoods, especially in rural areas. The traditional crops of taro, coconut, cocoa, taamu and banana are still the main ones grown as they suit local environmental conditions. However, farmers in the two study sites are facing problems such as a lack of planting materials (especially for taro), a lack of resources, and pests and diseases. These same problems also confront farmers in the four villages that took part in the PRA. However, advisory officers have not received sufficient agricultural training to enable them to solve the problems.

It is recommended that MAFFM review its training programmes for advisory officers, in order to ensure that they provide the officers with the skills needed to address farmers' needs. MAFFM could request donor agencies to provide specialists in the problem areas of pests, diseases, crop husbandry, crop protection and chemical application, who could contribute to the training of advisory officers. Training should be followed up and reviewed regularly to check on its relevance and progress, in order to maintain and sustain quality in agriculture.

In order to ensure a continuing supply of professionally trained people in agriculture, Samoa and donor agencies should provide scholarship programmes for students of agriculture and related sciences.

PARTICIPATORY RURAL APPRAISAL

MAFFM's advisory service is now using the PRA approach, which incorporates part of the focus group framework and works well at the village and community levels. Farmers who have participated in the PRA programme and follow-up training, understand the PRA concept and practices. They have a positive opinion of the approach as it allows them to take part in decision-making regarding challenges to agriculture, and ways of solving them. Farmers were happy to be involved in and have ownership of the mechanisms to sustain their agricultural practices despite the existing problems.

It is recommended that the PRA approach be used to facilitate the crucial link between farmers and MAFFM. The participatory nature of the approach makes it possible for advisory officers to address farmers' needs and impart remedies. Advisory officers should be trained in:

- cultural protocols, so that they can follow the right procedures when conducting PRAs in villages, as village support is crucial to the successful implementation of agricultural initiatives;
- communication skills, so that they can facilitate discussions effectively during PRAs;
- analytical skills, so that they can conduct in-depth analyses of farmers' problems and needs in order to identify long-term solutions rather than the superficial, short-term measures that their current level of competence limits them to.

Advisory officers should also encourage farmers to use new pest- and disease-tolerant crop varieties, as well as technological mechanisms to increase agricultural production because indigenous knowledge is inadequate to cope with current agricultural problems.

RESOURCES FOR RESEARCH

It has been noted that MAFFM's research unit needs to take action to reduce the high mortality rate of crop resources for trials and on-farm demonstrations. Crop research and development is expensive.

It is recommended that any future projects be planned and structured to ensure that they use resources efficiently. Professional advice from abroad could contribute to agricultural development. The ministry should also establish a multiplication scheme to ensure an adequate supply of planting materials for farmers, as a lack of such materials is one of the major problems hindering agricultural production.

GENDER ISSUE

MAFFM has not addressed gender equity in its operations, and it is difficult to retain qualified female advisory officers. Female extension officers work well with female farmers, of whom there are increasing numbers. The use of female advisory officers will also encourage women to increase their contribution to the agriculture sector.

It is recommended that MAFFM address the issue of gender equity throughout all of its operations in order to encourage women to become advisory officers. In addition, women should be given more opportunities to pursue higher education in agriculture-related subject areas.

OTHER ISSUES

There may be a need to carry out a small-scale project or programme to assist MAFFM in *upgrading its advisory services*. This issue should be explored further after the outputs from any pest and disease risk analysis have become available.

Farmers attribute low agricultural productivity to the lengthy procedures required to obtain *Gramoxone permits*. MAFFM should review these procedures and find ways of increasing access to this much-needed farmers' resource.

MAFFM needs to review its resources in order to allocate adequate *transport facilities* to its advisory officers, as lack of transport is a constraint to farm visits and essential contacts with farming communities.



FAO PHOTO/12357/F. Mattioli

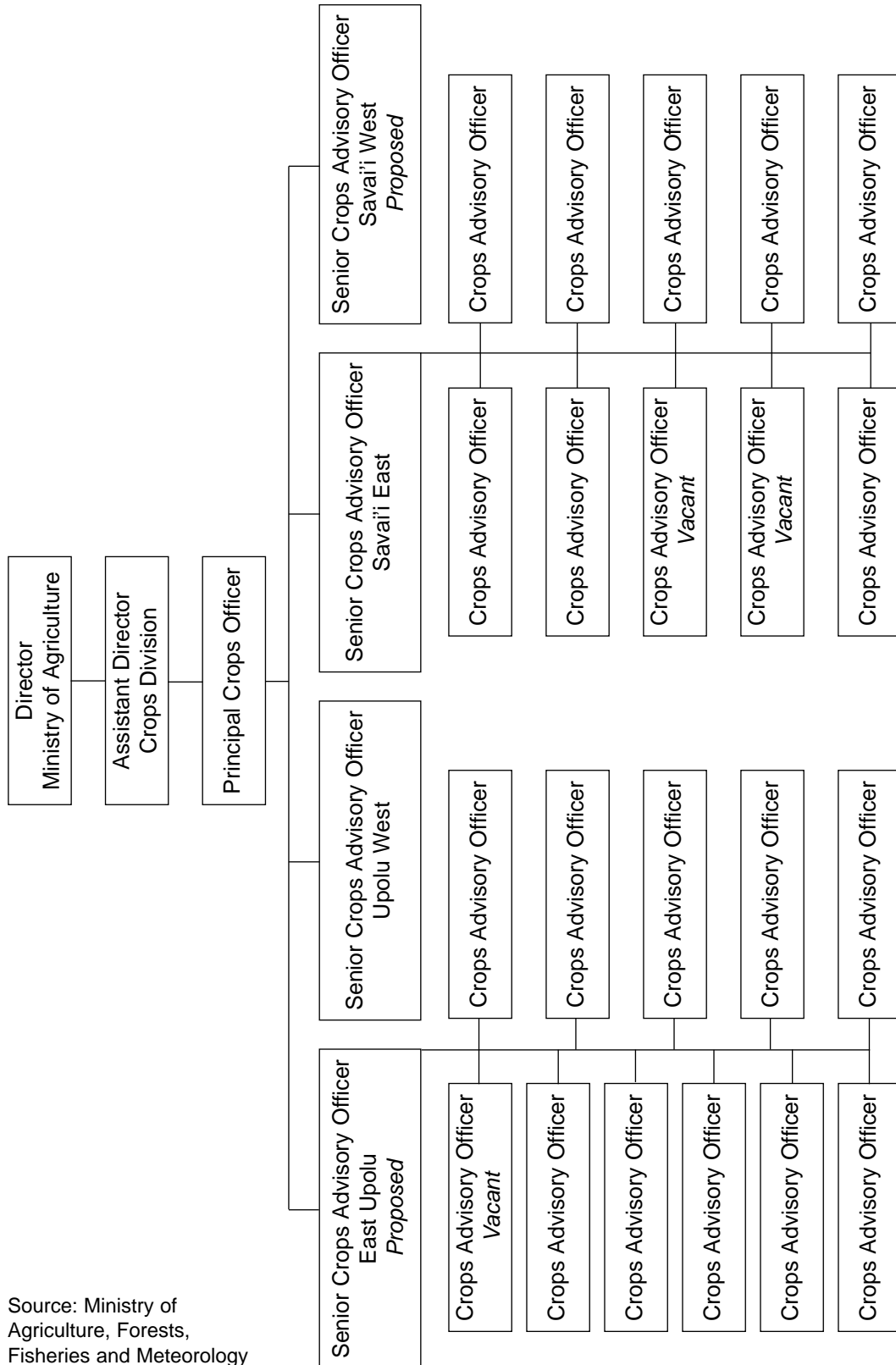
Farmer fertilizing his crop, Dominica

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ANNEX 1

CROPS ADVISORY /EXTENSION SECTION



Source: Ministry of Agriculture, Forests, Fisheries and Meteorology

ANNEX 2

FINDINGS OF PARTICIPATORY RURAL APPRAISAL IN FOUR VILLAGES

Sakalafai/Salelologa

Number of participants: 34.

Table 1: Major problems in agriculture faced by farmers

PROBLEM	IMPORTANCE			EFFECT			SEVERITY			DECISION
	Ranking	Farmers	%	Ranking	Farmers	%	Ranking	Farmers	%	
1. Diseases of crops	5	9	26.5	5	14	41.2	5	19	55.9	5
	4	1	2.9	4	3	8.8	4	4	11.8	
	3	6	17.6	3	7	20.6	3	6	17.6	
	2	0	0.0	2	0	0.0	2	0	0.0	
2. Insect pests	5	16	47.1	5	10	29.4	5	13	38.2	4
	4	3	8.8	4	4	11.8	4	2	5.9	
	3	2	5.9	3	6	17.6	3	3	8.8	
	2	3	8.8	2	1	2.9	2	0	0.0	
3. Weeds	5	12	35.3	5	13	38.2	5	17	50.0	7
	4	1	2.9	4	2	5.9	4	3	8.8	
	3	1	2.9	3	2	5.9	3	1	2.9	
	2	0	0.0	2	0	0.0	2	0	0.0	
4. No knowledge of chemical rate for spraying	5	16	47.1	5	19	55.9	5	19	55.9	6
	4	2	5.9	4	1	2.9	4	2	5.9	
	3	1	2.9	3	1	2.9	3	2	5.9	
	2	0	0.0	2	0	0.0	2	1	2.9	
5. Poor crop growth due to chemicals	5	1	2.9	5	7	20.6	5	3	8.8	8
	4	0	0.0	4	1	2.9	4	1	2.9	
	3	1	2.9	3	2	5.9	3	2	5.9	
	2	1	2.9	2	2	5.9	2	1	2.9	
6. No planting materials	5	25	73.5	5	17	50.0	5	17	50.0	3
	4	0	0.0	4	3	8.8	4	2	5.9	
	3	0	0.0	3	0	0.0	3	1	2.9	
	2	0	0.0	2	0	0.0	2	1	2.9	
7. Expensive chemicals and fertilizer	5	19	55.9	5	20	58.8	5	21	61.8	2
	4	0	0.0	4	3	8.8	4	4	11.8	
	3	1	2.9	3	1	2.9	3	1	2.9	
	2	0	0.0	2	0	0.0	2	0	0.0	
8. No market	5	20	58.8	5	21	61.8	5	23	67.6	1
	4	1	2.9	4	1	2.9	4	3	8.8	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
	1	0	0.0	1	0	0.0	1	0	0.0	

Table 2: Major pests and diseases faced by farmers

PROBLEM	IMPORTANCE			EFFECT			SEVERITY			DECISION
	Ranking	Farmers	%	Ranking	Farmers	%	Ranking	Farmers	%	
1. Corm rot of taro - Fili, P10	5	22	64.7	5	22	64.7	5	25	73.5	1
	4	16	47.1	4	2	5.9	4	2	5.9	
	3	1	2.9	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
2. Banana black leaf streak	5	20	58.8	5	10	29.4	5	17	50.0	9
	4	6	17.6	4	12	35.3	4	0	0.0	
	3	1	2.9	3	0	0.0	3	9	26.5	
	2	0	0.0	2	0	0.0	2	0	0.0	
3. Cocoa pink disease	5	20	58.8	5	18	52.9	5	16	47.1	8
	4	5	14.7	4	5	14.7	4	4	11.8	
	3	0	0.0	3	1	2.9	3	1	2.9	
	2	0	0.0	2	0	0.0	2	0	0.0	
4. Yellow kava leaves	5	13	38.2	5	13	38.2	5	19	55.9	6
	4	4	11.8	4	6	17.6	4	3	8.8	
	3	3	8.8	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
5. Poor crop growth	5	24	70.6	5	23	67.6	5	23	67.6	7
	4	2	5.9	4	2	5.9	4	1	2.9	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
6. Giant mimosa	5	28	82.4	5	28	82.4	5	28	82.4	2
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
7. Black weed	5	28	82.4	5	28	82.4	5	24	70.6	3
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
8. Kava (wild species - New Guinea)	5	9	26.5	5	9	26.5	5	9	26.5	11
	4	6	17.6	4	4	11.8	4	5	14.7	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
9. Kuava	5	6	17.6	5	7	20.6	5	6	17.6	10
	4	2	5.9	4	6	17.6	4	4	11.8	
	3	5	14.7	3	3	8.8	3	3	8.8	
	2	3	8.8	2	1	2.9	2	1	2.9	
10 Fau	5	20	58.8	5	17	50.0	5	21	61.8	6
	4	3	8.8	4	3	8.8	4	4	11.8	
	3	1	2.9	3	0	0.0	3	0	0.0	
	2	2	5.9	2	2	5.9	2	0	0.0	
11. Rhinoceros beetle	5	25	73.5	5	26	76.5	5	26	76.5	4
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
12. Fruit piercing moth	5	24	70.6	5	26	76.5	5	26	76.5	5
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
	1	0	0.0	1	0	0.0	1	0	0.0	

Letui/Sasina

Number of participants: 19 (all women and members of a women's committee).

Table 3: Major problems in agriculture faced by farmers

PROBLEM	IMPORTANCE			EFFECT			SEVERITY			DECISION
	Ranking	Farmers	%	Ranking	Farmers	%	Ranking	Farmers	%	
1. Poor soil fertility	5	10	52.6	5	3	15.8	5	5	26.3	5
	4	0	0.0	4	6	31.6	4	5	26.3	
	3	2	10.5	3	3	15.8	3	5	26.3	
	2	0	0.0	2	1	5.3	2	1	5.3	
2. Crop pests and diseases	5	9	47.4	5	8	42.1	5	11	57.9	6
	4	1	5.3	4	0	0.0	4	1	5.3	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	1	5.3	
3. Insufficient knowledge	1	1	5.3	1	2	10.5	1	1	5.3	4
	5	4	21.1	5	9	47.4	5	11	57.9	
	3	1	5.3	3	0	0.0	3	1	5.3	
	2	0	0.0	2	0	0.0	2	0	0.0	
4. Lack of markets	1	0	0.0	1	1	5.3	1	2	10.5	2
	5	16	84.2	5	13	68.4	5	16	84.2	
	4	0	0.0		0	0.0	4	0	0.0	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
5. Lack of appropriate tools for crop production	1	0	0.0	1	0	0.0	1	0	0.0	1
	5	16	84.2	5	16	84.2	5	16	84.2	
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
6. Lack of ornamentals planting materials	1	0	0.0	1	0	0.0	1	0	0.0	3
	5	16	84.2	5	10	52.6	5	10	52.6	
	4	0	0.0	4	3	15.8	4	2	10.5	
	3	0	0.0	3	2	10.5	3	0	0.0	
	2	0	0.0	2	1	5.3	2	1	5.3	
	1	0	0.0	1	0	0.0	1	0	0.0	

Table 4: Major pests and diseases faced by farmers

PROBLEM	IMPORTANCE			EFFECT			SEVERITY			DECISION
	Ranking	Farmers	%	Ranking	Farmers	%	Ranking	Farmers	%	
1. Taro leaf blight	5	16	84.2	5	12	63.2	5	16	84.2	3
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
2. Yellowing of taro leaves	1	0	0.0	1	0	0.0	1	0	0.0	6
	5	10	52.6	5	6	31.6	5	7	36.8	
	4	3	15.8	4	4	21.1	4	6	31.6	
	3	0	0.0	3	2	10.5	3	3	15.8	
	2	0	0.0	2	0	0.0	2	0	0.0	
3. Banana black leaf streak	1	0	0.0	1	0	0.0	1	0	0.0	5
	5	8	42.1	5	7	36.8	5	7	36.8	
	4	5	26.3	4	4	21.1	4	6	31.6	
	3	1	5.3	3	3	15.8	3	3	15.8	
	2	0	0.0	2	0	0.0	2	0	0.0	
4. Fruit piercing moth	1	0	0.0	1	0	0.0	1	0	0.0	1
	5	16	84.2	5	16	84.2	5	16	84.2	
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
5. Armyworm of cabbage	1	0	0.0	1	0	0.0	1	0	0.0	2
	5	16	84.2	5	15	78.9	5	14	73.7	
	4	0	0.0	4	1	5.3	4	2	10.5	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
6. Slugs and snails	1	0	0.0	1	0	0.0	1	0	0.0	1
	5	12	63.2	5	6	31.6	5	9	47.4	
	4	1	5.3	4	3	15.8	4	0	0.0	
	3	0	0.0	3	3	15.8	3	0	0.0	
	2	0	0.0	2	0	0.0	2	1	5.3	
7. Rhinoceros beetle	1	0	0.0	1	3	15.8	1	5	26.3	4
	5	11	57.9	5	11	57.9	5	16	84.2	
	4	2	10.5	4	3	15.8	4	0	0.0	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
	1	0	0.0	1	0	0.0	1	0	0.0	

Malae Faga

Number of participants: 15.

Table 5: Major problems in agriculture faced by farmers

PROBLEM	IMPORTANCE			EFFECT			SEVERITY			DECISION
	Ranking	Farmers	%	Ranking	Farmers	%	Ranking	Farmers	%	
1. Obtaining Gramoxone permits	5	5	33.3	5	8	53.3	5	6	40.0	5
	4	1	6.7	4	2	13.3	4	1	6.7	
	3	1	6.7	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	1	6.7	
2. Rodent damage	1	0	0.0	1	0	0.0	1	1	6.7	4
	5	4	26.7	5	7	46.7	5	2	13.3	
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	3	20.0	3	0	0.0	3	4	26.7	
	2	2	13.3	2	2	13.3	2	4	26.7	
3. Pests and diseases	1	0	0.0	1	0	0.0	1	0	0.0	3
	5	9	60.0	5	6	40.0	5	7	46.7	
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	1	6.7	3	3	20.0	3	2	13.3	
	2	0	0.0	2	0	0.0	2	0	0.0	
4. High cost of inputs	1	0	0.0	1	0	0.0	1	0	0.0	1
	5	10	66.7	5	10	66.7	5	7	46.7	
	4	0	0.0	4	0	0.0	4	2	13.3	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
5. Weeds	1	0	0.0	1	0	0.0	1	0	0.0	2
	5	7	46.7	5	8	53.3	5	8	53.3	
	4	0	0.0	4	0	0.0	4	2	13.3	
	3	2	13.3	3	1	6.7	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
	1	0	0.0	1	1	6.7	1	0	0.0	

Table 6: Major pests and diseases faced by farmers

PROBLEM	IMPORTANCE			EFFECT			SEVERITY			DECISION
	Ranking	Farmers	%	Ranking	Farmers	%	Ranking	Farmers	%	
1. Corm rot and redness of petiole of taro	5	9	60.0	5	7	46.7	5	9	60.0	2
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	0	0.0	3	1	6.7	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
2. Taro armyworm	1	0	0.0	1	0	0.0	1	0	0.0	3
	5	5	33.3	5	5	33.3	5	5	33.3	
	4	2	13.3	4	0	0.0	4	4	26.7	
	3	3	20.0	3	3	20.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
3. White fungus	1	0	0.0	1	0	0.0	1	0	0.0	4
	5	3	20.0	5	4	26.7	5	2	13.3	
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	2	13.3	3	0	0.0	3	0	0.0	
	2	0	0.0	2	1	6.7	2	0	0.0	
4. Gaogao	1	4	26.7	1	4	26.7	1	6	40.0	1
	5	9	60.0	5	9	60.0	5	5	33.3	
	4	0	0.0	4	0	0.0	4	4	26.7	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
5. Rodents	1	0	0.0	1	0	0.0	1	0	0.0	4
	5	2	13.3	5	1	6.7	5	0	0.0	
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	5	33.3	3	7	46.7	3	0	0.0	
	2	2	13.3	2	1	6.7	2	3	20.0	
	1	0	0.0	1	0	0.0	1	6	40.0	

Fagasa

Number of participants: 35.

Table 7: Major problems in agriculture faced by farmers

PROBLEM	IMPORTANCE			EFFECT			SEVERITY			DECISION
	Ranking	Farmers	%	Ranking	Farmers	%	Ranking	Farmers	%	
1. Pests and diseases	5	9	25.7	5	10	28.6	5	10	28.6	3
	4	1	2.9	4	0	0.0	4	0	0.0	
	3	1	2.9	3	1	2.9	3	2	5.7	
	2	0	0.0	2	0	0.0	2	1	2.9	
2. Mimosa pudica (giant mimosa)	1	0	0.0	1	0	0.0	1	0	0.0	5
	5	4	11.4	5	0	0.0	5	1	2.9	
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	7	20.0	3	3	8.6	3	4	11.4	
	2	2	5.7	2	7	20.0	2	2	5.7	
3. Expensive agricultural tools and equipment	1	0	0.0	1	5	14.3	1	5	14.3	2
	5	9	25.7	5	11	31.4	5	8	22.9	
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	2	5.7	3	1	2.9	3	1	2.9	
	2	1	2.9	2	1	2.9	2	2	5.7	
4. Lack of knowledge of how to start a plantation	1	0	0.0	1	0	0.0	1	1	2.9	1
	5	18	51.4	5	10	28.6	5	16	45.7	
	4	0	0.0	4	3	8.6	4	0	0.0	
	3	0	0.0	3	0	0.0	3	0	0.0	
	2	0	0.0	2	0	0.0	2	0	0.0	
5. Insufficient planting materials	1	0	0.0	1	0	0.0	1	0	0.0	4
	5	10	28.6	5	2	5.7	5	5	14.3	
	4	1	2.9	4	7	20.0	4	1	2.9	
	3	4	11.4	3	2	5.7	3	1	2.9	
	2	1	2.9	2	2	5.7	2	2	5.7	
	1	0	0.0	1	0	0.0	1	0	0.0	

Table 8: Major pests and diseases faced by farmers

PROBLEM	IMPORTANCE			EFFECT			SEVERITY			DECISION
	Ranking	Farmers	%	Ranking	Farmers	%	Ranking	Farmers	%	
1. Taro leaf blight	5	12	34.3	5	15	42.9	5	20	57.1	2
	4	2	5.7	4	1	2.9	4	0	0.0	
	3	2	5.7	3	1	2.9	3	0	0.0	
	2	0	0.0	2	1	2.9	2	0	0.0	
2. Banana leaf streak	1	0	0.0	1	0	0.0	1	0	0.0	1
	5	14	40.0	5	20	57.1	5	20	57.1	
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	1	2.9	3	0	0.0	3	0	0.0	
3. Discoloration of giant taro (taamu) corm flesh	2	1	2.9	2	0	0.0	2	0	0.0	4
	1	0	0.0	1	0	0.0	1	0	0.0	
	5	7	20.0	5	6	17.1	5	7	20.0	
	4	6	17.1	4	2	5.7	4	2	5.7	
4. White fungus in tomato	3	0	0.0	3	4	11.4	3	0	0.0	5
	2	0	0.0	2	0	0.0	2	2	5.7	
	1	2	5.7	1	2	5.7	1	3	8.6	
	5	3	8.6	5	4	11.4	5	7	20.0	
5. Banana bunchy top	4	0	0.0	4	0	0.0	4	1	2.9	3
	3	3	8.6	3	4	11.4	3	1	2.9	
	2	5	14.3	2	3	8.6	2	1	2.9	
	1	0	0.0	1	1	2.9	1	4	11.4	
	5	9	25.7	5	11	31.4	5	12	34.3	
	4	0	0.0	4	0	0.0	4	0	0.0	
	3	1	2.9	3	1	2.9	3	1	2.9	
	2	2	5.7	2	1	2.9	2	0	0.0	
	1	1	2.9	1	1	2.9	1	1	2.9	

ANNEX 3

QUESTIONNAIRE FOR COLLECTING DATA

1. Brief personal profile

- 1.1 Village : _____
- 1.2 Name of interviewee: _____
- 1.3 Gender: Male / Female
- 1.4 Age: _____
- 1.5 Level of education: Primary _____
Secondary _____
Tertiary _____
Other (specify) _____

2. Area currently operated on

2.1 How much land do you work?

Type	Acres/fractions of acres
2.1.1 Customary land	_____
2.1.2 Leased customary land	_____
2.1.3 Leased government land	_____
2.1.4 Owned freehold land	_____
2.1.5 Leased freehold hand	_____
2.1.6 Other	_____

3. Agricultural activities

3.1 What are the main crops grown?

Acreage

- Taro _____
- Taro palagi _____
- Banana _____
- Taamu _____
- Yam _____
- Cassava _____
- Breadfruit _____
- Coconut _____
- Cocoa _____
- Other (specify) _____

3.2 What are the main vegetables grown?

Acreage

- Cabbage _____
- Tomato _____
- Cucumber _____
- Other (specify) _____

3.3 What are the main fruits grown? Acreage

Orange _____

Other (specify) _____

3.4 What are the main purposes of agricultural activities?

Mainly for home consumption _____

Mainly for sale _____

Partly for home consumption and partly for sale _____

Other (specify) _____

4. Other sources of food and income for the household

4.1 Does the household own any livestock? (Encircle 1 for "Yes", otherwise encircle 2 and go to Question 4.2)

1 Yes 2 No (Go to Question 4.2)

4.1.1 Kind of livestock and poultry	Kept	Consumed	Sold
Cows and heifers	_____	_____	_____
Bulls and steers (2 years and more)	_____	_____	_____
All other cattle	_____	_____	_____
Pigs	_____	_____	_____
Chickens	_____	_____	_____
Other (specify)	_____	_____	_____
	_____	_____	_____

4.2 Does any member of the household go fishing? (Encircle 1 for "Yes", otherwise encircle 2 and go to Question 4.4)

1 Yes 2 No (Go to Question 4.4)

4.2.1 Type of fishing	Consumed	Sold
Offshore (tuna/pelagic)	_____	_____
Reef fish	_____	_____
Seafood	_____	_____

4.3 Did the household plant any forest trees (specify names)?

4.3.1 What is the purpose of planting forest trees (specify)?

5. Constraints to agricultural production

5.1 What are the main constraints to increasing agricultural production (specify)?

5.2 Which of these (from Question 5.1 above) do you consider should be handled by the Ministry of Agriculture's extension service?

6. Marketing of agricultural production

6.1 Do you sell any of your agricultural produce? (Encircle 1 for "Yes", otherwise encircle 2 and go to Question 7)

1 Yes 2 (Go to question 7)

Where do you sell your produce?

Fugalei market _____
 Salelologa market _____
 Stall in front of house _____
 Farmgate (on the farm) _____
 Town vendor _____
 Village vendor _____

6.2 What are the main marketing possibilities for crops/commodities that would simulate improvements to agricultural production?

7. Extension services

7.1 What is the main source of technological and extension advice in this household?

Agricultural extension services (EO)	_____
Research stations (e.g. Nu'u, etc.)	_____
Agricultural academic institutes (e.g. USP)	_____
Private sector	_____
Non-governmental organizations	_____
Other (specify)	_____

7.2 What are the agricultural extension approaches and methodologies for delivering technical advice to farmers (*men, women and young farmers*) (explain)?

7.2.1 What extension advice do you obtain from the sources listed in Question 7.1 (explain)?

7.2.2 Has the advice given met your farming needs (explain)?

8. What is your assessment of the extension advice and training that is currently being provided? Please explain the advice and training being implemented.

9. What are the major problems you are facing regarding your farming activities?

10. What do you consider as the main training needs that would help you to improve your production?

11. Other comments
