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FARMERS' KNOWLEDGE AND ATTITUDES TOWARDS PESTICIDE USE AND OLIVE PEST MANAGEMENT PRACTICES IN VLORA, ALBANIA: A BASELINE SURVEY

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Farmers' Knowledge and Attitudes Towards Pesticide Use and Olive Pest Management Practices in Vlora, Albania: A Baseline Survey

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Abstract

The IPM CRSP/Albania Project is an integral part of the Global IPM CRSP Project financed by USAID. The IPM CRSP began working in Albania in 1998. The first activity of the IPM CRSP/Albania Project, the participatory appraisal (PA) of olive growers' situation in the southern part of Albania, was implemented in July-August 1998. The baseline survey was conducted to complement and verify the results of the PA with a larger sample of farms and more quantitative methods. The main purpose of the survey is to identify the farmers' stock of knowledge and farmer perceptions regarding olive pests, natural enemies, pest management practices, and pesticide use.

This report presents the results of an interview survey of 200 olive growers in five villages in Vlora district, Albania, conducted in January 1999. The information and results obtained through this survey are presented and discussed in several sections including the profile of the study area, the methodology used, the socio-demographic profile of olive growers interviewed, farmers' knowledge of olive pests and their natural enemies, pest problems and management practices, institutional constraints, and gender roles in pest management decision making.

The results of this survey: (i) provide an understanding of the group of socioeconomic factors that influence pest perceptions, pest management practices and potential constraints to IPM adoption, (ii) serve as a basis for quantitative comparison of pest management practices between olive growers over time and the retrospective assessment of project net benefits, and (iii) help design and prioritize the research, extension, and training efforts. Men's and women's roles in pest management decision making were discussed and the respective knowledge gaps regarding olive pest management practices were identified.

The top two constraints to IPM adoption identified in the survey were farmer's inadequate knowledge and information related to olive pests and pest control methods and the lack of collective action on the part of farmers to control for olive pests. This study concludes that although the extension and department of agriculture specialists are highly regarded as reliable sources of information by farmers, the farmers' contact with these sources is relatively infrequent.

Based on the survey, the highest priority for IPM research is to develop a selective method for controlling olive fruit fly and olive moth that will be practical for farmers. Where black scale is a problem, it is usually where broad-spectrum sprays for other

pests have eliminated natural enemies for the black scale. In Albania, a fortuitous result of the growers' inability to spray olive trees for olive fruit fly and olive moth is that a parasite complex has become established. Consequently, while olive fruit fly and olive moth injury is currently unacceptable, black scale is maintained below the economic injury level through natural biological control.

Another priority is to develop control methods for olive diseases that (a) utilize the most up-to-date technology, and (b) can fit within Albanian orchard practices and constraints.

A complicating factor at present is a lack of differentiation in prices between olives infested with olive fruit fly, and high quality fruit. This will need to be adjusted to economically justify IPM actions by farmers.

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1. Introduction

1.1 The IPM Concept

Pesticides are an important input for increasing food production to meet a growing food demand. In the 1940s and 1950s, pesticides were thought to be the final word in pest control and their introduction contributed substantially to raising agricultural productivity in many regions of the world. Since then, pesticides have become an important component of many intensive agricultural systems. However, the benefits of pesticide use in agriculture can be offset in some cases by the social cost of pesticide pollution. Pesticide use is accompanied by several externalities that are harmful to the environment and to human health. Rachel Carson's book *Silent Spring* (Carson, 1962)[1] played a pivotal role in drawing the public attention to the harmful effects caused by pesticides to the environment, human health, and wildlife.

Many studies have shown that repeated application of pesticides selects for resistance on the part of the pest (Adams, 1990; Beaumont, 1993). This resistance leads to the increased application of pesticides and to the collapse of the agricultural systems characterized by highly resistant pests, with no natural enemies left to control them. These negative effects become of particular concern when pesticide use increases in response to pest resistance, resurgence, and secondary outbreaks. Crop losses caused by pests may be substantial and the damage to the ecosystem severe.

In most countries with intensive agricultural systems, the use of pesticides has become an area of environmental concern. In addition to the adverse effects mentioned above, there is evidence that pesticide use poses a potential danger to human health and to groundwater contamination. This situation is not a concern only for the developed nations. Although developing countries account for a relatively small portion of total pesticides used each year, they have the highest rates of pesticide poisoning of humans (Adams, 1990; Beaumont, 1993). For example, in Albania many agricultural specialists point out that health concerns have always been present, especially on the ex-state farms.

Concern for the negative effects of pesticide use has led to research and promotion of alternative pest management practices. These management practices are known as Integrated Pest Management or simply IPM. IPM is an approach to making pest management decisions with increased information and multiple tactics to manage pest populations in an economically efficient and ecologically sound manner (Norton & Mullen, 1994). "Integrated" means that a broad interdisciplinary approach is applied using scientific principles of plant protection to incorporate a variety of pest management strategies and tactics into a single system. This integration of techniques must be compatible with agricultural and marketing systems (Arneson & Losey, 1997).

[1] The title appeals to the silence that will occur when birds are killed as a result of ingesting poison remaining in the bodies of insects upon which they feed.

“Pests” include all biotic agents (insects, mites, nematodes, weeds, bacteria, fungi, viruses, parasitic seed plants, and vertebrates) that adversely affect crop production. “Management” here refers to the decision making process to control pest populations in a planned, systematic way by keeping their numbers or damage at economically acceptable levels. Tactics include chemical, biological, cultural, physical, mechanical, genetic and regulatory procedures. The goal of integrated pest management is to optimize pest control in relation to the crop production system in light of economic, social, and environmental conditions (Adams, 1990).

Since the 1960s, IPM has been the dominant paradigm in crop protection (Morse & Buhler, 1997). Initially, the ideas behind IPM came out of environmental concerns (Morse & Buhler, 1997). However, some note that recent developments related to IPM have been driven by economic factors. “The driving force behind USA research and development in IPM since the 1970s has been profit...Concerns over environmental contamination by input-oriented agriculturalists were not the major concerns by the majority of producers and those who advised them” (Barfield & Swisher, 1994). Others emphasize that the balance among social, environmental and economic considerations has been a central theme of IPM since its inception (Cuperus, Berberet, and Kenkel, 1997).

The IPM philosophy does not necessarily imply a complete abolition of pesticide use. It has been argued that well-timed applications of the appropriate doses of carefully selected pesticides can be safe and effective for the control of certain pests (Arneson & Losey, 1997). Therefore, pesticides remain an important component of IPM strategies.

1.2 The IPM CRSP/Albania Project

The IPM CRSP/Albania project is an integral part of the Global IPM CRSP Project. The IPM CRSP is composed of a consortium of U.S., host country, and international research institutions with the Management Entity (ME) based at the Office of International Research and Development (OIRD) at Virginia Tech. The latter is charged with managing IPM CRSP and a USAID Project Manager monitors its progress. The IPM CRSP/Albania is financed by the USAID Mission in Tirana with a grant for a three-year period. The major Albanian institutions involved are the Plant Protection Research Institute (PPRI) in Durres, the Fruit Tree Research Institute (FTRI) in Vlore, and the Agricultural University of Tirana (AUT).

The goals of this cooperative work are to develop improved olive IPM technologies and institutional changes in Albania that will: (i) reduce crop losses, (ii) increase farmer income, (iii) minimize pesticide use by encouraging only appropriate and prudent use according to IPM principles, (iv) minimize pesticide residues, (v) improve IPM research and education program capabilities, (vi) improve ability to monitor pests, and (vii) increase the involvement of women in IPM decision making and program design.

The efforts to initiate this project started in 1996. In September 1996 and February 1998, two teams of IPM CRSP scientists went to Albania for data-gathering missions to prepare the project proposal in close collaboration with the above mentioned Albanian institutions and the USAID Office in Tirana. During the stakeholders’ meeting in

February 1998, olive was chosen as a priority crop for the IPM CRSP project. The USAID/Albania Mission approved funds for the project in May 1998.

In July-August 1998, the first activity of the IPM CRSP/Albania Project was undertaken. A Participatory Appraisal (PA) of olive growers' pest control practices was implemented in the southern part of Albania (Vlore-Fier-Berat). Specialists from the three Albanian institutions (FTRI, PPRI, AUT) as well as from American universities (Virginia Tech, Pennsylvania State University, University of California Davis, and University of California Riverside) participated in this PA activity. During this activity, the research group conducted relatively structured but in-depth interviews with olive growers. Based on the results from the PA, research, training and information exchange activities relevant to IPM were prioritized and a work plan was derived. A baseline survey was then conducted to verify the results of the PA with a larger sample of farms and more quantitative methods.

1.3 Why a Baseline Survey?

What is a baseline survey? The baseline survey provides data on the existing situation in the absence of a contemplated intervention. The net benefits of a intervention are often measured as a difference between situations with the intervention and without the intervention, and assumptions and estimates underlying the baseline can be as influential as the intervention itself in determining net benefits (Alston et al., 1995).

This survey is an integrated activity that describes the socioeconomic context of pest management in olive production in Albania. It provides background and context for the experimental studies to be carried out by IPM CRSP/Albania. The main purpose of the Baseline Survey is to identify the farmers' stock of knowledge and farmer perceptions regarding olive pests, natural enemies, and pest management practices, as well as to specify knowledge gaps with respect to olive pest control. Baseline data are required to understand the socioeconomic factors that influence pest perceptions, pest management practices and potential constraints to IPM adoption. The results of this survey will allow quantitative comparison of pest management practices between olive growers over time and the retrospective assessment of net project benefits. They make the comparison of pesticide use and risks possible along the IPM continuum - from pesticide dependent practices to IPM based practices - as a critical step in documenting food safety, economic, environmental, and human health benefits of IPM adoption. The survey also highlights those pests for which currently available management tools are pesticide dependent. This information is valuable in prioritizing the field research. Baseline data will be used to compare practices at different sites, which can be useful for planning and targeting of research, extension, and training efforts.

The overall objective of this study is to identify farmers' knowledge and attitudes about pesticide use and pest management practices in olives in Vlora district of Albania. The specific objectives are to:

1. conduct a farm baseline survey among a sample of farmers in a representative set of villages in Vlora district, Albania;
2. collect data to support statistical analysis of pest perceptions, pest management practices and related socioeconomic factors; and
3. provide baseline data to assess project impacts.

The main hypothesis underlying this study is that, in many cases, farmers exhibit a heterogeneous set of pest perceptions and pest management practices.

The survey was implemented by a team of Albanian researchers from Agricultural University of Tirana (AUT), Plant Protection Research Institute (PPRI) in Durres, and Fruit Tree Research Institute (FTRI) in Vlore in close collaboration with Dr. Charles Pitts (IPM CRSP/Albania Site Chair, Penn. State), Dr. Greg Luther (Assistant Program Director, IPM CRSP, Virginia Tech), Dr. George Norton, Dr. Daniel Taylor and Lefter Daku (Department of Agric. & Applied Economics, Virginia Tech). Lefter Daku (Virginia Tech) and Josef Tedeskini (PPRI) coordinated the fieldwork. The list of the IPM CRSP/Albania Baseline Survey Team Members appears in Appendix 1.

This report summarizes the Baseline Survey results. First, it provides a brief profile of the study area, Vlora district, and describes the methods used for conducting the survey. Next, it discusses the survey results, including a gender-differentiated analysis. Finally, it highlights main recommendations and action points that need to be addressed in the future.

2. Country Background

2.1 Position and Resources

Albania is located between 40⁰ and 43⁰ north within the western part of the Balkan Peninsula. The Adriatic and Ionian Seas border it to the west, Greece to the south, Macedonia to the east, and Former Yugoslavia to the north (Figure 1). The smallest of the Eastern European countries, Albania has an area of 28,748 square kilometres. The population is about 3.4 million people.

Figure 1. Map of Albania

Albania is well endowed with natural resources, including chromium, copper, iron, nickel, and petroleum. The agricultural sector is relatively large compared to other European countries. It accounts for 55% of the country's GDP. Albania remains predominantly rural with about 60 per cent of the population living in rural areas. The country is predominantly hilly or mountainous, with the exception of the fertile western plains beside the Adriatic Sea. Only about 32 percent of its total land surface is arable. About 48.5% of total agricultural land is forested, another 19% is counted as pasture

land, leaving 704,000 ha of arable land for crops and orchards (World Bank/EC, 1992). It is clear that there has been a significant increase in the total amount of agricultural land due to major land reclamation and improvement programmes undertaken during the period 1946-1990.

Under the communist regime (1945-1990) the agricultural sector underwent radical transformation and adjustments. The first Land Reform took place in 1946. The reform led to expropriation without compensation of all agricultural land, animals and buildings, which mostly belonged to big landowners. The process of transforming agriculture into the co-operative system followed immediately. It was concentrated in the lowlands first and later extended to the hilly and mountainous regions. The setting up of agricultural co-operatives was compulsory. Gradually, the Albanian peasants were denied individual access to land. This policy was culminated with the total abolition of any small family plots.

During the last four decades and especially after 1970, agriculture has been considered as the base industry of the economy. The agricultural sector has served the country as the main source of food for rural and urban areas, a source of export earnings, a source of labour for urban industrial growth and a source of capital for financing urban investments.

2.2 Transition to a Market Economy

By 1990 the cumulative effects of Albania's central planning system had led to an economic crisis. The most salient characteristics were a high internal deficit (16% of GDP), the collapse of export markets, a large balance of payments deficit and substantial arrears with foreign commercial banks (IMF, 1992). As a result the country was unable to offset a growing shortfall in domestic supply with imports. This economic crisis, plus growing pressure for political change, led to the first economic reforms in late 1990.

Since 1991, Albania has been making radical changes in both its political and economic systems. The country is now in the midst of transition toward developing a functioning market economy. It has already privatized agriculture, housing, small and medium industries and is working on privatizing large state enterprises. Many institutions and modes of interactions are undergoing major changes. However, the transition to a market economy has been slow and difficult. The social unrest that exploded in 1997 after the collapse of get-rich-pyramid investment schemes swamped the country's economy and seriously challenged the newly market-framed institutions. This situation has negatively affected the rate of the market reforms' implementation as well as the performance of various sectors of the Albanian economy. Since then, the country has recovered slowly due also to a lack of political stability.

2.3 Agricultural Sector Reforms

The transition from a centralized system to a market economy brought about radical changes concerning the nature of basic elements of Albanian agriculture (the production process, farmers, the farm and farm business) as well as the functioning of essential support services. The state-controlled cooperatives and state farms were broken up and new production structures composed of a great number of small-scale

farms emerged. The new entrepreneurs are operating in a highly uncertain environment and in the absence of an adequate institutional framework. The previous planning and support structures are dismantled and not yet replaced by market institutions. The present private farm units in Albanian agriculture suffer from a lack of balance between production factors available to each farm and institutional structures needed to support efficient agricultural operations. Because of the risk farmers face, the lack of well-functioning markets and the absence of efficient supporting systems, retrenchment is their dominant attitude (Daku, 1997).

The adoption of new technologies and farm practices in farming activities is of crucial importance for Albania, a country with a rapidly increasing population and severe scarcity of productive agricultural lands. Raising agricultural productivity through new technology is also essential to alleviate poverty and to assure the country's economic growth. Equally important over the long term is helping farmers adopt less intensive and more environmentally sound agricultural practices. The gradual expansion of agricultural land through land reclamation and improvement programs since 1946 has been one of the major determinants of the increase of agricultural production in Albania. As the sources for further expansion of agricultural land are exhausted, almost all increases in Albanian agricultural production will have to come from higher output per hectare. Shifting from resource-based to technology-based farming systems requires an explicit policy framework for providing new technologies and information to agricultural producers. Indeed, the institutionalization of IPM practices in Albania may contribute towards this transition to a technology-based agriculture.

3. Profile of the Study Area

The baseline data on farmers' knowledge and attitudes towards pesticide use and olive pest management practices were collected in five villages (Cerkovine, Bestrove, Kanine, Panaja, Tre Vellazen) of Vlora district, in January 1999, using a structured questionnaire. The survey was conducted in Vlora district, because this is the primary research site in Albania where IPM CRSP project activities are to be carried out, and it is in the heart of the olive growing area.

3.1 Major Olive Growing Regions

Olive is a major crop in Albania: 60% of the population grows olives, and 22 of the country's 36 districts have olive trees. National production averages 25,000 metric tons per year, but it has reached 50,000 tons. Olive oil production is 4,000 metric tons per year. During the last four decades, olive yields have fluctuated greatly, varying from 8 to 45 kg per tree. There are over 20 olive cultivars in Albania, and 3.405 million olive trees were in production in the country in 1996 (MOAF Statistical Yearbook, 1996).

Of the 45,000 ha of olive trees in Albania, 27% are not densely planted, 56% are planted intensively and 17% have wild trees. Roughly speaking, there are four main olive growing regions (AUT, 1987):

1. *Ionic region*, (along the Southern Coastline) which includes Saranda and Southern part of Vlora. It is considered the area with the highest potential for cultivating olives. It accounts for 38.4% of the country's olive production, 28.5% of total olive groves and 28.8% of total olive trees (Tables 6-11, Appendix 2).
2. *Adriatic region*, (along the Western Coastline) which includes part of Vlora starting from the Vlora Bay, Fier, Lushnje, Kavaje, Durres, Tirane, and Berat. This region is also considered as an area with good potential and favorable conditions for growing olives. It accounts for roughly half of the country's olive production, total olive groves and total olive trees.
3. *Near-Adriatic region*, which includes Tepelene, Elbasan, Kruje, Lezhe, and Shkoder. In these districts, olives are grown only in those plain and valley areas where the temperature is not very low. It accounts for 14.9% of the country's olive production, 16% of total olive groves and 20.3% of total olive trees.
4. *Interior region*, which includes Gjirokaster, Permet, Skrapar, and Gramsh. These districts have a low potential for olive production except for some areas where the microclimate allows olive cultivation. Its contribution to olive production is quite minimal.

3.2 Olive Pests in the Study Area

The main pests of olive in Albania are (i) olive fruit fly (*Bactrocera oleae*, formerly *Dacus oleae* Gumelin), in Albanian: miza e ullirit; (ii) black scale (*Saissetia oleae*

Olivier), in Albanian: breshkeza; (iii) olive psyllid (*Euphyllura olivina* Costa), in Albanian: psilla or bloza; (iv) olive moth (*Prays oleae* Bern), in Albanian: tenja; (v) leaf spot (*Cycloconium oleae* Cast), in Albanian: syri i palloit, and (vi) olive knot (*Pseudomonas syringae pv savastanoi* (E.F.Smith) Stevens), in Albanian: tuberkulozi.

Infestation by the olive fruit fly is a major cause of high acidity[2] in olives, which lowers the quality of the product. Promptness in processing after harvest is very important since the fruit continues to degrade with time. Some olive cultivars in Albania have oil content up to 30%. While the fruits are still in the trees the level is less than 1% but after harvest it can rise. There is great interest in raising oil quality. Production of oil is presently 1,000-1,200 liters per ha, but with proper crop management techniques, this level can be doubled. Before 1991 there were more oil processing factories than at present. However, a number of small factories at the village level still exist and are functioning.

Olive production in Albania uses very little pesticides, fertilizers and other inputs. Presently, the use of pesticides by olive growers is the exception rather than the rule. Only a small number of farmers in the olive growing areas are reported to have used pesticides since 1992, when they took over the state-owned olive trees (Luther et al., 1999). As a result of a lack of pest management practices, the production losses are substantial, table olives are of low quality and olive oil has high acidity.

3.3 Vlora District

Vlora district is the major olive growing region in Albania. It is located in the southern part of the country along the coastal area of the Adriatic and Ionian seas. It has an area of 1,609 square kilometres. The population is about 170,000 people, of which 53.7% live in rural areas and 46.3% live in urban areas. The main administrative center of the district is Vlora city. The district has three small towns and its rural area is divided into 23 communes and 96 villages.

Table 1. The Monthly Average Temperatures and Rainfall in Vlora, Albania, 1986.

Month	Temperature (^{0}C)	Rainfall (mm)
January	9	64.7
February	10.1	126
March	12.8	119.8
April	15.2	29.7
May	19.7	52.8
June	22.2	44.3
July	23.8	6.2
August	25.3	0.0
September	21.6	34.8
October	17.9	74.5
November	13.3	44.4
December	8.7	23.7
Annual Average	*16*	*51.74*

[2] The level of acidity determines the rating of the oil: extra virgin has less than 1% oleic acid, virgin has 1-3% oleic acid, and virgin lampante has greater than 3%.

The district is characterized by a Mediterranean climate with most of the rainfall occurring during the winter and early spring. The monthly average temperature varies from 9 ^{0}C in January to 35 ^{0}C during August. The monthly average rainfall varies from 0 mm in August to 130 mm in February-March (Table 1)[3]. It leads other districts in terms of olive production, area of olive groves and the number of olive trees. It produces 30% of the country's olives and accounts for 17% of olive groves and 16% of the total olive trees (Tables 6-11, Appendix 2).

The study area included the following villages: Bestrove, Cerkovine, Kanine, Panaja, and Tre Vellazen. The area where these villages are located has a high potential for increasing olive production in Vlora district. The importance of olive trees in these villages makes them well suited for an evaluation of farmers' knowledge and attitudes towards pesticide use in olive trees and the potential impacts of the introduction of integrated pest management practices.

Table 2. Olive Production in Vlora District (Pre-'90 period)[4]

State Farms and Cooperatives[5]	Production (metric tones)					
	1981	1982	1983	1984	1985	1986
1. NB Ullishte	795	1,566	3,041	364	977	1,300
2. NB Llakatund	88	233	348	94	172	150
3. NB Rinia	325	448	837	98	505	400
4. KB Sherisht	145	276	989	22	146	320
5. KB Narte	531	814	1,673	132	552	940
6. KB Tre Vellazen	178	273	588	50	122	150
7. Subtotal (1+ 6)	2,062	3,610	7,476	760	2,474	3,260
8. % Over District's Total	31.7	67	47.7	63.3	30.2	62.5
9. Other Economies	4,439	1,782	8,188	441	5,716	1,953
10. Vlora District	6,501	5,392	15,664	1,201	8,190	5,213

During the communist regime farmers in those villages were members of socialist cooperatives and state farms. The olive groves in the study area were formerly a part of the state farms: "NB Ullishte" and "NB Rinia" located in the surrounding areas of Vlora city and of cooperatives Sherisht, Narte and Tre Vellazen. Looking at the trends of olive production in the pre-'90 period, the study area has accounted for as much as 67% of the district's olive production (in 1982- see Table 2). Also, in most of the former socialist economies of the study area, olive yields were well above the district's average olive yields (Table 3).

[3] Data presented in tables 1-5 were provided by the FTRI specialist, Dhimiter Panajoti.
[4] We refer to the pre-90 period due to the lack of village and commune-level statistics for the period 1991-1998.
[5] NB stands for Ndermarrje Bujqesore (ex-State Farms)
KB stand for Kooperative Bujqesore (ex-Agricultural Cooperatives)
Ex-KB Narte included villages of Narte, Panaja, Oshtime, and Kerkove.
Ex-KB Tre Vellazen included villages of Cerkovine, Skrofotine, and Tre Vellazen.
Ex-KB Sherisht included villages of Sherisht and Kanine.

The total area available for cropping in the district is 39,400 ha. As Table 4 shows, in 1987, the study area accounted for 34% of the total arable land, nearly 60% of the district's olive groves and 56.4% of the district's number of olive trees.

Table 3. Olive Yields in Vlora District (Pre-'90 period)

State Farms and Cooperatives	Yield (kg/tree) 1981	1982	1983	1984	1985	1986
NB Ullishte	8.3	14.2	27.4	3	8	10.6
NB Llakatund	6.1	15	20.9	5.6	7.1	6.2
NB Rinia	20.1	23.6	44.1	4.5	17.1	13.5
KB Sherisht	5	8.9	30	0.6	4.1	9.1
KB Narte	14.1	20.8	26.8	2.9	12.3	20.9
KB Tre Vellazen	9.3	13.6	28	2.1	5.1	6.2
Vlora District	15.7	12.1	33.4	2.4	15.6	7.8

The farming systems in the study area are similar to other regions in the southern part of Albania. The most important crops are wheat, maize, vegetables, white beans, alfalfa and other forage crops. The most important fruit trees/vines planted are olives, citrus and grapes. Livestock consists of cattle, sheep, goats, chickens, horses, mules, and donkeys. Almost all households in the study area own one to two milking cows, mostly for home consumption. The surplus milk is sold to the local market, mainly in Vlora city. The majority of families have a vegetable garden with an area that varies between 0.01 and 0.2 ha. They grow tomatoes, peppers, onions, garlic, cabbages, cucumbers, eggplants, and beans mainly to meet the year around family needs.

Table 4. Land Resources and Olive Trees in Vlora District, 1987

State Farms and Cooperatives	Arable Land (ha)	Olive Groves (ha)	Number of Olive Trees
1. NB Ullishte	2,874	1,613	168,000
2. NB Llakatund	2,983	674	71,500
3. NB Rinia	1,893	443	74,000
4. KB Sherisht	1,743	581	55,000
5. KB Narte	1,838	768	60,000
6. KB Tre Vellazen	2,105	480	40,000
7. Subtotal (1+ 6)	13,436	4,559	468,500
8. % Over District's Total	34	59.2	56.4
9. Other Economies	25,964	3,141	361,500
10.Vlora District	39,400	7700	830,000

The land is usually tilled using tractors. However, in some of the villages, for example, in Kanine where the terrain is very steep and plots are small, the land is tilled manually or using animals. But even in other villages like Panaja and Cerkovine where the terrain is flatter the tractors and implements formerly used on the big state farms and cooperatives are not suitable for the small land holdings. Horses, mules and donkeys are used for transport. Few tracks and other transport means are available in the area.

4. Methods

4.1 Sampling Procedure

The baseline survey was conducted among a sample of Albanian olive growers through the following steps:

- Preparation of questionnaires;
- Training of enumerators;
- Selection of villages and sample farm households
- Pre testing of questionnaires;
- Farm household interviews;
- Data entry and error checking;
- Data tabulation, grouping, and report writing;

Farm households were selected in each village, roughly based on the village population (Table 5) and the number of olive trees each household owns following the procedures of the stratified sampling. The intention was that the sample of the households selected for interviews be representative of the whole study area.

Table 5. Population and Number of Households in the Study Area, 1997

Villages	No. of Households	Population
Bestrove	178	900
Panaja	265	1,700
Oshtime	130	750
Kerkove	120	620
Cerkovine	170	952
Tre Vellazen	350	2,100
Skrofotine	157	830
Sherishte	200	680
Kanine	400	2,340

4.2 Survey Design

The questionnaire instrument was developed based on a previous version that had been used to study the pest management practices in rice and vegetables at the Philippine IPM CRSP research site in 1995. Most of the questions from this previous version were modified to fit the specific features of the olive production system in Albania. Additional questions concerning marketing, credit, institutional, and informational constraints faced by the olive growers in the study area were added.

The questionnaire, which is included in Appendix 3, is divided into eight sections. A preliminary draft of the questionnaire was revised extensively by the study team. The questionnaire was translated into Albanian (Appendix 4) and was pre-tested on ten farmers to ensure that each question was appropriate for and understandable by

farmers. After the pre-testing, the study team discussed the questions that needed to be dropped, added, or modified in order to come up with the final version of the questionnaire. Next, the final version of the questionnaire was coded by assigning a given number to each possible response. For the open-ended questions, the possible responses were grouped into broad categories.

The first section requests background information on olive production systems. The second section asks about the pest management decision making within the household regarding the purchase of pesticides, pest control, and marketing of agricultural products.

The third section deals with factors affecting pesticide use. The farmers were asked to give information about the level of olive production, olive yields, marketable surplus olive oil, olive processing technologies, transport and processing expenditures, marketing of olive oil and the constraints they face. Questions also were included about the amount spent for purchasing pesticides, the importance of various factors affecting their choice of pesticides for different crops, borrowing and credit opportunities as well as constraints they face for getting credit.

Section four requests farmers' opinions and perceptions about the effects of pesticides on human health and the environment. Section five deals with farmers' knowledge about olive pests and their natural enemies. Farmers were asked about the olive pests they know, the nature of the damage they cause on olive trees and fruits, the natural enemies of olive pests and their respective role, and their opinion on effects of pesticides on natural enemies. Section six asks for information about the olive pest management practices including the olive pests encountered during the last season, methods for controlling those pests, use of pesticides, timing of pesticide application, the effects of pesticides on those pests, and spraying equipment. Farmers also were asked to list the reasons for not applying pesticides on olive trees.

Section seven addresses sources of information used by farmers in making decisions with respect to olive pest control. Farmers were asked to identify the most important sources of pest control advice, as well as about their participation in training courses. Questions were also included about the adequacy of information they receive, and innovative cultural, production and pest control practices that they have introduced into the olive production system. The eighth section asks about the farmer's socioeconomic characteristics including level of education, years of experience working with olives, tenure status, age, household size, membership in farm organizations, and major income sources.

4.3 Interview Procedures

Farmers' interviews were conducted from Sunday, January 24 through Sunday, January 31, 1999. The team was made up of 14 research scientists: 4 from AUT, 3 from PPRI, 6 from FTRI, and one from Virginia Tech, USA. Interviews were conducted in the following Vlora villages: Cerkovine, Bestrove, Kanine, Panaja, Tre Vellazen. A list of the study team and the farmer interview schedule appears in Appendix 1.

The survey was conducted by personal interviews with a sample of 200 farmers in 5 villages (Table 12). Out of 200 farm households, in a target group survey of 50

households both male and female household heads were interviewed to obtain gender-differentiated data and determine their respective role in pest management decision making. Overall, 250 questionnaires were completed.

Initially, the team was divided into five combined groups with specialists from each institution. The mixture of the team was changed everyday to avoid some kind of "enumerator or group biases" during the interviews.

Farmers interviewed were very cooperative throughout the interview process. The interview process coincided with the peak of olive harvest. Moreover, this year farmers had relatively high olive yields, so that they were very pleased and responsive during the interviews. These circumstances facilitated the interview. The team found it difficult to find many households in which to interview both husband and wife. From 100 such households that were planned, the team managed to interview only 50 husband/wife pairs. The main reason was that the team tried to reach farmers that were harvesting olives in their own olive groves, and in most cases both husband and wife were not present there at the same time. Therefore, to find such cases, interviewers had to visit farmers when they were at their houses, a very time-consuming process.

Completed questionnaires were reviewed by the interview team to ensure completeness and response consistency. After this review and error checking, data from completed questionnaires were entered into the computer. The frequency tables and some simple statistical computations were done using the Excel Spreadsheet Program. The descriptive statistics were generated using the statistical procedures available in the Statistical Analysis System (SAS) packages (SAS Institute, Inc., 1985).

5. Results

5.1 Socio-Demographic Profile

5.1.1 Sample Size

The survey covered 200 households (HH's) with an average size of 5.7 persons. Of the 200 farmers interviewed, 34 (17%) were from Bestrove, 45 (22.5%) from Cerkovine, 36 (18%) from Kanine, 54 (27%) from Panaja, and 31 (15.5%) from Tre Vellazen (Table 12)[6].

5.1.2 Gender and Age

Ninety-five percent of those responding to the main questionnaire were male while only 5 percent were female. This area is characterized by heavy migration of men to other countries such as Greece and Italy. The temporary migration of household males increases during the summer time. If the survey were conducted in the summer, the percentage of women respondents would have been much higher due to temporary migration of males. The village of Kanine had the highest proportion (13.8%) of female respondents. The average age of the respondents was 49 years. The age of farmers ranged from 16 to 80 years with the largest percentage (28.5%) falling between 41 to 50 years. The age distribution of respondents was similar among the villages (Table 13).

5.1.3 Education

Farmer education ranged from 0 to 16 years of schooling with an average of 9 years. Only 8 respondents had received no schooling while 8.7% had elementary education, 57.7% had middle school education, 30.4% had high school education, and 1.7% had attended college (Table 13).

5.1.4 Family Size and Labor Use

Family size of the respondents ranged from 2 to 18 members with the largest percentage (43.5%) falling between 5 and 6 members. The average family size was roughly 6 members while the median family size was 5 members. The largest average family size was found in the village of Panaja (nearly 7 members). Seventy-five percent of working family members reported working full-time or part-time on the farm, while the rest are engaged either in non-farm activities or working abroad. The respondents declared that a shortage of labor exists during the harvesting season of olives (November-January). However, those with insufficient family labor said that they do not use hired labor, but rather their relatives and neighbors help them (Table 14).

[6] The Baseline Survey Tables appear in Appendix 5.

5.1.5 Farmers' Experience with Olives

The farmers' experience working with olives ranged from less than 5 years to more than 20 years. The majority of farmers interviewed (nearly 60%) had more than 20 years of experience working with olives, while only 4.5% had less than five years of experience (Table 14). However, as it was emphasized in the profile of the study area, most of those private olive growers had been members of socialist cooperatives and state farms for a long period of time. These cooperatives lacked a continuous flow of technical information. Extension services were non-existent. Moreover, men and women working in cooperatives and state farms did not have enough incentive to master and apply innovative production techniques. Albanian peasants were denied elementary rights to act as professional farmers. Working for more than four decades in those large and very specialized production structures, they lost their professional skills. They were simply a huge labor force that lost the technical and managerial skills needed to manage a private farm. The indigenous knowledge structures about farming inherited for generations were destroyed. The master farmer was gone. In these circumstances, the new landowners respond with difficulty to the market economy. Consequently, it is doubtful whether this long experience with olives can be used as evidence of an adequate level of farmers' knowledge about the olive production systems.

5.1.6 Farm Size

The average farm size is 1.59 ha, while the median farm size is 1.23 ha (Table 15). The farm size ranged from 0.1 ha to 12.5 ha with most farmers (68%) having 1.5 ha or below. The farm size distribution differed among the villages. Farmers in Kanine and Bestrove had a smaller average farm size than those in other villages (Table 15). Panaja had the highest average farm size (1.84 ha) and the standard deviation (SD) in farm size for this village was also the largest (2.7 ha).

5.1.7 Number of Olive Trees

The average number of olive trees owned by farmers is 56 trees. Farmer ownership of olive trees ranged from 8 to 200 trees with the majority of farmers (84%) owning 90 or below (Table 16). The distribution of olive tree ownership varied greatly among villages. Bestrove had the highest average number of trees owned by a farmer (85) followed by Kanine (69). Half of farmers in Bestrove owned more than 78 olive trees. The standard deviation (SD) of the number of olive trees owned by a farmer was the largest (51.1) in Kanine. Cerkovine had the smallest average number of trees owned by a farmer (39), while Panaja and Tre Vellazen were in between with 49 and 51 trees/farmer respectively (Table 16).

5.1.8 Olive Varieties

The sixty-five percent of olive trees owned by farmers are from dual-purpose varieties that can be used both for oil and pickling and 33% are from oil varieties. Only 2.2% of olive trees owned are from table varieties (Table 16). Farmers reported several olive varieties. Among those varieties, Kalinjot was reported by 62% of farmers, followed by Pula Zeqin (27%), Frantoju (8%). The rest (2%) were wild varieties (Table 24).

5.1.9 Other Fruit Trees

In addition to olives, many farmers in the study area own citrus, grapes and other fruit trees. Almost half of farmers (47.5%) grow grapes (Table 17). Panaja had the highest proportion of farmers growing grapes (69%) while Kanine had the smallest (22%). Citrus is not so widespread in the villages sampled. Only 16% of farmers reported owning citrus. An exception was Cerkovine with 36% of farmers growing citrus and selling part of their citrus production on the market. Also, 31.5% of farmers interviewed own other kinds of fruit trees (apples, plums, peaches, pears, figs, nuts) in addition to olives, grapes or citrus (Table 17).

5.2 Yields, Prices and Income

5.2.1 Olive Yields

Farmers reported olive yields ranging from 1.2 to 100 kg/tree. The average olive yield for 1998/99 was 31.1 kg/tree and the distribution of olive yields were skewed toward the higher end. It should be noted that 1998/99 was a good production year for olive growers[7]. The average yield this year was well above the country's average achieved in the past (including pre-1990). Fifty percent of farmers obtained yields ranging from 30 to 100 kg per tree. However, the yields vary greatly among farmers interviewed with the standard deviation (SD) in yield of 18.3 kg/tree. The distribution of olive yield also varies among villages. Panaja reported the highest average yield of 35.8 kg/tree (SD:18.8), while Kanine reported the lowest average yield of 28 kg/tree. However, the latter had the widest range of olive yields with a standard deviation of 20.9 kg/tree. This wide range might be an indication that farmers interviewed in that village were somewhat reserved in reporting this information due to tax concerns. Tre Vellazen had the highest median yield, 35 kg/tree (Table 18).

5.2.2 Sales

Olive is a cash crop. As Figure 2 shows, forty-five percent of the farmers interviewed reported olives as the most important source of income while another 38.5% of respondents ranked olives as the second most important source of income (Tables 19-20). Other sources of income important to farm families were remittances from migration, non-farm income, income from crops, livestock, and other fruit trees. The ranking of olives as the major source of income differs among the villages. In Tre Vellazen, Bestrove, and Kanine, more than half of the farmers reported olives as the main source of income. In Panaja, olives were ranked the lowest, because farmers in Panaja put a higher value on grapes than on olives.

[7] Olive trees normally exhibit biennial bearing: each year of high yield is followed by a year of low yield.

Farmers reported sales of canned olives and olive oil in the market. Looking at each olive product marketed, the number of farmers selling olive oil is much higher than

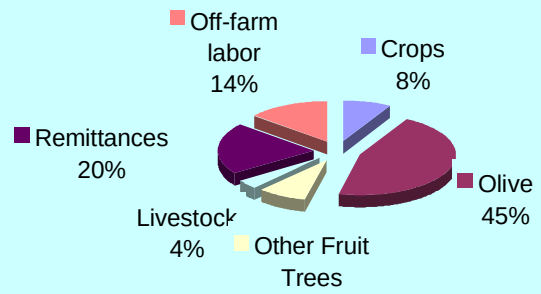

Figure 2. Farmers' Most Important Source of Income (sampled farmers). Vlora, Albania, 1999

the number of farmers selling canned olives. The majority of farmers (60%) marketed part of their olive oil production, while only 4 % of farmers sold canned olives. This is because the olive trees that are oil varieties are widespread in the study area. In the villages of Kanine and Tre Vellazen farmers reported no sale of canned olives.

Of 309.2 MT olives produced by surveyed farmers during 1998/99, 28 MT (9.1%) were used for family consumption, 280.2 MT (90.6%) were processed for oil and only 1 MT (0.3%) was sold in the market as canned olives with an average price of 178 lek/kilo[8] (Table 21).

Farmers extracted 65.3 MT of olive oil with an average oil content of 23.3%. The largest portion of the olive oil produced (38 MT or 58.3%), was sold in the market and the remainder (41.7%) was used for family consumption (Figure 3). Olive oil sold in the market received an average price of 302.5 lek per liter. During the interviews, many farmers stated that they set aside more olive oil than they needed for the annual

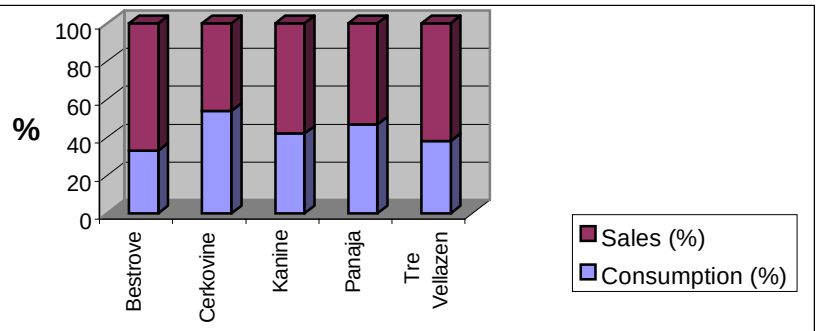

Figure 3. Sales and Consumption of Olive Oil by Sampled Farmers. Vlora, Albania, 1999.

family consumption due to periodicity of olive production. Olive trees usually produce every other year in the study area and therefore farmers try to keep additional olive oil to meet the family demand in the year olive trees do not produce. The quantity of olive

[8] Lek is Albanian currency. The exchange rate at the time the Baseline Survey was conducted (January 1999) was: 1 USD = 145 Lek

oil sold varies among the villages. Farmers in Bestrove reported the highest sale ratio of olive oil (67.5%) while farmers in Cerkovine reported the lowest sale ratio (46.2%).

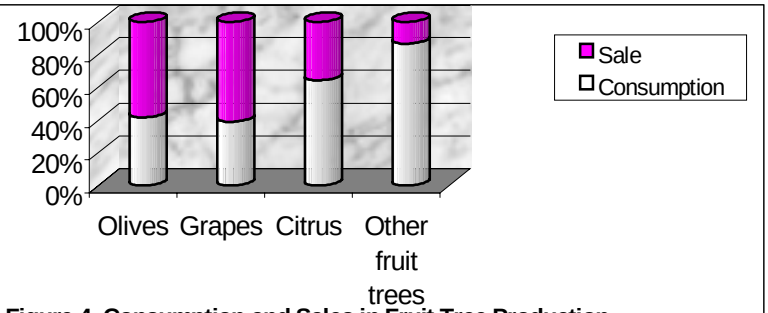

Figure 4. Consumption and Sales in Fruit Tree Production (sampled farmers). Vlora, Albania, 1999.

Farmers also are engaged in selling part of the production from other fruit trees. However, with exception of grapes, the marketable surplus from other fruit crops is relatively small compared to that of olives. Relatively speaking, the marketable surplus of grapes and olives is similar (Figure 4). In absolute terms, the quantity sold and income received from the olive sales accounts for a larger share in the total farmers' income than those from grapes.

5.2.3 Income

The farmer income from canned olive sales in 1998 ranged from 2,000 to 140,000 lek/farmer with the majority of farmers (55.5%) receiving between 10,000 and 80,000 lek/ha. The average reported income from canned olive sales was 60,222 lek per farmer (Table 22). However, it should be emphasized that the income from canned olives does not account for a substantial share of the total farmer income from olives because only a small number of farmers reported sales of this commodity[9]. Instead, it is the income from olive oil sales that constitutes the major share of income from olives. The farmer income from olive oil sales for the production year 1998/99 ranged from 6,000 to 540,000 lek, with half of the farmers receiving between 72,500 and 540,000 lek (Table 23). The average reported income from olive oil sales for the same season was 98,815 lek/farmer. The distribution of olive oil income varies greatly among farmers with a SD of 84,909 lek/farmer. The distribution of olive oil income differed also among villages. Bestrove had the highest level of average income at 140,978 lek/farmer, while Cerkovine had the lowest figure (76,875 lek/ha) which is close to half of the income level for farmers in Bestrove. However, Cerkovine has the widest range of income among farmers with SD of 113,901 lek/farmer. The latter makes it doubtful whether farmers in this village reported their incomes accurately.

5.3 Agronomic Practices

Only 25% of farmers interviewed had planted olive seedlings during the last five years. Cerkovine and Tre Vellazen had the highest number of plantings among sampled villages. One explanation may be the existence of the FTRI experimental fields close to

[9] But it may be important for some, however.

these two villages. Indeed, the majority of respondents (54%) cited the Fruit Tree Research Institute in Vlora as the primary source of olive seedlings. Private growers accounted for 32% of olive seedling supply, followed by traders (8%) and their own plots (6%) (Table 24). The olive seedlings were planted in December (29%), in January (51%), and in February (20%). Given the fact that large olive tree groves lie in the study area, a higher number of new plantings could be expected. Farmers interviewed mentioned several factors that have contributed to this low number of plantings such as the lack of financial means, the lack of a structured market for seedlings, and the long time before they enter production. Even though the FTRI was cited as the primary source of olive seedlings, the FTRI does not have a specialized sector for producing seedlings to meet the farmers' demand[10]. No commercial nurseries exists at this time.

5.4 Knowledge of Pests and Their Natural Enemies

5.4.1 Commonly Known Pests

The olive pests most commonly known by farmers were olive fruit fly (*Bactrocera oleae*, formerly *Dacus oleae* Gumelin), olive psyllid (*Euphyllura olivina* Costa), black scale (*Saissetia oleae* Olivier), olive moth (*Prays oleae* Bern), leaf spot (*Cycloconium oleae* Cast), and olive knot (*Pseudomonas syringae pv savastanoi* (E.F.Smith) Stevens), (Table 25). The olive fruit fly is known by an overwhelming majority of farmers (95.5%) while leaf spot is known by only 35% of farmers. Farmers perceive the olive fruit fly as the most damaging olive pest (86%), followed by black scale and olive psyllid (30%), olive moth (23%)[11], olive knot (20.5%), and leaf spot (16.5%) (Table 26). Farmers gave diverse responses regarding the nature of damage caused by olive pests. They generally could give a description of the damages caused by pests on olives, but in some cases they failed to distinguish between certain pests. In many cases their description of pest damages did not match those of respective pests. Eighty-five percent of respondents think the olive fruit fly damages the olive fruit while 14.5% think this pest damages tree branches and leaves. The majority of farmers think black scale damages tree branches and leaves and just a few farmers think this pest also damages the fruit[12]. The same opinion was expressed about the nature of the damage caused by the olive psyllid. Half of the respondents think that olive moth damages tree branches and leaves while the other half think it damages olive fruit. The overwhelming majority of respondents thought that leaf spot and olive knot damage the tree branches and leaves (Table 27). The overwhelming majority of respondents (96.5%) answered that it is necessary to use chemicals to control the olive pests (Table 28).

5.4.2 Natural Enemies

Farmers' knowledge about the natural enemies of olive pests was very limited. Even those farmers who responded seemed a little surprised about this question because they had never thought about it. Only 27.5% of respondents were aware of the

[10] This fact does not necessarily mean that the FTRI should be a source of olive seedlings for private farmers. The commercial nurseries from the private sector are expected to be major providers of olive seedlings.
[11] This figure for olive moth may not be accurate because many farmers seem to mistake olive psyllid for olive moth.
[12] Fruit damage is not characteristic for black scale (!)

beneficial or neutral insects and animals, while the rest either were not aware or had no opinion. Farmers' awareness about the natural enemies of olive pests differs considerably among villages. More than half of farmers in Kanine are aware of these beneficial insects/animals whereas Bestrove had the smallest percentage of farmers who stated they were aware of these in their olive groves (Table 29). The natural enemies most often mentioned by farmers who knew about the beneficial insects and animals in olives were birds, spiders, sheep, and red ants[13] (Table 30). Over twenty two percent of farmers believe that the role of these natural enemies is to kill or eat pests damaging olives. Other roles of these natural enemies as perceived by farmers include spinning webs in the olive tree, feeding on the olive fruit, and grazing in olive groves. However, a quarter of farmers declared that they had no idea about the role of natural enemies (Table 31). Most farmers who know of natural enemies of olive pests don't have a clear-cut answer whether they are killed or die when sprayed with pesticides (Table 32).

5.4.3 Pesticide Effect on Yields

Farmers' opinion on the role of pesticide in increasing olive yields is equally divided between those that agree and those that have no opinion about it. Only two farmers disagree that the application of pesticides increase olive yields (Table 33). Half of those that indicated that application of pesticides increases olive yields think so because they are confident the pesticides they apply do not cause other pest problems (Table 34).[14]

5.5 Pest Problems and Management Practices

5.5.1 Pests Observed Last Season

During the 1998/99 season, olive fruit fly was observed on the olive trees by 88.5% of farmers, followed by olive psyllid, black scale, olive moth, olive knot, and leaf spot (Table 35). Olive psyllid seems to be more widespread in Kanine and Bestrove than in other villages. The overwhelming majority of farmers (79.5%) mentioned the olive fruit fly as their most problematic pest in olives followed by olive psyllid and olive moth (Table 36). The highest proportion of farmers (34%) considered the black scale as their number two-pest problem in olives followed by olive psyllid, olive moth, and olive knot (Table 37). The control measures used against the first and second most important pests were the same as those used for other pests (Table 38-40).

5.5.2 Pest Control Measures

Only 22.5 % of farmers used pesticides on olive trees (Table 40-41). However, almost half of the farmers interviewed (46%) had used pesticides on grapes (Table 17- Figure 5). Farmers tried to explain during the interviews that the rationale behind this different treatment of grapes versus olives lies in two factors. First, the production periodicity of olive trees serves as a disincentive to farmers to use chemicals in the

[13] Probably there exists a much more diverse complex of natural enemies, parasites and so forth, but they are not known by farmers.

[14] In addition to increasing yields, pesticides may improve crop quality but this issue was not addressed in the survey.

year when there is no production, while grapes give production every year. Secondly, olive trees will give some yield even without spray, whereas grapes are less likely to do so. Third, grape is of special importance for every Albanian family because the distilled alcoholic traditional drink called *Raki* is made from them. Indeed, Albanians are very fond of it.

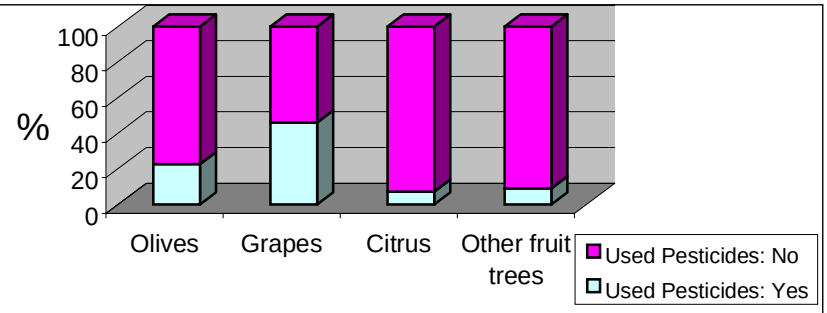

Figure 5. Pesticide Use on Olive Trees. Vlora, Albania, 1999

Other control measures used by farmers were pruning (83.5%), tilling of area under the tree (78.5%), mechanical methods, and the use of resistant varieties. It should be emphasized that the latter were not used as pest control methods per se. However, open pruning increases mortality of black scale and tilling of soil can kill pupees of olive fruit fly. Seventeen percent of farmers reported to have applied no pest control measure (Table 41).

During the participatory appraisal (PA) of the olive growers conducted in the same area in July 1998, the PA team found that only a few farmers had used pesticides to control olive pests. The increase in the number of farmers that have used pesticides on olives can partly be explained by the fact that the Department of Agriculture sprayed olive groves in some parts of the study area during the fall of 1998. However, this increase could also serve as an indication that the olive growers are going to intensify the use of pesticides to control olive pests in the years to come.

5.5.3 Timing of Application

The bulk of farmers (47%) had applied pesticides on olives during the fruiting phase (Table 42). Others had applied the treatment before and during the flowering phase (26%) and the rest before the harvesting (27%). For part of the period between bloom and harvest, olive fly is inactive because of heat and therefore no sprays are applied within that interval. The preharvest sprays are applied closer to harvest. The main target pests during these phases were olive fruit fly and olive moth (Table 43). Nevertheless, many farmers stated that the application of pesticides on olives was used as a preventive measure against all pests. There were cases when farmers had used the same pesticides for grapes and olives. Sixty-one percent of farmers claimed that their main reason for applying pesticides was to prevent pest and disease infestation (prophylactic treatment), while 39% applied pesticides to control an existing pest infestation (curative treatment) (Table 44). The majority of farmers who had applied pesticides believed that the pesticides were effective. However, 24% stated that they did not know about the efficacy of pesticides (Table 45). Half of farmers

applied the pesticides themselves. Others reported hired labor applied the pesticides and the rest reported that the Department of Agriculture (Table 46) had done the spraying of the olive groves. Farmers' chemical expenses on fruit trees including olives varied between 500 and 1500 lek per year. On average, of growers using pesticides, each farmer spent 5,459 lek for purchasing pesticides last season (Table 47).

5.5.4 Awareness of Pesticides' Harmful Effects

As shown in Figure 6, farmers revealed little awareness of the potential harmful effects of pesticides on human health and the environment. The majority of farmers either did not agree or expressed no opinion about whether pesticides can harm water quality. When asked whether the water supply in their area may have been contaminated from the use of pesticides, only a small number of respondents (6.5%) agreed. Many of them seemed surprised and did not believe pesticides are harmful to underground water. Nevertheless, some farmers (8.5%) mentioned cases when their family members had been poisoned while applying pesticides (Table 48).

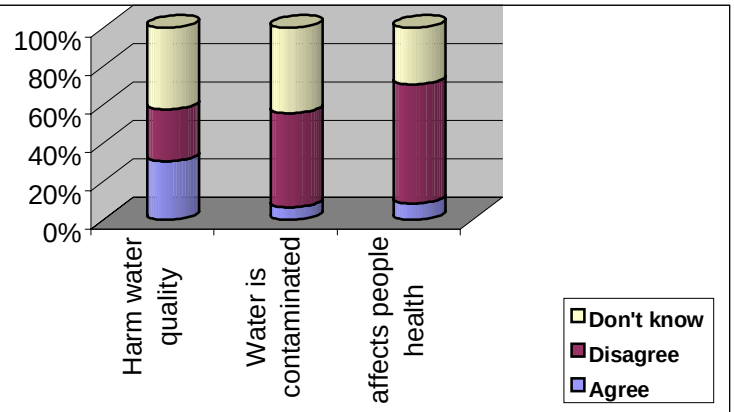

Figure 6. Farmer Perceptions of Pesticides' Effects on Human Health/Environment

Farmers interviewed gave several reasons for not using pesticides on olives (Table 49). The majority of farmers (73.5%) reported high pesticide prices as the main reason. Further they explained that they could not afford spending for chemical treatment in the year that olives give no production. Other reasons mentioned by farmers were: uncertainty about the quality of pesticides supplied by local traders (58.5%), the lack of spraying equipment (46%), other farmers' not using pesticides[15] (33.5%), the lack of knowledge on timing and right mixtures of applying pesticides (20.5%), and the limited availability of pesticides in the local markets (11.5%).

Farmers reported several factors that affect their choice of pesticides (Table 50). The overwhelming majority of respondents (83%) ranked pesticide costs and agricultural specialists' advice as the most credible factors that they take into account when

[15] The reasoning behind this factor is related to the negative spill over effects of pest infestation and reinfestation. As explained in the previous section farmers own olive trees in several plots. If one farmer sprays his own olive trees in a given plot and the farmer owning olive trees in the neighboring plot does not, the sprayed trees will be reinfested by olive pests coming from unsprayed trees. So the farmer who sprayed will waste money and will get no compensation for the harmful effects of the neighbor's action (inaction).

purchasing pesticides in the market. Forty-four percent of farmers mentioned the pesticide dealer's advice as another factor that affects their choice of pesticides in the market. However, 22.5% of farmers stated that they are suspicious about the pesticide dealer's advice when purchasing pesticides. However, in many cases, pesticide dealers seem to be the only factor affecting the farmer decisions to choose the right pesticide. Others factors considered by farmers to a lesser degree when buying pesticides were neighbors' advice and the pesticide's safety.

5.5.5 Spraying equipment

Fifty-five percent of surveyed farmers owned spraying equipment, mostly backpacks, hand sprayers, and tractor pump (Table 51-52). The distribution of sprayer ownership differed among the villages. Sprayer ownership among farmers is higher in Bestrove (73.5%) and Panaja (59.3%) than in other villages. One explanation for this difference may be the fact that grapes are very widespread in those two villages. As a result, the spraying equipment in these villages may be directly related to the chemical treatments on grapes rather than on olives. Of the 90 farmers that do not own any sprayer, 24.4% borrow from other farmers, 11.1% say the hired laborer provides the sprayer and 56% do not use a sprayer at all. Only a few farmers (2.2%) had rented sprayers. The majority of farmers (63%) who own a sprayer calibrate it before each application. Others calibrate the sprayer either when it is purchased or once a season. Some of them (8.5%) had never calibrated the sprayer (Table 53).

5.6 Institutions

5.6.1 Marketing

Fifty-eight percent of olive oil is sold in the market indicating that olive is a cash crop for most of the farmers. However, more than half of the respondents says that the prices are low and structured markets for olive products are non-existent. No link exists between wholesale and retail markets as well as between local and regional markets for olive products. Packing of canned olives and bottling of olive oil is done in a very primitive way, not according to hygienic standards. No price differentiation is applied with regard to different grades and quality of olive oil produced by farmers. The BS team noticed that while the local markets in the study area seemed overwhelmed with olive oil, in other parts of the country one could see obvious shortages for the same product. Little has been done so far to facilitate the creation of marketing channels.

The availability of market information is generally limited. Coming from a centralized economy, in which the state took responsibility for every aspect of their work, private farmers generally know very little about output markets for agricultural products. Many of them seemed to only have experience with selling products privately at the local market, but so far few institutionalized agencies have been developed. The lack of cooperative institutions has also contributed to the underdevelopment of domestic olive markets. Indeed, farmers interviewed reported no affiliation with any farmer organization (Table 54).

The overwhelming majority of farmers (99%) processed the olive for oil in factories. Only two farmers reported home processing. Eight olive processing factories were reported functioning in the villages sampled (Table 55). Panaja had the highest number of factories (3), followed by Kanine (2), and the rest had one factory for each village. The majority of farmers (57.4%) reported that the number and capacity of factories was not enough to meet farmers' increasing demand for processing olives for oil. Although these factories use modern technologies, farmers wait for many days to process their olives. The team visited two such factories in Panaja and Bestrove and noticed long lines of farmers who had been waiting for days. Many farmers stated that the low processing capacity of factories had affected the quality of oil produced. The factory shortage was more severe in Tre Vellazen, Kanine and Bestrove than in other villages. The overwhelming majority of farmers interviewed in those villages stated that many more factories are needed. The average distance from the farm to the processing factory was 3 km. The shortest distance (0.7 km) was reported in Panaja and the longest distance (7 km) was reported in Kanine. Farmers transported their olives mainly by vehicles, but in some cases used donkeys or other animals (Table 55).

The low number of processing factories and the fragmentation of olive trees each farm owns have led to an increase in olive production costs. Farmers spend on average 87 lek/kv[16] for the transport of olives from olive groves to the house and 162 lek/kv for the transport from house to the processing factory. The longer the distance, the more they have to pay for transporting olives. The cost of transporting for Panaja with three factories is half the cost of other villages such as Tre Vellazen, Kanine and Cerkovine with fewer factories. The average amount paid for olive processing was 788 lek/kv. The processing cost was almost the same in all villages sampled. Kanine is an exception. Although the average processing cost was 800 lek/kv, the standard deviation is 162 lek/kv suggesting that farmers in this village had to pay more when they could not find any factory close to their village (Table 55). Some farmers in this village stated during the interview that they had to travel as far as 15 km to process their olives for oil.

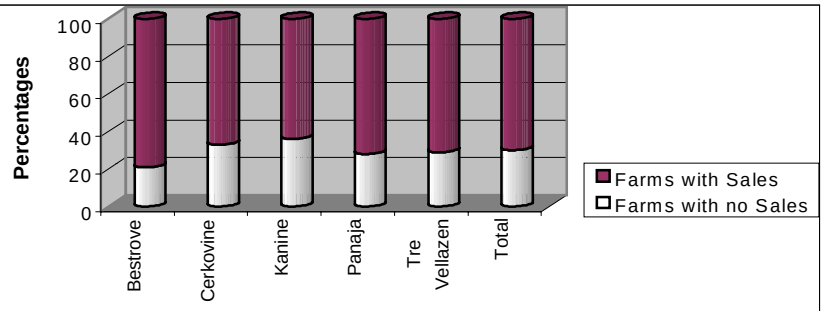

Figure 7. Percentage of Farms Selling Olive Products in the market

Farmers sold their olive products to five main sources (Table 56). Thirty-eight percent of farmers sold olive oil at the local market, 15.5% to the local traders, 14.5% at non-local markets and the rest to the olive processors and trade associations. Nearly 30% of farmers reported no sale of olive products (Figure 7).

[16] one kv equals 100 kg

Farmers were asked to list constraints and problems that they face in marketing olive products. The major marketing constraints reported by farmers were the following (Table 57): the inability of local markets to absorb the local supply of olive oil and the lack of alternative regional markets to sell olive products for higher prices (70%), the undeveloped network of local collection centers (48%), low domestic prices for olive products (42%), lack of transportation (33%), inadequate conditions and experience to do product standardization, packing and advertising (28%), high costs of transportation (27%), low level of marketing surplus of olive products that prevents farmers from establishing continuous links with markets (27%). Only 3.5 % of respondents reported no constraint related to the marketing of olive products.

5.6.2 Credit

The agricultural banking sector in Albania is in the process of being reformed and therefore not in a favorable position to meet the credit needs of farmers. It seems that lending to agriculture is entirely under government control. Presently, Albanian farmers have no access to loans at market rates.

Of the 200 farmers interviewed, only one reported to have received credit from a trader (Table 58). Only 38% of respondents consider it possible to borrow. The rest stated they have not tried to get credit because there are so many constraints and the interest rates are too high. There is a resistance among farmers to using land as collateral. However, since 1993 the collateral, specifically the land title, has become a frequent requirement for obtaining credit. Many farmers have not yet received their title, because the process of registering land property is taking place very slowly. Twenty-two percent of farmers reported that the capital of banks is very limited, so that they can not cover all the farmers' demand for credit. In addition, a quarter of respondents feel that the bank personnel are corrupt. They mentioned many cases when they were asked to pay bribes in order to obtain credit (Table 59).

Another constraint mentioned by farmers is that banks are far away from the village and moreover the bank representatives never travel to rural areas. Also, respondents said the state banks apply many bureaucratic procedures that are hard for them to understand. From discussions with farmers it appears that the present credit system is very unsatisfactory, but many of the respondents nevertheless emphasized their strong need for credit. The overwhelming majority of respondents (85.5%) reported that they would invest in expanding olive groves should they have access to credit (Table 59).

5.6.3 Land Tenure

The overwhelming majority of respondents received their land and fruit trees when agricultural cooperatives and state farms were broken up starting in 1991.

Private ownership of land is dominant, accounting for almost 100 % of total land held by these farmers. Respondents reported no other forms of land tenancy (Table 2). Not many farmers appeared to have obtained ownership titles for their land.

Small farms of 1.2-1.5 ha are prevalent in all villages sampled. These farms usually contain several parcels of land and vary from only one to between three and five

parcels. Indeed, farmers interviewed reported that the land fragmentation is a major constraint facing them. The majority of the families had their land holdings scattered in several places. The existence of just a few land transactions among farmers due to undeveloped land markets and the absence of other forms of land tenure indicate that this situation will continue unchanged for some time.

Prior to 1991, the socialist cooperatives and state farms were the sole owner of olive trees. The fruit trees were distributed and taken over by private farmers after the decollectivization campaign that started in 1991. The majority of respondents reported that olive trees had been distributed in 1991, while the rest were distributed during the period 1992-1994 (Table 60). The overwhelming majority of farmers stated that the olive tree distribution was carried out according to the law, that is, on a per capita basis. There were some cases when certain individuals took possession of the olive trees according to previous original ownership. However, respondents emphasized that the process of tree distribution was in many cases spontaneous and not well organized. This uncontrolled process of privatization brought about several problems that presently are hard to fix. One problem was the widespread damage of fruit tree plantations throughout the country. Another was that farmers received olive trees scattered in several locations (Table 60). This figure ranges from one to six places with forty-two percent of respondents having their olive trees scattered in 3-4 different locations. This is more evident in Bestrove and Panaja.

5.6.4 Information and Training

As sources of pest control advice farmers mentioned radio and TV programs, magazines and other written materials, extension and research specialists, neighbors and relatives, their own judgement and experience, pesticide dealers, and private consultants (Table 61).

The majority of farmers interviewed reported their own experience as the most credible source of pest control advice or information (Table 62). Next, the extension and Department of Agriculture specialists were rated as most important sources by 43% of respondents. However, the majority of farmers (55.5%) reported that they would ask the extension specialists first if an unknown olive pest (Table 63) seriously damaged their olive trees. Although pesticide dealers constitute one of the main sources of advice about pests and pesticides, farmers did not express much faith in their advice. Indeed, only 8% of farmers rated pesticide dealers as the most credible source of pest advice. Also, a number of farmers ranked specialists of research institutes as a credible source of pest control advice. However, they added that these researchers are very busy with experiments and they never seem to come to the field. During the discussions farmers clarified that they value their own experience because there are not other information sources available.

Farmers mentioned various reasons for the credibility of sources of pest information on olives (Table 64). Most of respondents indicated that extension specialists as the most credible source of advice because they are more knowledgeable, have more experience, have university education, and they tell what and how to do things. However, no farmer interviewed stated that extension specialists were accessible. A small number of respondents also considered research specialists as a credible source of information, but not accessible in most of the cases. Few respondents mentioned

magazines, radio, and television, neighbors, pesticide dealers and own experience as other alternative sources of information.

Farmers were asked to rank the qualities that a source of advice should have in order to be as effective as possible for them. Knowledgeability was ranked as the first quality a pest advice source should have, followed by experience, university education, practicality, and accessibility (Table 65).

Only two percent of farmers reported to have participated in a training course related to pest control in olives. However, the overwhelming majority (82.5%) said they are willing to participate in such courses in the future (Table 66).

Around sixty percent of farmers had never had any contact with agricultural extension specialists since they took over the olive trees (Table 67). Only 13% of farmers reported to have contacted a specialist who discussed non-pesticididal means of olive pest control (Table 68). Eighty-five percent of farmers report to have inadequate access to information (Table 69). On the other hand, ninety-eight percent of respondents rank the information and technical assistance as very necessary (Table 70). In the communist system, agricultural extension did not exist as a separate organization. There was no formal link between research institutions and agricultural producers. The transfer and dissemination of technology and agricultural practices were carried out directly between the research institutes and the state and cooperative farms. Such a pattern used to work reasonably well given the small number of collective farms. In the new situation, it is no longer feasible for the researchers to be involved directly in delivering new technology to private farmers.

The extension service in Albania is in the organizational structuring stage. The law on extension adopted in January 1992 establishes the extension service as an independent agency under the Ministry of agriculture that would provide technical, marketing and business advisory services. The first step was taken during 1993, through a pilot project financed by European Union, this service was developed for the six biggest districts, mostly in the plains (Shkoder, Durres, Fier, Lushnje, Korce, and Elbasan).

The period of 1994-1995 marked the second stage of organizing and structuring of the extension service. From 6 districts in the beginning it was extended to 18 districts, including 4 districts in the mountainous regions. Ten more districts were included in the extension program in 1996, while it was planned that coverage of all districts with the extension service be completed in 1997 by including the remaining nine districts[17]

Farmers interviewed seem to be very nostalgic about the past with respect to the state support for agriculture. More than 88% think that the state support for agriculture should be the same or stronger than before the 90's (Table 71).

Farmers were asked whether they had applied any innovative practices in the olive production system since they took over the olive tress from the collective farms. Nearly

[17] The social turmoil which occurred in Albania during 1997 due to the collapse of get-rich-pyramid schemes made it impossible to achieve this objective. However, great efforts are presently being made for the further development and consolidation of the extension service in Albania. For more discussions and information on these issues see Daku (1997)

40% of respondents reported to have applied some practices while the rest indicated they had introduced nothing new (Table 72). Farmers in Tre Vellazen, Kanine, and Cerkovine appear to be relatively more innovative than farmers in other villages. Nearly half of farmers in Tre Vellazen had applied light and heavy pruning and the tilling of area under the tree. Only a few farmers reported to have used pest resistant cultivars and trapping methods for pest control (Table 73).

The majority of farmers (65.3%) mentioned their own experience, neighbors, and other farmers as the major sources of advice for these innovative practices (Table 74). This fact is indicative of the poor job that is being done by extension and research institutions to provide technical assistance and information to farmers in the study area. Indeed, this is not the case in this area alone. Farmers mentioned several reasons for not applying innovative practices including lack of financial means, lack of access to credit, and inadequate access to information (Table 75). However, most of them stated that they are willing to introduce more innovative practices to the olive production system should the access to information and credit be improved. Because, they added, olives are a major source of family income and they can not afford to ignore the great income opportunity olives offer them.

6. Gender Analysis

6.1 Rationale for Gender Analysis

Throughout the world, women's participation in agricultural production is considerable. Rural women contribute to the physical work of farm production as well as supporting the livelihood of the farm household in many other ways. The role of women in the agricultural development has been underestimated for a long time. It is only recently that the role of this invisible force has been placed on the agenda of analysis and research (Ellis, 1988). During the last two decades gender studies on the role of women in development increased in number. Most of these studies seek to combine the study of gender relations with the study of rural development processes, as well as relating both of these to biophysical and technical aspects of agricultural production and the rural environment.

In developing countries, there is a growing awareness that the gender-specific implications arising from the introduction of new technologies such as IPM should be considered carefully. The knowledge, needs and perceptions of women farmers regarding these new technologies might be distinct from those of men. The rationale behind those differences is related to the gender division of labor and unequal access to land, labor, finance, education, information, and so forth.

One of the objectives of the IPM CRSP/Albania Project is to increase the involvement of women in IPM decision-making and program design. Women play a crucial role in the agricultural sector in Albania by performing a considerable part of agricultural operations. Many women are farm operators and major players in the decision-making process related to farm activities. Women working with olive trees and pest control need to be informed and consulted about IPM practices. For this purpose, out of 200 farm households sampled, in a target group of 50 households both male and female household heads were interviewed to obtain gender-differentiated data. These data will help determine men's and women's role in pest management decision making and identify the knowledge gaps, if any, with respect to olive pest management practices. This section starts with a brief discussion on the past and present position of women within Albanian society. Next, it presents the main findings arising from the survey.

6.2 The Position of Women in Albania: An Overview

Historically, family life in Albania has been regulated by the patriarchal system in which men dominated the private and public life in every aspect. Families were always headed by men. In the past, social relations were regulated by customary laws and codes. One such a code is the Kanun [Canon] of Lek Dukagjini, dating from the Middle Ages, which was particularly applied by the catholic population in Northern Albania. This canon codifies people's obligations and rights in the areas of family relations and property and formalizes practices of discrimination and inequality between men and

women. The central elements of this canon are the male centered inheritance practices and punishment of defiant female behavior by father or husband. In other parts of Albania, where the majority of the population was converted to Islam, the laws of the Ottoman Empire prevailed[18].

The first Civil Code of the Albanian State (1929) introduced significant changes regarding the status of women such as: prohibition of polygamy, equal rights for men and women with respect to divorce and so forth. After the Second World War, with the establishment of the communist regime, women and men formally became equal. Women were given the right to vote, the right to work, and the right to be paid equally for the same job. Whether women really enjoyed these rights in practice is another story. Nevertheless, gender equality improved under the communist regime. The 8-year schooling became compulsory for girls and boys, subsidized day-care centers were established and arranged marriages were discouraged. Adult literacy rates for 1989 were 92% and 90% for urban and rural areas respectively. In the beginning of the '90s, 37% of university graduates were females and they represented 50.4% of the total number of secondary education students (World Bank/EC, 1992).

During the communist regime, women were fully incorporated into the economic and social life of the country as a vital force in both rural and urban areas. Up to 1990, the employment ratio was 76.3% for females and 75% for males. Women carried out the bulk of the fieldwork on state farms and cooperatives. Many women held leading positions in the management structures in agriculture as well as in other sectors of the economy.

The fall of the communist regime and radical changes in the political and economic system in 1991 brought about considerable changes in women's position: women's participation in the labor force as well as in the political and social life decreased. The sharpest decline in women's employment was in the industrial sector in urban areas. In the rural areas, the break-up of state farms and cooperatives and the privatization process brought about the creation of several hundred thousands of very small private farms. For women in rural areas there was only a change in their employment status: they passed from collective paid work on state farms and cooperatives to self-employment on their private property (family farm). However, their workload and the isolation from social life increased.

Presently, men often migrate to other countries in search of work opportunities. It is estimated that in every three families there is a man (husband or sons) who has emigrated abroad. People's economic situation has improved remarkably due to the remittances from migration. However, the migration of men has created new social problems for women, especially for those in rural areas. Along with the childcare and housekeeping responsibilities, women have to run the farm. Accordingly, their decision-making role in farming activities has increased.

The workload of women is higher that that of men. Woman's tasks include child care, housekeeping, cooking, cow husbandry, processing of milk into yogurt, curd, butter,

[18]For more on this issue see "NGO Forum on Women -Report on the Status of Women NGOs in Albania", Beijing, China, September 1995.

and cheese; vegetable gardening, crop cultivation, olive harvesting. Men usually do ploughing of land whereas other activities such as planting, weeding, watering, and harvesting are performed by men and women together. The women's workload is higher in the spring and in autumn. With the breakup of cooperatives and state farms, women are involved more in heavy manual labor.

6.3 Survey Findings

6.3.1 Socio-Demographic Profile

The average age of the women respondents was 43 years, while that of men was 48 years. The age of women ranged from 16 to 75 years with the largest percentage (28%) falling between 41 to 50 years. The age distribution of respondents was similar among the women and men (Table 77).

The education of women ranged from 0 to 16 years of schooling with an average of 8 years. Only 3 women respondents had received no schooling while 16% had completed elementary school, 50% had middle school, 28% had high school, and none had attended college. On average men had one more year of education compared to women (Table 77).

The working experience with olives was almost the same for both women and men with an average number of years of 18 and 20 respectively. This slight difference is a good indicator of the role women played in agricultural sector during the pre-90 period as well as during the pos-90 period, after the privatization of agriculture.

Fifty-six percent of the women interviewed reported olives as the most important source of income while only 42% of men ranked olives as the major source of income (Table 78). The rankings of women and men regarding other sources of income important to farm families such as remittances, non-farm income, income from crops, livestock, and other fruit trees were slightly different.

6.3.2 Gender Roles and Decision Making

An overwhelming majority of respondents from the main sample reported males to be the sole decision-maker regarding expenditures on pesticides (78%), purchase of pesticides (90%), pest management action (84%), and marketing of agricultural products (75%), (Table 76-Figure 8). The women were reported to have a minor role as a sole-decision maker on the above issues of pest management.

Even women respondents from the sub sample in which both husband and wife were interviewed reported men to be the most important decision maker regarding decision on pest management in olives (Table 79-Figure 9). The majority of women (ranging from 76 to 84%) think that men (husband and sons) are the sole decision maker with respect to the level of pesticide expenditure, purchasing the pesticides and pest management. Unlike the men, women reported a lower profile for men as decision-makers regarding the marketing of olive products.

Only half of women respondents reported men as sole decision-maker for marketing and 46 percent of women think they are involved in marketing decisions either as joint decision-maker or as sole decision-maker. Although, as Figures 8 and 9 show, women respondents reported more cases of joint decisions than men respondents did. With the emigration of men, especially during the summer time, women have to face the everyday work to keep the family, the cattle, and to carry out agricultural operations. Under these circumstances, women are expected to play a much greater role in running the farm and making decisions while men are away.

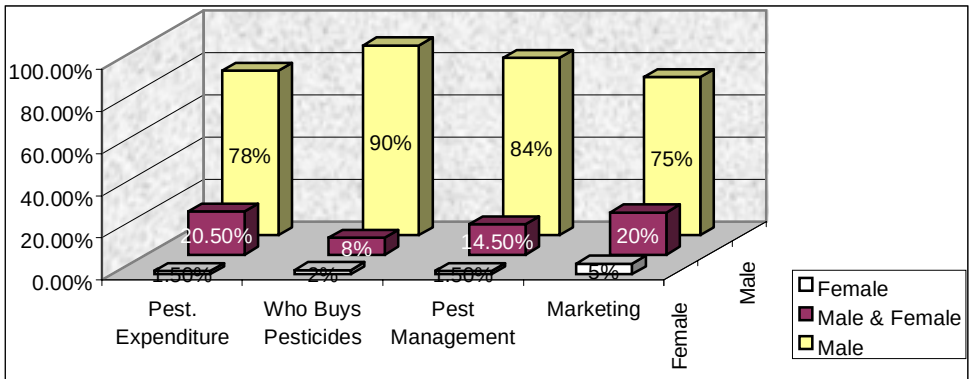

Figure 8. Household Decision Relating to Pesticide Use by Gender (Male Respondents)

Women showed the same awareness as men when asked whether the number and capacity of olive processing factories is enough to meet farmers' demand for processing olives during the harvest time. Like men, 54% of women think the number and capacity of such factories are not enough (Table 80).

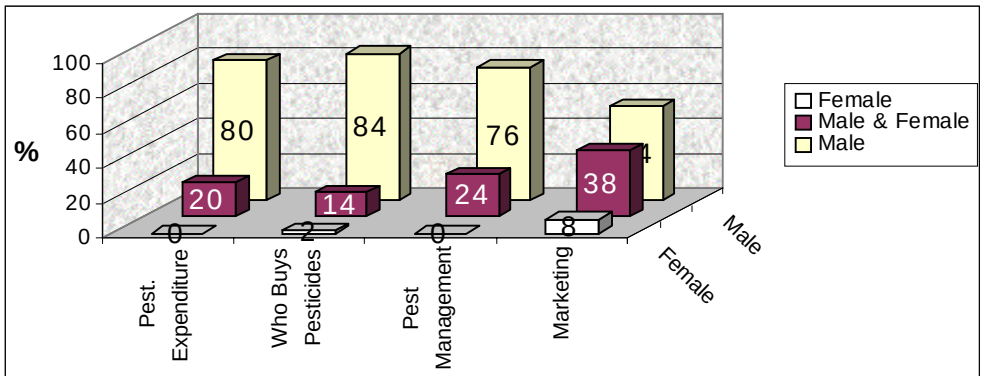

Figure 9. Household Decision Relating to Pesticide Use by Gender (Women Respondents).

Women mentioned several market outlets where they sell olive products (Table 81). Their responses do not differ from those given by their husbands. When asked to list the constraints they face for marketing products, women mentioned all constraints mentioned by men as well. However they did not appear very interested in knowing more about the olive packing, standardization and advertising for olive products. Only

7% of women mentioned the lack of knowledge about this issues as a major constraint (Table 82). On the other hand, they expressed the same opinion as their husbands that olive product prices are low and markets are far away. Old women are often observed selling seeds, vegetables and fruits in the market. Some of the respondents said that when the couple lives independently from the parents of the husband, the women have more chances to play an influential role in household decision-making.

Given the present banking system in Albania, it seems it is impossible for women to obtain credit. Only the household head, mostly a man, is named in the land property title. The title is one of the main documents required by banks as collateral to issue credit. Women listed several constraints they face for obtaining credit, although most of them stated they have not even thought of trying to get credit (Table 83). It is a man's task they stated.

6.3.4 Access to Information

Like men, women respondents mentioned extension specialists, research specialists, neighbors and other farmers, relatives, pesticide dealers and own experience as sources of pest control advice (Table 84). Half of the women ranked the extension specialists as the most credible sources of pest control advice in olives and the other half ranked their own experience as the most credible source (Table 85). However, when asked whom they would ask first about a seriously damaging pest, the majority of women (64%) chose extension specialists as the most credible source (table 86). Men respondents also ranked the extension specialists as the most credible source of pest control advice.

As emphasized in the previous section, extension service is in the development and structuring phase, being unable so far to fulfill farmers' needs for information. Only 16% of women respondents said they had contacted extension agents once or twice and the rest stated that either had never met an extension agent or could not remember doing so (Table 88-89).[19]

Presently, an extension service for rural women is functioning being supported by Land'O Lakes, Inc. (L.O.L.), a private American organization. This extension service is carrying out a dairy improvement effort with the objective of teaching women how to increase the quantity and quality of milk and milk products (Brigatti, 1995). In this program, fourteen Albanian field agents work with 5,200 rural women. They use a methodology based on the American "Tupperware method", in which a village woman agrees to host a demonstration by L.O.L. field agent in her home. She invites approximately 14 other women to attend the lesson of the field agents. Then, once a month, the key leaders of each group attend a meeting on a volunteer basis in the district center. They meet other key leaders from other villages and then they return to educate their group (Brigatti, 1995; Daku, 1997).

The BS team did not find any evidence of the L.O.L. extension service for women in the study area. Like men, all women interviewed stated that they had not attended any

[19] Presently, there exists some confusion in the country regarding the roles and functions of the Department of Agriculture and of Extension Service. Some of the respondents who reported to have had contacts with extension specialists may have had in mind the specialists of the Department of Agriculture at the district and commune level .

training course (Table 87). However, unlike men, nearly half of women showed no interest in participating in future training courses. The same attitude was expresses when women were asked how they perceive the importance of agricultural information and technical assistance. Only half of women ranked the information as very necessary, while this figure for men is 70% (Table 90). However, women revealed the same awareness as men regarding the inadequate access to information (Table 91). Similar attitudes were expressed by both women and men regarding the role of the state support for agriculture. Seventy-six percent of women and 82% of men stated that the state support for agriculture should be stronger than in the pre-'90 period[20] (Table 92).

6.3.5 Knowledge of Pests and Management Practices

The most commonly known olive pests by women farmers were olive fruit fly, olive psyllid, black scale, olive moth, leaf spot, and olive knot (Table 93). The overwhelming majority of women (94%) know olive fruit fly. However, a lower number of women than men have knowledge about other olive pests. For instance, only 36% of women know black scale as compared to 70% of male respondents[21]; only a few women have knowledge about leaf spot, olive moth and olive knot (12%, 36%, and 40% respectively - Table 93). The majority of men and women ranked olive fruit fly as the most damaging olive pest (Table 94). For women, the second most damaging pest is olive psyllid, while for men it is the black scale. Women showed less awareness than men with respect to the existence of olive beneficial insects (Table 96). Only 18% of women were aware of the beneficial olive insects. The awareness on these beneficial insects was not high for men either (26%).

Like men, all women respondents think that pesticides must be used to control olive pests and diseases (Table 95). More women (66%) than men (48%) believe that application of pesticides to olive trees leads to an increase in olive yields (Table 97). Only a slight difference was found between the opinions of men and women with respect to the effects of pesticide application on pest infestation and pest resurgence. When asked whether pesticide application can hasten pest infestation, only 28% of women and 20% of men agreed with this statement (Table 98). Women and men were asked to rank the credibility of factors affecting their choice of pesticides. As Table 99 shows, more women than men consider as a credible factors pesticide dealer advice, neighbor's advice and safety considerations. The overwhelming majority of women (80%) either disagrees or has no opinion on the question that pesticides can harm water quality. The same figures are lower for men respondents (Table100). Also fewer women than men agree to the statement that pesticides may have contaminated their farm's water supply. Equal numbers of men and women respondents (although just a few) agree to the statement that health problems of family members may be attributed to pesticide use. The majority of men and women (90%) do not believe this to be true (Table100).

Women revealed similar knowledge as men regarding the olive pests and diseases observed last season (Table101). Like men, they consider olive fruit fly as the most

[20] Pre-'90 period refers to the period during the socialist regime when respondents were members of collective farms.
[21] Refers to male respondents in sub sample.

important pest problem during the last season (Table 102). Women's rankings for the second most important pest problem differ from that of men. Women consider olive psyllid as the second most important pest problem, while men rank as such the black scale (Table 103). However, this difference might not be that important given the fact that farmers find it difficult to distinguish between black scale and olive psyllid. The majority of women indicated that the main reasons for not applying pesticides on olives are the high price of pesticides, lack of information about the quality of pesticides, and the lack of spraying equipment (Table 104). Men emphasized the same reasons as well.

7. Discussion and Conclusions

Farmers' Knowledge and Information Sources

The survey found that farmers in Albania know very little about olive pests and their natural enemies. The olive fruit fly is the most widely known pest to farmers and is considered the most damaging olive pest. Farmers tend to be less knowledgeable about olive diseases than insects. They gave diverse responses regarding the nature of damage caused by olive pests. During the interviews, many of them contradicted each other as to which pest caused what damage to the olive tree and fruit. In many cases their descriptions of pest damages did not match those of the pests. For example, many of them mistake black scale and olive moth for olive psyllid and vice versa. Farmers' knowledge about the natural enemies of olive pests and their role was more limited than their knowledge of pests. Only a small number of farmers had any knowledge about natural enemies. Even those who responded mentioned only a few of natural enemies. There probably exists a diverse complex of natural enemies, but farmers do not know it. During the interviews, faculty at Tirana Agricultural University (AUT) emphasized that the question about natural enemies is difficult even for university graduates to answer. Indeed, no significant statistical relationship was found between farmers' knowledge of natural enemies and their education level.

The knowledge base with respect to olive pest management practices is also very limited. Farmers know about fertilization, irrigation, light and heavy pruning, but not much about methods for controlling olive pests and less so or not at all about IPM practices. Supporting structures such as those in agricultural research and extension have poor links with farmers. Information on pest control methods is virtually nonexistent. Only a few farmers had participated in a training course on pest control in olives. Most of the farmers had never had any contact with extension specialists. Farmers do not have much faith in pesticide dealers' advice, explaining that the dealers do their best not to provide advice and information to them, but rather to sell the products they market (pesticides).

The main source of the information farmers presently rely on is their own experience. The IPM training courses on olive production systems may help farmers understand the olive pest and natural enemy biology, pest damage and the use of alternative control measures. Efforts should be made to strengthen the farmer-research-extension linkages by organizing farmer participatory training courses. Research scientists involved in IPM CRSP research should increase contacts with extension service specialists and work with them to insure that the olive IPM practices, developed by the IPM CRSP/Albania project, reach the farmers in the study area and beyond. Such a research-extension system has not existed in the past. The organization of field demonstrations with farmer groups coming from other regions as well may help in this direction. Also, information about IPM CRSP/Albania research activities and research results could be disseminated through developing special programs in cooperation

with the local radio and television stations in the study area and throughout the country.

Olives vs. Grapes

Olives receive very few pesticides, fertilizer, and other inputs. Only a small number of farmers use pesticides on olive trees. However, farmers do apply pesticide sprays and other inputs on grapes. Several factors may explain this different treatment of grapes versus olives. Olive trees normally exhibit biennial bearing. That is, each year of high yield is followed by a year of low yield. This biological feature of olive trees serves as a disincentive to olive growers to use chemicals especially in the year when there is no production. However, it may not be wise to question farmers' rationality regarding this point in the absence of economic data on justification of spraying in the off-year. Therefore more research is needed in this area. Unlike many other fruit trees, olives are very resistant to unfavorable agro-climatic conditions. Olives will give some yield even without spraying or any other inputs including fertilizer and irrigation, while grapes, are less likely to do so.

Olive Grove Fragmentation and Pest Management

The economic changes and structural reforms in Albanian agriculture have substantially affected pest control in olive groves. The process of fruit tree distribution following the decollectivization campaign in 1991 was in many cases spontaneous and not well organized. As a result, farmers received olive trees scattered in several locations. Having olive trees scattered in 3 to 6 plots hinders the application of agricultural practices especially those related to pest management. It also increases the cost of production by involving extra expenditure for chemical treatment, transportation, labor, and so forth.

The olive grove fragmentation and the lack of farmers' group action with respect to chemical treatment of olive trees has led to some negative spillover effects from pest infestation and reinfestation[22]. That is, if one farmer sprays his own olive trees and other farmers do not spray trees in neighboring plots, the sprayed trees will be reinfested by olive pests coming from unsprayed trees[23]. Consequently, the farmer who sprays wastes money and gets no compensation for the harmful effects caused by other farmer actions (inaction). Private decision makers have limited incentives to include such hidden costs in their pest control decision. One way to internalize such negative spillover effects may be the promotion of group action by farmers so that they can jointly spray olive trees. Another would be the consolidation of olive groves through redistribution of olive trees. However, the latter is easier said than done, because it is essentially a mini land reform and requires political support by various power structures within the village communities and beyond. This is a tremendous task given the present unstable situation throughout the country.

[22] For more on the meaning of externalities see the boxed material in the end of this section.
[23] Indeed, farmers considered the case of these negative spillover effects as a strong reason for not using pesticides (see Table 49).

Other Factors

The limited application of pest management practices in olives is explained by other factors as well. Farmers do not have the economic resources to purchase farm inputs. Agricultural inputs are also not always available locally so farmers can not purchase them whenever they need them. There exists little price differentiation in the local markets for different qualities of canned olives and olive oil. This gives farmers insufficient incentive to raise the quality of olive products by improving pest management and reduce olive oil acidity.

Lack of Information on Safety

Farmers revealed little awareness of the potential harmful effects of pesticides on human health and environment. Most farmers perceive that pesticide application leads to an increase of olive yields. However, the results of the survey showed that those who applied pesticides did not get higher yields. On the contrary, a small but significant negative relationship ($r = -.09$) was found between pesticide application in olives and olive yield. This result is consistent with a previous study carried out in The Philippines by Lazaro et.al. (1995). Data also revealed that pesticide application in olives was positively related to pesticide application in grapes and citrus and to ownership of spraying equipment. The implication is that many of those farmers who sprayed other fruit trees, sprayed olives as well. Probably, those farmers used the same pesticides even though the pests of various fruit trees including olive trees are different and their control requires specific treatment. The IPM participatory courses would help farmers recognize the potential negative effects of pesticide use on ground water, environment, and human health and show them how to take these potential effects into consideration in their pest management decisions.

Increase of Pesticide Use and Need for IPM

Although pesticide use has recently dropped drastically due to the factors mentioned above as well as the weak economic position of farmers and the lack of functioning agricultural input markets, this situation will not last for long. As farmers' economic situations improve and the agricultural input markets consolidate, it is likely that farmers' ability to purchase off-farm inputs, including pesticides, will increase. Therefore, it is advisable that tendencies for increasing pesticide use be coupled with an integrated approach of pest management that will optimize crop production and maximize net economic returns while minimizing pesticide use and damage to human health and the environment. In this context, introduction of IPM practices to the olive sector in Albania is timely and appropriate and because most farmers' not currently using pesticides for controlling olive pests, it is an opportune time for implementing IPM programs. It has been shown that one of the serious obstacles to olive IPM implementation in developing countries is the growers' reliance on chemical treatments for controlling pests (Katsoyannos, 1992). Such reliance is not currently a major obstacle to adopting olive IPM practices in Albania. This finding is consistent with FAO's study on olive pests and their control in other countries of the Mediterranean region (Katsoyannos, 1992).

Role of Women

Women play an essential role in the agricultural sector in Albania. Generally, the olive field operations are carried out jointly by men and women. However, most of respondents including women reported men to be the sole decision-maker regarding expenditures on pesticides, purchase of pesticides, pest management in olives, and marketing of agricultural products. Nearly half of women say they are involved in marketing decisions to the same extent as men are. Women's perception of the role of pesticide application in increasing olive yields appears to be stronger than those held by men. Women's knowledge and perception on olive pests and pest management practices were found to be very similar to those of men. This finding indicates that the knowledge gap between men and women regarding olive production system is not wide and that women are involved in performing agricultural operations related to olive to the same extent as men are. The implication is that women must constitute an important target group in the training courses on olive pest management practices that might be organized in the future by IPM CRSP/Albania project, extension service and/or other organizations. This is also necessary because many men work outside the country for at least part of the year.

Pest Mobility, IPM and Need for Collective Action

In addition to olive grove fragmentation, pest mobility is another factor that makes it difficult for individual farmers to manage the control for certain olive pests. Pests are not unique to a single farm and therefore pest control can be considered a communal problem (Knight & Norton, 1989; Lazarus & Dixon, 1984). Some of the mobile olive pests, like olive fruit fly, constitute a problem for the whole region because their movement may not be limited to between adjacent fields and olive trees. Olive pest mobility suggests that the optimal pest control strategies must consider the possibilities for collective action within the olive growing region(s). Collective pest management strategies may offer additional advantages because of economies of scale in information gathering, processing and decision making (Norgaard, 1976). That collective action may involve various groups including agrochemical industry, pesticide dealers, government institutions, NGO-s, and/or groups of farmers themselves (Knight & Norton, 1989).

During the last eight years, group-actions by Albanian private farmers have generally been limited. The survey data showed that no respondent was a member of any farmer organization. This fact has great repercussions for the farming and agribusiness activities in the future including pest management practices in olives. There exists a close relationship between the different evolutionary stages of farms and needs for group action. Experience has shown that even when supporting systems with suitable institutions for marketing, supply, credit, research, extension, and other services exist, small village producers do not always make use of them (Weitz, 1971). Therefore there must be an intermediate organizational structure between the individual farmer and the service systems. This can be best achieved by united action of the farmers through cooperative associations.

Several reasons can explain farmers' hesitancy toward group action. There exists an aversion among members of ex-socialist cooperatives to cooperation. By joining in associations, they believe their voices will be lost in the crowd. Albanian farmers are

strongly influenced by this concern because of their experience as former members of socialists cooperatives, where, on paper, they were told they had the final decision power, but in reality, it was collective farm managers and communist party structures that made decision about everything. Also some elements of so-called subculture of peasantry such as mutual distrust in interpersonal relations, a lack of innovativeness, limited time perspective, strong and hierarchical family structures[24] and so forth, may affect farmer attitudes and perceptions toward cooperation. Another reason is that joining new associations implies that farmers can retain the essence of their proprietary status only if they give up part of it. Actually, Albanian farmers highly value their newly acquired status as being totally independent to run their everyday life.

The promotion of farmer group action through the creation of farmers' associations remains an imperative task in terms of IPM implementation. Public policies are needed to provide incentives for collective action to control olive pests throughout the region. IPM constitutes a new paradigm in crop protection and involves the integrated use of some or all of the pest control strategies. It is a concept and practice based in science and good business practice. According to Hutchins (1999), in order for pest management to be considered IPM, "...two qualifying conditions must be met: objective value-based decision criteria are used (the economic-injury level is the basic concept) and multiple tactics are considered for use with an understanding of their respective features and interactive relationship." (p. 4). IPM is more complex for the producer to implement than spraying by calendar. It requires skills in pest monitoring and understanding of insect bionomics and ecology. It involves cooperation among producers for effective implementation. But this can not be done if farmers act alone and do not cooperate together and if the present stock of farmers' knowledge on olive pest management practices is not improved and upgraded.

[24] It is difficult to confirm whether such elements are widely present or not among peasant communities in Albania. To the knowledge of authors, no study has been carried out to elaborate this topic.

Externalities

An externality may occur when the well-being of an individual or the production possibilities of a firm are directly affected by the actions of another agent in the economy (Mas-Collel, Whinston, & Green, 1995). Externalities are also called spillover effects or external economies. According to Pigou (1932) an externality arises when a person in the course of rendering some services to another person for which the payment is made, incidentally also renders services or disservices to other persons.

A positive externality arises when the service provided by someone to one individual, also spills over to others who have not paid for the service. A negative externality arises when the services provided to one individual cause harmful effects to others.

The central features of an externality are unenforcability of compensation (Head, 1974) and unavoidability (Coase 1960). In the case of positive spillover effects, the unenforcability of compensation property is close to the public good concept of the impossibility of exclusion. That is, people that do not pay for the service cannot be excluded from benefiting from it. (Musgrave, 1959). Likewise, those who provide such services can not capture any payment from the beneficiaries.

The case of negative spillover effects is similar to the concept of a public bad. That is, those who cause negative effects cannot be charged for the damage they incur (Head 1974). Nevertheless, unlike public goods, these incidental services need not be identical in nature or quantity to the services for which the payment is made.

The unavoidability implies that the third party affected is unable to avoid the negative spillover effects. Like enforcement, avoidance of external effects is possible, but at very high costs and therefore, economically unjustifiable (Coase, 1960).

The externalities arising from a particular activity create a divergence between private and social costs (or benefits) resulting from that activity (Pigou, 1932; Papandreu, 1994). Whenever private agents do not consider the social implications of their actions, this may lead to a loss in social welfare. Therefore, the equilibrium allocation of resources and the Pareto optimum will not be achieved**. Externalities are considered as deviations from an attainable Pareto optimum, when markets are unable to cope with these side effects.

The implication is that if costs and benefits arising from external effects are not incorporated into allocative decision processes, the inefficiency results in the form of undersupply of activities that generate positive spillover effects and oversupply of activities that generates negative spillover effects.

Due to the inability of market forces to deal with externalities, some other non-market mechanisms are needed to internalize these external effects. Internalizing externalities refers to a process, usually a change in the property rights, that enables these external effects to bear (in a greater degree) on all interacting persons (Demsetz, 1967; p.348). Thus, internalizing externalities avoids the divergence between private and social costs.

When markets fail to achieve the Pareto optimum allocation of resources, it follows that government intervention or other non-market mechanisms can be used as an alternative. Government can impose taxes on those who emit negative externalities and subsidize those who cause positive externalities. This is the well-known Pigovian tradition of the tax-subsidy scheme for internalizing externalities (Pigou, 1932).

** Pareto optimum of the Walrasian model with zero transaction costs is the point of reference for the misallocation effects and other distortion of externalities.

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Acronyms

AUT = Agricultural University of Tirana
BS = Baseline Survey
FTRI = Fruit Tree Research Institute (located in Vlora)
IPM CRSP = Integrated Pest Management Collaborative Research Support Program
PA = Participatory Appraisal
PPRI = Plant Protection Research Institute (located in Durres)
SARA = Support for Agricultural Restructuring in Albania
USAID = United States Agency for International Development

Appendices

Appendix 1: The IPM CRSP/Albania Survey Team Members

Appendix 2: Albanian Olive Sector Statistics

Appendix 3: Interview Questionnaire (English version)

Appendix 4: Interview Questionnaire (Albanian version)

Appendix 5: Baseline Survey Tables

Appendix 6: Gender Differentiated Tables

Appendix 1

IPM CRSP/ALBANIA BASELINE SURVEY TEAM MEMBERS

Name	Specialization
IPM CRSP- Virginia Tech, USA	
Lefter Daku	Agricultural Economics
Agricultural University of Tirana (AUT)	
Fadil Thomaj	Horticulture
Myzejen Hasani	Phytopathology
Rexhep Uka	Entomology
Kolec Kovacaj	Agricultural Economics
Plant Protection Research Institute (PPRI)	
Josef Tedeskini	Entomology
Harallamb Bace	Phytopathology
Bujar Huqi	Weed Science
Fruit Tree Research Institute (FTRI)	
Dhimitraq Toti	Production Techniques
Hajri Ismaili	Olive Specialist (Breeding)
Mendim Baci	Phytopathology
Zaim Veshi	Extension
Dhimiter Panajoti	Olive Specialist
Jaho Nelaj	Production Techniques

SCHEDULE FOR IPM CRSP/ALBANIA BASELINE SURVEY

Date	*Description of Daily Activities*	*Evening*
Wednesday, 6 January through Friday, 9 January	Lefter Daku and Josef Tedeskini: (1) Meet with and inform key officials about the Baseline Survey (2) Get signatures for Memorandum of Understanding in Tirana, Durres and Vlore (3) Organize Baseline Survey Team and (4) Set up contacts with villages and farmers to be interviewed in Vlora area.	Overnight in Tirana
Sunday, 10 January through Tuesday, 12 January	Daku travels to Scopje/ Macedonia to get American visa	Overnight in Scopje
Wednesday, 13 January through Friday, 15 January	Daku and Tedeskini train interviewers in Tirana, review the questionnaires and prepare for questionnaires testing	Overnight in Tirana
Saturday, 16 January through Monday, 18 January	Baseline Survey team drives to Vlora to select villages, sample farm households and test questionnaires	Overnight in Vlora
Tuesday, 19 January through Friday, 22 January	Baseline Survey team returns to Tirana; reviews and multiplies questionnaires; prepares for next trip: farmer interviews	Overnight in Tirana
Saturday, January 23 Through Monday, 1 February	Baseline Survey Team drives to Vlora to conduct farmer interviews in the following villages: Bestrove, Cerkovine, Kanine, Panaja and Tre Vellazen.	Overnight in Fieri
Tuesday, 2 February through Friday, 5 February	Baseline Survey Team returns to Tirana; error checking, data entry and tabulation;	Overnight in Tirana

Appendix 2

Table 6. Pesticide Use in Albanian Agriculture

Nomenclature	Years					
	1970	**1980**	**1984**	**1985**	**1986**	**1993**
Insecticides (000/ton)	5.9	10.2	11	13	7	5.9
Active Ingredient (kilo/ha)	75	133.5	115.8	126.8	148.4	……

Source: Albanian Statistics Yearbook, 1994

Table 7. Dynamics of Olive Production in Albania

Years	**Olive Yields (kilo/tree)**	**Olive Production (000 Ton)**
1951-1955	12.8	60.4
1956-1960	12.4	62
1961-1965	25.9	129.6
1966-1970	15.3	76.5
1971-1975	20.48	102.4
1976-1980	20.14	100.7
1981-1985	26.74	133.7
1986-1990	30.6	153

Source: Albanian Statistics Yearbook, 1991

Table 8. Dynamics of Number of Olive Trees and Olive Groves in Albania

Year	Olive area (000/ha)	Number of Trees
1938	10	1 500 000
1950	11.4	1 559 000
1960	17	2 173 000
1970	36	4 262 000
1980	41.4	4 768 000
1990	45	5 821 000

Source: Albanian Statistics Yearbook, 1991

Table 9. Olive Production by Public and Cooperative Sectors

Years	Total Olive Production (000 Ton)	of which: (in percentage)	
		Public Sector	Cooperative Sector
1970	2.5	13.1	86.9
1975	33.8	28.1	71.9
1980	26.9	43.4	56.6
1981	24	34.2	65.8
1982	17.6	44.1	55.9
1983	50.3	32.8	67.2
1984	8.2	56.1	43.9
1985	33.4	38.6	61.4
1986	17.9	46.9	53.1
1991	35	…..	xxxx
1992	20	…..	xxxx
1993	25	Olive Privatized	xxxx

Source: Albanian Statistics Yearbook, 1991, 1994.

Table 10. Dynamics of Olive Oil and Table Olive Production in Albania

Year	Olive Oil (Ton)	Oil Content (%)	Table Olives (Ton)
1938	2 200	…..	
1946-1950	18 144	21.7	…...
1951-1955	10 060	21	6 801
1956-1960	7 878	18	5 825
1961-1965	11 505	19.5	7 325
1966-1970	18 776	17.5	4 722
1971-1975	13 723	18	……
1976-1980	14 910	17.3	12 234
1981-1985	14 907	15.9	19 428
1986-1990	12 913	16.4	20 611

Source: Albanian Statistics Yearbook, 1991

Table 11. Olive Production, Olive Orchards and Number of Olive Trees by Districts, 1986

Districts	Olive Production		Olive Orchard		No. of Olive Trees		Density of Olive tree (tree/ha)	Olive Growing Regions by:		
	(TON)	(%)	(000 Ha)	(%)	No. of trees	(%)		% of olive production	% of olive area	% of olive trees
Region 1										
Sarande	1 634	9.2	5.1	11.3	680 216	12.83	127	**38.4**	**28.5**	**28.83**
Vlore	5 213	29.2	7.7	17.2	830 755	16.00	101			
Region 2										
Berat	2 064	11.5	5.4	13.2	741 152	14.00	116			
Fier	3 793	21.2	7.8	17.5	813 313	15.34	101			
Lushnje	1 178	6.6	2.7	6.0	357 615	6.74	128	**46.5**	**53.3**	**50.57**
Durres	485	2.7	2.9	6.4	298 005	5.62	93			
Tirane	803	4.5	4.5	10.1	469 534	8.87	96			
Region 3										
Tepelene	274	1.5	0.8	1.7	91 238	1.72	101			
Elbasan	1 999	11.2	4.4	7.8	550 975	10.40	116			
Kruje	171	1.0	1.6	3.6	155 806	2.94	91	**14.9**	**16.0**	**20.35**
Lezhe	42	0.2	0.3	0.6	33 900	0.64	117			
Shkoder	177	1.0	1.0	2.3	246 393	4.65	240			
Region 4										
Gjirokaster	35	0.2	0.1	0.2	14 716	0.28	151			
Permet			0.04	0.1	6 276	0.12	74	**0.2**		
Skrapar			0.04	0.1	4 866	0.10	75			
Gramsh			0.05	0.1	4 937	0.10	92			
Albania	**17 868**	**100**	**44.8**	**100**	**5 299 697**	**100**	**111**	**100**	**100**	**100**

Source: Olive Study Report, Agricultural University of Tirana, 1987