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Introduction

Palestine considered as West Bank and Gaza Strip has a total surface area of 6,207 km^2, of which 5,842 km^2 in the West Bank and 365 km^2 in Gaza Strip. The population is about 2.89 millions of whom 1.87 million in West Bank and about one million in Gaza Strip.

The Gross Domestic Product was estimated in 1997 at around 4,173 million US $ and the income per capita was 1500 US $. The Palestinian economy was characterized over the last 10 years by dependence on foreign aid for financing projects and main activities, while relying on Israel as the major trading partner and employer of Palestinian labor.

Agriculture

Agriculture sector is considered important for the country not only for its direct contribution to the national economy (nearly 15-20% to Gross Domestic Product), but also as a symbol of Palestinian culture. It plays a role in environmental protection, enhancing biodiversity, and combating desertification. It is worth mentioning that agriculture sector gives job opportunities to over 20% of the population as well as it is the main or secondary source of income for a large segment of the population.

The area devoted to agriculture is about 186 thousand hectares; 90% of these hectares are in the West Bank and 10% in the Gaza Strip. Despite its small geographical area, Palestine is characterized by a great diversity in its topography and altitude, as in the West Bank where its altitude ranges

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between 1020 meters above sea level in the mountain and 375 meters below sea level in Jordan valley. This variation makes it possible to have crop production all over the year.

Rain-fed agriculture is the predominant pattern governing farm systems in the country. The average rainfall, that is usually concentrated between November and May, ranges between 100-700 mm per year. The amount of water used in agriculture is estimated at around 175 million m^3 per annum, represents 64% of the total water used in the country. In Gaza Strip irrigated farming is predominant representing 66% of the cultivated area, while just 5.5% of the cultivated area in the West Bank are under irrigation mainly in Jericho.

Agricultural production was valued at 787 million US $ in 1997, of which 60.5% was attributed for plant production, and 39.5% for animal production. Regarding foreign trade, 20% of the total Palestinian imports were for Agriculture while the agricultural exports constitute around 23% of Palestinian export commodity.

Horticulture

The total area devoted to plant production is distributed among three main different sub-sectors:

Vegetables	18 thousand hectares
Cereal crops	53 thousand hectares
Fruit trees	115 thousand hectares

The value of plant production is estimated at 340 million US $, 39% from vegetables production, 7.9% from production of cereals and cut flowers and 52.5% from fruit trees production.

Vegetables play an important role in providing 91% of domestic consumption food. The climate variability in Palestine allows production of vegetables all year round, also with the current use of greenhouses in the coastal and semi-coastal areas. Open field vegetables are the most common pattern of

planting covering about 9 thousand hectares, which is 70% of the total area devoted for vegetable growing. The most common vegetable crops are tomatoes, cucumbers, eggplants and squash.

Fruit trees are the main sector that enriches the national income due to the wide surface area it covers. They occupy about 106 thousand hectares in the West Bank and 9 thousand hectares in Gaza strip. Nearly 2.7%and 70.4% of the fruit tree areas are irrigated in the West Bank and Gaza Strip respectively. Olive production is the major use of land allocated for fruit production in the West Bank, making up 73.7% of fruit tree surface area. The main fruit species cultivated other than olive are stone fruits, grapevine, citrus, figs and banana. Most of these crops depend on rain as a main, if not the only, source of water. For that, the cultivated crops are those capable to withstand semi-dry conditions.

Palestinian Agricultural Policy for Horticulture Sector

During the last 2 years, the Ministry of Agriculture (MOA) prepared the Palestinian Agricultural Policy in 1999, that includes a group of programs and projects to develop agriculture in the country starting from the building of destroyed infrastructure due to the long period of Israeli occupation of the land. This policy is aiming to raise up the productivity of the production unit in order to provide reasonable profit for the producers. This aim could be achieved by intensifying the activity of agricultural research and extension, protecting the country from imported diseases and epidemics, applying plant protection measures that take account of human health and environment. The transfer of modern production technologies, and the promotion of teamwork cooperation are also considered. Another aspect to develop this sector envisages the alternatives for current production systems to achieve integrated agricultural systems. It seems very important to emphasize the need for maintaining the breeds and germplasm that are mentioned in the Palestinian Agricultural Policy in 1999. This

could be done by defining and preserving the local breeds and germplasm, encouraging the farmers to participate effectively in maintaining the best germplasm in their production, and develop the legislative and institutional frame for the production, circulation and import of seeds or propagating material.

The current status of fruit tree industry.

Olive: as major crop in the rainfed areas, occupies about 45% of the total plant production in the country, and up to 25% of gross agricultural income .Their production provides the bulk of income for thousands of olive farmers, each of whom supports an extended family of about a dozen people. As a whole, olive cultivation, picking, pressing and marketing involves more than 100,000 people and is an important economic base in the country. It is covering the northern part of the West Bank, comprises 68.5% of the total planted area while 1.4% are in Gaza Strip. Olive trees cover nearly 82 thousand hectares. The average of olive production ranges between 7.4-177 and 2.2-5.5 thousand tons for the West Bank and Gaza Strip respectively. The difference between low and high production years is due to fluctuation in productivity as a result of the alternate bearing habit of the trees. This phenomenon has a low effect in Gaza due to irrigation.

Most of cultivated olives are for oil production. Sorri is the major cultivated variety representing about 85% of olive trees and used mainly for oil production followed by Local Nabali (Baladi) and Improved Nabali. Other less cultivated varieties are Mulleesi, Manzinilo, Barenge and K18.

Olive production is influenced by the phenomena of alternate bearing and annual rainfall fluctuations that cause variation in production prices. Lack of agricultural extension as well as political, economic and marketing problems are encountered. Improving the production quantity and quality to yield high grade virgin olive oil is needed. This

would facilitate oil export and sale to foreign markets at higher prices. It is important to develop the local varieties by clonal and sanitary selection for the propagating material. It is also important to develop new ways of canning, labeling and marketing of olive products to meet the needs of the consumer. These include quality and marketing considerations. A financial support is to be raised for research on olives to develop this crop as well as for the setting up of agricultural industries for making pickles and canning of olives.

Grapevine: is the second important fruit crop in Palestine after olive, covering about 9 thousand hectares. It is grown everywhere in Palestine, but the majority of commercial vineyards are distributed in the southern part of the region. This is mainly due to the more favourable climatic conditions of this region as well as to the traditional experience of farmers . Hebron and Bethlehem regions are the main grapevine-growing areas where grapevine covers more than 75% of the grapevine total area. The average production of grapes in Palestine is about 50 thousand tons. The highest production comes from Hebron reaching 58% of the total amount. This average yield did not change significantly during the last few years. Grapevine varieties cultivated are for fresh consumption whereas only Dabouqi, a local table variety, is traditionally used also for wine production. The main cultivated varieties of local origin growing under rainfed conditions are: Shami, Halawani, Dabouqi, Bulloti or Beitoni, Jandali, Marrawi and Zaini. Some varieties have different names referring to their colors or the localities they come from like Biadi, Baladi, Smari,…etc. The main seedless grapevine varieties cultivated are Sultanina, Superior seedless, Perlette and Down seedless.

Viticulture is facing several problems, the absence of certified propagating plants, the invasion of *Phylloxera (Viteus vitifoliae)* in Hebron and Bethlehem regions. Other main obstacles for viticulture are the lack of agricultural research and extension that should ensure the improvement of grape varieties, suggest suitable agricultural practices, and

make laboratory studies of phylloxera and other important diseases.

Stone fruits: come after olive according to the surface area and cover nearly 13 thousand hectares: 7,6 thousand hectares in the West Bank and 3,7 thousand hectares in Gaza Strip. Their profitability is going down as they are mostly neglected. Stone fruits include almonds, the major cultivated one, plums, apricots, peaches, nectarines, and cherries

Almonds constitute the largest cultivated area for stone fruits occupying about 72%. Due to low productivity, the total production ranks second after plums. Plum orchards occupy the second greatest area after almonds, comprising 23% of the total area of stone fruit cultivation, yielding 65% of the total production of stone fruits. Plum production is concentrated in the southern part of the West Bank where 2.3 thousand hectares are cultivated, compared to 0.7 thousand hectares in the north. Apricots are mainly cultivated in the northern West Bank covering 435 hectares, while in the south, they cover only 64 hectares. Peach cultivation accounts for a small percentage of the total cultivated stone fruit area, covering only 91 hectares. Cultivation is concentrated mainly, in descending order, in the Hebron, Bethlehem and Ramallah areas. Cherry cultivation and production are in short supply, as consumption demands in the Palestine are primarily met by importation. The creation of new orchards must be considered in order to increase production in the West Bank and Gaza Strip.

Stone fruits cultivation requires intensive work either in cultural practices or introducing new promising varieties. The lack of varieties suitable for the local environmental conditions, with higher productivity, better quality and a wider range of ripening dates is the primary problem facing this sector. Intensive extension programs for farmers, helping them to follow new methods and techniques for orchard management could be useful for improving this culture. Also the establishment of new peach orchards, replacement of local low productivity varieties with new ones characterized by high

productivity, and increasing the areas of nectarine and cherry production are needed. Suitable programs are needed for introducing improved varieties, fertilization techniques, pests and diseases control. Furthermore, nurseries must be encouraged to use healthy, certified and well-known rootstocks, and cultivated varieties.

Citrus: covers more than 7 thousand hectares in the West bank and Gaza strip. It is widespread in the coastal area in Gaza, Qalqilia, Talkarem and Jericho thanks to the water availability and suitable climate. In 1997 the production was 170 thousand metric tons. The most famous varieties grown in the country are Shammouti, Faransawi, and Dam Alzaghloul, Palestinian sweet lime and Yousef Afandi. This crop is facing the lack of water resources as well as marketing constraints. Considering the value of the product and the water consumed for that , many farmers prefer to change their citrus canopy to vegetable production. Another important fact that pushed farmers to reduce the interest of this crop is the severe infection with tristeza virus (CTV) that destroyed more than 50% of citrus. Other reports showed the presence of other virus infections such as Psorosis virus (CPsV) and other unidentified virus-like infection.

Others: Figs and Banana are usually considered as secondary crops. Fig trees are mainly used as inter crops with olives. Therefore they are either neglected or receive minimum crop practice. Banana crop has a prospective future and market. Its surface area is increasing yearly especially in Jericho where the climate is suitable for that.

Sanitary status of the crops with particular reference to virus and virus-like diseases.

The only information about the sanitary status of the crops are the studies carried out by Italian Institutions (IAM-B and UBA) in collaboration with the Palestinian Ministry of agriculture. Hereinafter is the sanitary information available for the main crops:

Olive: a limited number of samples tested with dsRNA analysis showed an infection level (62%) comparable with other Mediterranean countries. This result is not enough to give a clear idea about the sanitary status of the crop since other virus diseases as Sickle disease and Bark cracking were reported from neighbouring countries.

Grapevine: samples covering all viticultural areas were collected and tested and showed a high incidence of viral infections (82%) in particular in local varieties. GVA, GVB, GFLV, GFkV, GLRaV-1, 2, 3 and 7 had been detected by ELISA while vein mosaic and vein necrosis virus-like diseases had been ascertained by indexing. This seems indicative of a long time existence of this virus in the region. The rare and isolated detection of GFLV-infected vines in the fields suggest the scarce presence of *Xiphinema index*, its nematode vector. Samples coming from the only rootstocks mother plot, established with material coming from Israeli nurseries, ascertained a low viral infection level (20.3%). However, it is a potential focus for new infections and spread of viral diseases that will add up to the viruses already present in the varieties.

Stone fruits: samples collected from different commercial fruit trees were tested by ELISA for the presence of stone fruit infecting viruses. The detected viruses were PDV, ACLSV and PNRSV with incidence of 18.5%, but none of PDV, ApMV and nepoviruses were detected in any of the stone fruits samples. Peach had shown the highest percentage of infection (35.6%). Fire blight has been described in many orchards in Salfeet area, but more investigation is needed to ascertain the level of infection.

Citrus: a limited number of samples were tested by ELISA and showed the presence of CTV as a main virus detected with a high rate of infection in Shammouti, Valencia and W. Navel oranges. CPSV was also detected while CVV, CVEV and *S. citri* were not found. Considering that the total infection of the tested pathogens is fairly high (31.6%), it could be higher if viroids and virus-like diseases had been looked for.

Developing and Improving of horticulture industry

As mentioned before ,horticulture represents the backbone of agriculture in the country, so developing and improving it means getting up with Palestinian agriculture and increasing its participation to the GDP. Developing horticulture should start from nursery production of the propagating material until controlling the import and export of agricultural products. This could be done by implementing a clonal and sanitary selection as a first step of any expected certification program. To achieve that, these points should be stressed:

- Building the infrastructure
- Developing human resources
- Issuing the appropriate legislation
- Enhancing the national and international cooperation

Overview of the current situation in the country

Nursery

There are more than 50 nurseries; few of them are producing fruit trees on a large scale. Their production of propagating material is sufficient for local consumption and the excess is exported. For olive more than one million grafted plants are produced, followed by grapevine with about 750 thousand rooted cuttings. Most of these nurseries depend on their own mother plots as a source of grafted varieties or rootstocks. Some of them import rootstocks from Israeli nurseries. All of these processes are implemented without clonal or sanitary measurements. Recent studies on these mother plots have shown the presence of viral infection in their plants. What is needed is a clonal and sanitary selection as a first step ending with a certified propagating material.

Scientific Institutions

For the improvement of horticulture, available infrastructure should exist. The Ministry of Agriculture through the Department of Extension and Agriculture research is taking up the responsibility for that. There are 3 agricultural stations belonging to MOA distributed in the country, Al-Arrob station (about 5 hectares) is the largest one. National Agricultural research center which is not yet activated, could be an important center for any agricultural development activity and one of the important elements for any certification program. What is needed for that center is to equip its laboratories to be qualified for sanitary work. Furthermore, there are more than 3 universities having the faculty of Agriculture or Applied biotechnology. These are An-Najah University/Faculty of Agriculture, Hebron University/Faculty of Agriculture and Bethlehem University/Faculty of science/UNISCO center in addition to NGO's which work in the same field.

Legislation

As Palestine was under Israeli occupation for a long period, agriculture legislation was that applied by it. But after Oslo agreement and the entrance of Palestinian Authority, a new legislation is needed. This is not an easy task without a clear picture of the situation of agriculture in the country. Also this must be harmonized with countries sharing the same area and trade.

Human resources

Many qualified persons work in the Palestinian Institutions, however few of them carry out a certification program. Over the last 5 years, and thanks to the Agronomic Institute of Bari, several Palestinian students have taken the opportunity to attend specialization courses of Protection of fruit trees (1 Ph.D., 2 Master of Science, 6 Diploma of specialization). But for completing this work, this number is still insufficient.

International cooperation

Several projects are studied and prepared to be implemented in the Palestinian territories according to PDP 1999-2003. These projects deal with land reclamation, food security, organization of phytosanitary services, olive development, Pesticides Control Program, rural development as a soft loan. All these projects are approved by MOA and MOPIC to be implemented through the period of PDP plan. These submitted projects are still not sufficient for the country needs, but they may be a first step along the right path.

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