DEVELOPING THE OCCUPIED TERRITORIES

An Investment in Peace

4

AGRICULTURE

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DEVELOPING THE OCCUPIED TERRITORIES

AN INVESTMENT IN PEACE

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CURRENCY EQUIVALENTS

(As of January 1, 1993)

Currency Units in use	=	New Israeli Sheqalim (NIS) and Jordanian Dinar (JD)
NIS 1.00	=	US$0.361
US$ 1.00	=	NIS 2.764
JD 1.00	=	US$1.453
US$1.00	=	JD 0.688

FISCAL YEAR

(January 1 to December 31)

ABBREVIATIONS

AGREXCO	=	Agricultural Export Corporation
ACC	=	Agriculture Credit Corporation
CA	=	Civil Administration
CBS	=	Central Bureau of Statistics
EC	=	European Community
GDP	=	Gross Domestic Product
GNP	=	Gross National Product
JD	=	Jordanian Dinar
NGO	=	Non-Governmental Organization
NIS	=	New Israeli Sheqalim
OT	=	Occupied Territories (West Bank and Gaza Strip)
PARC	=	Palestinian Agricultural Relief Committee
UAWC	=	Union of Agriculture Work Committees
VAT	=	Value Added Tax

MEASURES

1 DONUM	=	0.1 hectare = 1000 Sq. meters
1 MCM	=	1 million cubic meters

CONTENTS

PREFACE

1. At the request of the sponsors and organizers of the Middle East Peace Talks, the World Bank has been supporting the work of the Multilateral Working Group on Economic Development and Regional Cooperation by providing analyses of the key economic issues and developmental challenges facing the Middle East region. At its second meeting in Paris in October 1992, the Working Group requested the Bank to expand its contribution to include, *inter alia*, an assessment of the development needs and prospects of the economies of the West Bank and the Gaza Strip (commonly referred to as the Occupied Territories). In response to this request, a Bank mission visited the Occupied Territories during the period January 21-February 24, 1993. The mission comprised five teams focusing on the following areas: Private Sector Development, Agriculture, Human Resources, Infrastructure and Macroeconomics. Each team was in the field for about two weeks. The mission was led by Prem Garg who, together with Samir El-Khouri, stayed in the field throughout to provide continuity and guidance to the five teams. The staffing of the five teams was as follows:

Agriculture:	Gert van Santen (Team Leader) Ulrich Kuffner (Water Resource Engineer) Merle Jensen[1] (Horticulture Specialist)
Human Resources:	Fredrick Golladay (Team Leader) Maureen Field[1] (Education Specialist) Radwan Ali Shaban[1] (Human Resource Economist)
Infrastructure:	Alastair McKechnie (Team Leader) Ulrich Kuffner (Water Resource Engineer) Lawrence Hannah (Urban Specialist) Nail Cengiz Yucel (Transport Sector Specialist) Ted Moore[1] (Power Engineer)
Macroeconomics:	Michael Walton (Team Leader) Samir El-Khouri (Fiscal Analyst) Ishac Diwan (Macroeconomist)
Private Sector Development:	Albert Martinez (Team Leader) Robert Mertz (Financial Sector Specialist) Joseph Saba (Legal Specialist) Dileep Hurry[1] (Regulatory Environment and Tourism Specialist)

2. Mission members travelled extensively in the West Bank and Gaza, visiting municipalities, farms, businesses, industries, academic institutions, refugee camps and NGO-run facilities. Mission members also travelled in Israel, as needed, and paid several visits to Amman. The representatives of the key bilateral and multilateral donors in Jerusalem, Tel Aviv and Amman responsible for the Occupied Territories were kept briefed about the work of the mission. Close contact was also maintained with the field staff of UN agencies.

1/ Bank consultant.

3. The Bank mission was received warmly by all sides, who took keen interest in the work of the mission and provided superb logistical and counterpart support for the field work. The main counterparts on the Israeli side were the Bank of Israel and the Civil Administration in charge of the Occupied Territories. On the Palestinian side, the main counterparts were the Technical Committees of the Palestinian Team to the Peace Conference, consisting mainly of Palestinians who are members of the bilateral or multilateral peace teams. The Ministry of Planning was the main contact on the Jordanian side. The Bank would like to thank all concerned parties, especially the Israeli, Jordanian and Palestinian hosts, for the excellent support and cooperation that the Bank mission received for this field work.

4. This report is based on the findings of the above mission. The report is in six volumes:

- **Volume I** provides a summary ***overview*** of the key findings and recommendations of the study. After commenting selectively on the current socioeconomic situation in the OT and its evolution over time, it discusses prospects for sustainable development in the future and outlines the priority agenda of policies and programs needed to promote such development.

- **Volume II** explores the strategic choices at the ***macro*** level that will be faced by the OT in the future and the implications for economic relations between the OT and the rest of the region. The study looks at the current situation and its evolution over the past 25 years. The study then examines several policy choices for the future affecting the structure of development in the OT. Finally, it outlines some illustrative scenarios for the future, focussing on the consequences of current developments in the region.

- **Volume III** reviews the performance of the ***private sector*** (including, in particular, the industry and tourism sectors) in the OT. The study assesses the environment in which the private sector operates and its future prospects and makes recommendations for accelerating private sector development in the future.

- **Volume IV** reviews the evolution and structure of the ***agricultural*** sector in the OT; analyzes its current characteristics; assesses OT competitiveness in the immediate and longer term; outlines the main policy options and their implications; and provides a preliminary assessment of sectoral financial and technical assistance (TA) needs.

- **Volume V** assesses the current situation in the ***infrastructure*** sectors (electricity, water supply and sanitation, transport, housing and solid waste services) in the OT; identifies the major issues confronting these sectors; and outlines priorities for TA and investment needs. As local authorities are major institutions in the delivery of public services in these sectors, the study also includes a review of their current situation and makes recommendations for improving the functioning of municipalities.

- **Volume VI** reviews the current status as regards ***human resource*** development; analyzes options for enhancing individual welfare and labor productivity in the OT; and outlines investment and TA priorities for strengthening existing programs and for laying the foundation for later reforms.

5. It is worth highlighting two limitations of this study right at the outset. First, a number of key issues bearing upon the future development of the OT (e.g., the allocation of land and water resources, the disposition of Israeli settlements in the OT, the future status of expatriate Palestinians, the territorial issues surrounding Jerusalem and, most importantly, the nature of the proposed "self-governing" arrangements for the OT) are the subject of ongoing bilateral negotiations between the Israelis and the Palestinians. The resolution of these issues is likely to be based primarily on political and security considerations. As the Bank mission to the OT was a *technical mission*, with neither the mandate nor the expertise to deal with political or security aspects, this study does not take any positions on issues that are on the agenda for bilateral negotiations. The focus instead is on policies, institutions and investments--where optimal choices are largely invariant to the eventual political arrangements to be agreed at the bilateral negotiations. Thus, for example, while analysing, where appropriate, the economic links between East Jerusalem on the one hand and the West Bank and Gaza on the other, the report avoids making any judgements regarding the future status of East Jerusalem.

6. Second, the study has had to cope with very serious *data gaps and inconsistencies*. Much of the data on the OT are, directly or indirectly, from official Israeli sources. There are, however, serious gaps in the OT data base. A population census has not been carried out in the OT for more than 25 years. As a result, most of the demographic and labor force data are based on extrapolations and on sample surveys, the reliability of which are undermined by problems of nonresponse, especially since the onset of the *Intifada* (popular uprising) in 1987. Data on East Jerusalem and on Israeli settlements in the OT, both of which are treated as part of Israel by the official Israeli sources, are mostly unavailable. Data available on trade between the OT and Israel and on the profitability and competitiveness of the agricultural, industrial and service enterprises are also very limited. Data on the OT from Palestinian and Israeli nonofficial sources are sparse and selective. Also, Palestinian data, when they exist, are often based on *ad hoc* surveys that do not lend themselves easily to cross-sectional or longitudinal comparisons. In many instances, data differ between sources, and, even when the same source is used, there are gaps and apparent inconsistencies. Given these data problems, the report uses estimates that appear most plausible in light of the mission's field observations. In cases where the data differences among various sources are particularly sharp (e.g., population, unemployment and social indicators), the report attempts, where possible, to examine the reasons for these differences and to indicate the implications of alternative estimates for the results of the analysis.

7. In view of the limitations on the mission mandate, the data difficulties and the time and resource constraints, this study can only be considered a beginning. The analysis in the study, especially for the longer term, is necessarily incomplete; as, and when, progress is made in the bilateral negotiations, the study will need to be updated and expanded to take account of the agreements reached. Also, notwithstanding the care exercised in locating and interpreting the data from various sources, the empirical underpinnings of this study leave something to be desired, and, therefore, the conclusions of the study should be treated only as indicative of broad trends and priorities. Further, in-depth studies and project feasibility work will be required before the findings of this report could be used to make operational decisions.

8. An earlier draft of this report was discussed with the Israeli, Jordanian and Palestinian authorities by a Bank mission to the region during July 12-26, 1993. Where appropriate, the report has been revised to incorporate the comments received by the mission during the July discussions.

EXECUTIVE SUMMARY

1. The agricultural sector in the Occupied Territories (OT) has historically played a major role in the economy. This study aims at assessing the prospects for sustainable development of the sector, as well as to outline the priority agenda of policy adjustments, institutional development and investments needed to promote such development.

2. In this study data are quoted from the Civil Administration (CA) and the Central Bureau of Statistics (CBS), or from reports prepared by Palestinian institutions or authors, who often have used data from the CA and CBS. Various Palestinian groups and research institutes have also contributed data. In many instances, data differ between sources, and, even when the same source is used, there are gaps and apparent inconsistencies. The report uses estimates that appear plausible in the light of the mission's field observations, based on information from official and informal sources.

3. This report consists of three parts. This executive summary and synthesis is followed by the main report, which reviews the evolution and structure of the sector, analyzes its current characteristics and constraints, and assesses the competitiveness of OT agriculture. It outlines the main policy options for future sectoral development, and provides a preliminary assessment of sectoral financial and technical assistance needs. The Technical and Statistical Annexes provide a technical analysis of crop production and sector support systems, key inputs and markets, followed by statistics.

Past Developments and Current Constraints

4. Agriculture can be characterized, with some simplification, as a sector with expanding production and very high levels of employment, operating in a sectoral framework of major constraints. The current situation is not sustainable, and reflects distortions in labor markets, external markets and trade arrangements, the impact of policies and regulatory constraints.

Overall Trends

5. Prior to 1967, the sector accounted for one third of GDP and over 40 percent of total employment. Since then, both the structure of the sector and its relative importance in terms of GDP have fluctuated significantly, reaching a historic low of 24 percent in 1984/85 before recovering in the early 1990s. Following a period of rapid growth in the early 1970s, generated by expanding export demand and a rapid and effective transfer of new technology and knowledge from Israel, notably in the area of water-efficient irrigation techniques and production under plastic, sector growth declined. Growth actually became negative for some years, as export markets declined in importance, Israel's economy experienced set-backs, and the regulatory framework in the OT became more intrusive. During the mid-1980s growth resumed, and has been substantial during the past seven years, largely due to an influx of labor into the sector, the changing preference of Palestinians for locally produced products and an increase of unrecorded exports to Israel. The composition of agriculture has also changed during the past 25 years, with livestock and vegetable production growing in relative and absolute terms.

6. Agricultural policy in the OT has passed through at least three stages during the past quarter century. Initially, a highly successful expansionary and growth oriented sector policy prevailed, encouraging agriculture to modernize quickly and focus on external markets. This was followed by a more constrained policy framework, which prevailed until several years ago when policy again became more development oriented. Current policies are a mixture of constraints and encouragement/support.

7. In terms of technology, agriculture in the OT runs the full gamut from highly traditional rain-fed agriculture to relatively modern drip irrigation. Irrigated production technology, while considerably advanced compared to 25 years ago, is still well behind cutting edge technology. The competitiveness and comparative advantage of the traditional, largely rain-fed sub-sector and the irrigated vegetable and fruit sub-sector differ. Without up-to-date cost data, definitive comparisons of competitiveness of the region with neighboring countries, and between territories within the region are difficult. Therefore the following judgements are to some extent subjective. Most rain-fed crops currently cannot compete in world markets; products reflect local tastes, and more efficient producers exist elsewhere. While technological and efficiency improvements can be made, product competitiveness in markets other than local ones is likely to remain limited. For the niche markets for selected vegetables and fruits, the situation is difficult but more positive. Some crops (including citrus and mellon) are currently not competitive in external markets. Others, including selected vegetables, some fruits, and seedlings and seeds [2] might be grown competitively at an international level; competitiveness appears restricted for crops with relatively high water and labor requirements.

8. The competitiveness and current performance of OT agricultural production is largely determined by three factors: (i) its resource base; (ii) markets; and (iii) governance, which includes the regulatory regime, public policy and public support services. The importance of each factor fluctuates considerably between crops, making a clear cut ranking of the three difficult.

A. Natural Resources and Labor

9. The generally hilly area of the OT is small, about the size of Trinidad and Tobago. The OT cover an area of 6,200 square kilometers (6.2 million donums), of which 5.8 million donums are in the West Bank, and .36 million donums are in Gaza. In the West Bank, approximately 4 percent of the total land area is irrigated, with slightly more than 1.5 million donums under cultivation. In Gaza, 0.165 million donums are under cultivation by Palestinian farmers, two thirds of which are irrigated. Gaza and the West Bank display some differences in terms of crop and production patterns; however, the main difference concerns their potential for future sector development, which is much more constrained in Gaza than in the West Bank on account of their relative endowment of natural resources.

10. The area available for agricultural production has diminished considerably since 1967. Agricultural activities have been discontinued on some land for economic reasons and, on other land, because of lack of water. The area used for cultivation and grazing is also affected by regulations pertaining to the use of land.[3] Current Israeli policies concerning the ownership and use of land have

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2/ According to an assessment of horticultural markets by the Agriculture Markets Development Project in Jordan of June 1991, these crops may include varieties of strawberries, grapes, asparagus, melon, green beans, eggplants, tomatoes, peppers, peaches, nectarines, cherries and raspberries.

3/ According to the Civil Administration, the area available for grazing has been restricted; military zones are closed during exercises on selected dates, and restrictions apply in nature reserves. In the West Bank 1.16 million donums is military land. While Israel does not transform cultured lands into state land (except for purposes of general infrastructure, like roads) there is some uncertainty about what constitutes cultured land depending on the legal system being applied, and how it is being used. In Gaza no land was converted to state land

created an environment in which traditional legal titles to land have lost some of their value in protecting the owner against uncompensated loss, as detailed in the private sector report and in para 3.32 of the main report.

11. The climate in the OT allows production of early crops, notably in Gaza and the Jordan valley. Precipitation is the major source of water in the OT, although it is relatively modest and highly variable. Considerable groundwater resources lie underneath the West Bank and Israel. The apportionment of these resources will have to be agreed upon during the peace process. Less than 10 percent of arable land in the OT is irrigated, field crop yields are highly susceptible to changes in precipitation and variations in weather patterns. While the area under irrigated cultivation has increased, improved technology and production techniques have reduced water usage per crop and area unit. Since 1967, irrigated land under cultivation by Palestinians in the West Bank has remained constant, while the area under irrigation in Gaza increased by half. Total water used for irrigated agriculture in 1990 was between 145 and 165 Million Cubic Meters (MCM)[4], with the West Bank accounting for 80-95 MCM and Gaza for 65-70 MCM. The authorities imposed production limits in 1975 on individual wells producing water for agriculture[5]. Strictly enforced production limitations are but one limitation on water production. A modest number of permits for new wells, or for refurbishing of existing wells have been granted. In the West Bank between 100 and 120 licenses were issued for well rehabilitation, but virtually no work has been done due to the high costs and the lack of long term credit.

12. For the West Bank, the annual renewable water that is available as groundwater from the aquifers shared with Israel is 600-800 MCM; for Gaza, 50-70 MCM is available. In the West Bank, from the aquifers shared with Israel, Palestinians use about 15-20 percent; the rest is used by Israeli settlers and Israel. Mekoroth, the Israeli water company, has drilled new wells in the West Bank to supply settlements. These wells reportedly access deeper aquifers and produce about 47 percent of all water discharged from West Bank wells. While the West Bank has considerable water resources, the water situation for agriculture and domestic use in Gaza is much more difficult. A negative water balance[6] has caused some serious salinity problems. Before 1967 withdrawals from Gaza aquifers exceeded average renewable recharges by some 50 percent; this has been reduced to 30 percent at

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after 1967; state land comprises 109,500, or about one third of the area. If state lands and nature reserves include Palestinian crop land, Israel will allow the Palestinians to continue to cultivate these lands. Cultivated land owned by Palestinians has generally not been used for Israeli settlements, except in the Jordan Valley; Israeli settlements cover 15,000 donums of state land in Gaza.

4/ Chapter 4, Table 2, Infrastructure Report (Volume V).

5/ According to the Civil Administration,it had meters installed on individual wells in 1972. On the basis of 1972 water consumption data, individual well quotas were set in 1973 slightly above 1972 water use. Between 1973 and 1975 well owners were informed of the quotas, and were appraised of their right to appeal. In 1987, due to drought conditions water quotas in the OT and Israel were cut across the board by 10 percent, and have not been changed since then.

6/ In part caused by Israeli pumping off the eastern border of the Gaza.

present. From the about 90 MCM total current withdrawals, Israeli settlers use 2.3 - 2.5 MCM, which are compensated by supplies from Israel[7].

13. Current Israeli policies on natural resource use are being perceived by the Palestinians as key factors determining the performance of the agricultural sector. However, even with these constraints in place, production growth has been considerable. Although improved access to traditional grazing areas would allow extensive animal husbandry operations to expand beyond current levels, and water from aquifers used for crops grown on land occupied by Israeli settlers could support Palestinian farmers, restricted access to natural resources has not been the only factor affecting agricultural production growth. Deteriorating market demand, many aspects of the regulatory and security environment, and declining productivity growth due to a lack of up-to-date knowledge have all restricted growth. Ultimately, the effects of the occupation, in combination with external market developments have constrained sector growth below its potential, and natural resource policies are part of this constraint. But as recent sector growth data demonstrate, the impact of these constraints were counterbalanced by distortions in the labor market, limited opportunities in the rest of the economy, and unrecorded exports to Israel.

14. Restricted natural resource access has also, however, been a major factor enhancing the water use efficiency of Palestinian farmers. In the more distant future the high opportunity costs of water will most likely be the key constraint which will negatively affect the comparative advantage of the entire region, including the OT, regardless of the ultimate division of the existing water resources between riparians. Competition for water will be critical, with urban areas competing with rural areas, agricultural users with non-agricultural users, and industry with domestic users. If water is to be priced to its real value in use, most of the current agriculture operations may not be able to compete, and only selected high value and high tech applications and selected rain fed applications may succeed. Ultimately this may result in the country-side being managed as catchment area for predominantly urban users, in which rain-fed agriculture may play an environmental as well as productive role.

15. *Labor.* Until the mid-1980s, agriculture in the OT shed workers, many of whom took up employment in Israel. Since 1987, following the start of the Intifada, the occurrence of more frequent strikes and other civil disturbances, and the Gulf war, Israel has imposed stricter control over Palestinian employment in Israel. Rapid population growth, emigration from the Gulf, and limited employment opportunities in other sectors, in combination with the stricter implementation of Israeli policies, and since 1987 the effects of the Intifada have caused a growing number of individuals to seek employment in the agricultural sector, the traditional depository of surplus labor. A growing number of farms in the OT, notably in marginal rain-fed areas, only survive thanks to the availability of cheap labor, much of which may not be recorded. Income of farm labor has remained extremely low in comparison to farmer incomes. The influx of labor has also made a key contribution to recent sector production growth, notably in the West Bank, while in Gaza the effect has been more limited.

7/ According to Mekoroth, the Israeli water company, the amount of water pumped to Gaza from Israel has been increased to 6.0-6.5 MCM recently; it covers the needs of the central refugee camps and fully covers the water needs of the Israeli settlers. The Civil Administration has also drilled wells for the Palestinian population for municipal purposes.

Agricultural Employment

Figure 1

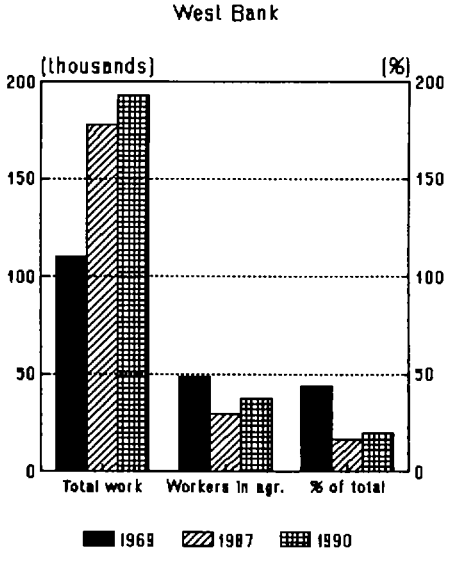
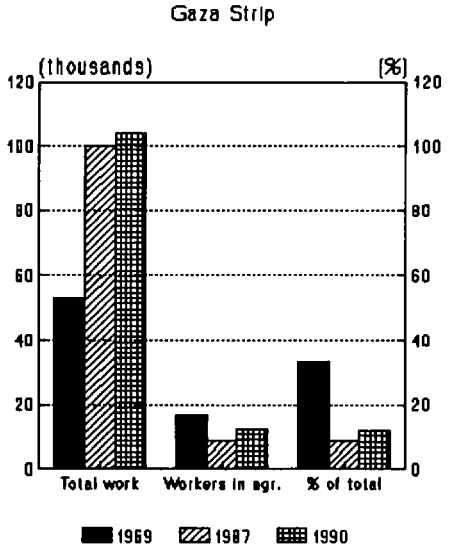


Figure 2



Each bar reflects data for 1969, 1987 and 1990.

Source: Statistical Abstract of Israel; 1971,1991.

16. What has happened in the past six years in the OT in terms of sectoral employment expansion is highly unusual in comparison to countries with a similar level of development. The increase in sector employment was possible because the new entrants had modest income expectations. In addition, Palestinian consumers increased the demand for locally produced products; and Israeli imports were partly replaced by local production. With sectoral employment levels already well above those of countries with comparable income levels, the ability of the sector to generate future employment growth is inherently modest, even when sector growth remains high. While the more traditional and least competitive parts of the sector are likely to continue to need cheap labor, the question is whether this could be provided by family labor, hired local labor or workers imported from abroad. Modern irrigated agriculture will require a combination of well educated farmers and cheap labor to be competitive.

B. Markets

17. While, historically, production in the OT has been mainly for local markets, Gaza has had a long tradition of exporting citrus. In the past 25 years, other fruits and vegetables have been exported, notably to Jordan and other Arab countries and Eastern Europe, but since the early 1980s the OT has faced increasing export problems. Markets in some Arab countries, Israel and Eastern Europe have declined or been lost due to the Iran-Iraq war, economic adjustments in Eastern Europe and more recently the Gulf war. In those markets where OT products continue to have access, trade is constrained by

relatively high production and marketing costs, quality concerns, quota restrictions and inappropriate institutional arrangements for marketing. Although the OT did remarkably well in the 1970's, at one time exporting close to half of its total production, the changing requirements and increased competition in external markets, and the increased restrictions imposed by the Israeli and Arab authorities have reduced exports to a fraction of past levels.

18. The local market has expanded quite substantially over the past 25 years. Population and income growth, and, more recently, the preference of the population for locally produced products, an expression of the Intifada, have been the cause. Consumer prices reflect relatively low income levels and quality requirements. Continuing production growth, declining export markets, the influence of the Intifada and imports from Israel have increased supplies to local markets over the past decade, lowering the prices of agricultural products. While this has reduced farm profitability, it has also created a welfare gain for consumers and may have increased the competitiveness of OT farmers.

19. Exports, as well as local markets are being affected, sometimes seriously, by the numerous regulatory, administrative and security regulations that currently hamper marketing efficiency and effectiveness. With trade being so important for the agricultural sector in the OT, and being entirely dependent on Israel for agricultural inputs, current procedures for imports and exports are perceived as cumbersome and expensive. The local market situation also reflects the prevailing trade regime between the OT and Israel, in which the trade of agricultural products is governed by the unconstrained entry of Israeli products into the OT and the selective entry, based on permits issued by Israeli authorities, of OT products into Israel. Imports of Israeli products strongly affect OT producers, with Israeli shipments often being concentrated during the period when OT growers harvest their crop. While official trade in agricultural products between the OT and Israel is affected by formal import restrictions, these are circumvented by a considerable non-recorded trade. Officially, trade between the OT and Israel is strictly controlled, and largely concentrated in raw material for industrial processing. However, market conditions for fruits and vegetables in the OT have encouraged informal exports to Israel, which continue to grow.

20. Trade with Jordan and beyond is currently seriously constrained by quotas imposed by Jordan and Israeli security regulations which considerably increase marketing costs and time. This trade, including the transit trade to other states around the Gulf, has been most affected by the political environment determining OT trade, and by the increasing competitiveness of local production and of neighboring countries. Until the early 1980s, restrictions and competition did not noticeably reduce the flow of products; markets suffered acute shortages of domestic supply, and the introduction of Israeli technology in the OT gave it a clear competitive edge. The outbreak of the Iraq-Iran war severely restricted citrus and vegetable exports, while Jordanian agricultural production witnessed unprecedented expansion in the 1980s. Jordanian production has become increasingly competitive, thanks to improved efficiency, in part the result of adopting OT technology, and access to relatively cheap water (subsidized for farmers, notably in the Jordan Valley), labor and other inputs. Turkey, Syria and Egypt have become equally competitive.

21. The OT have sent a number of trial shipments to the European Community (EC). Some faced difficulties and were not profitable, which confirms that the OT currently have difficulty meeting EC requirements in terms of quality, prices and reliability. These trial shipments also indicate that the OT itself does not have suitable market channels necessary to operate successfully in this market, although it can and has marketed through Israeli organizations.

C. Governance

22. Public policies, the regulatory framework and institutional support services are currently not conducive to sector development. Ambiguous or unclear sector and trade policies often constrain development. The regulatory environment, including licenses, the legal and administrative framework, taxes and its impact on the development of infrastructure in the OT, and, above all, the atmosphere of ad-hoc enforcement require substantial adjustment if the sector is to achieve its potential. The current public institutional services framework is deficient; while alternative non-public systems occasionally are efficient, the overall arrangements for non-public support services to assist the sector are not effective. Finally, while institutional financial services are available to the sector, services are limited; non-institutional credit is widely available, but essentially only covers short-term credit demand, sometimes at relatively high costs. Long term investments are almost always financed by equity only.

23. *Regulatory Environment.* The regulatory environment is detailed extensively in the private sector paper; the conclusions reached there also apply to agriculture. In general, the regulatory environment has not been conducive to private sector investment or growth in agriculture, although the farm sector may have been relatively less affected than agro-industry. The implementation of military orders related to security have had a considerable impact on activities. Those affecting exports to Jordan and the EC impose high transaction costs and, given the comparative price levels, materially affect the competitiveness of OT products.

24. *Agricultural Support Services.* The OT, because of its limited resource base, should derive its competitive edge from technology improvement. Instead, after an initial leap forward immediately following the start of the occupation, improvements in technology have waned. Public support for the sector, in terms of agricultural services, like research, extension and training has become extremely modest, as budgets and staffing levels have declined over the years. Private and non-governmental organizations have attempted to fill the void, creating a patchwork of uncoordinated service providers, which, while well-intentioned, provide generally ineffective services to farmers. Improving the knowledge base of the OT farmer includes: improving services like education, strengthening curricula, running technical training programs, performing applied research, and disseminating research results of agencies and institutions abroad; it also involves improving food safety and quality control, strengthening animal health and creating a more coherent system to transfer information to farmers. Finally it requires institutions and policies to guide the agricultural sector. Public policies and services have increasingly not been conducive to free knowledge transfers.

25. *Agricultural Credit.* At present, the agricultural sector relies on the informal sector for a considerable portion of its short-term funding requirements; the lack of institutional medium-term agricultural credit has had a constraining impact, notably during the past decade, on new investment in the sector. The few commercial banks in the OT do not provide agricultural credit. However, annually about US$5 million at subsidized interest rates is provided from private organizations and an even smaller, but undetermined amount from various cooperatives. The bulk of the credit, estimated at about US$25 million is provided by wholesalers, money lenders and suppliers of agricultural inputs and land owners, at interest reported between 2 and 4 percent per month. Because available funds from institutional sources are a small fraction of demand, subjective allocation procedures, often linked to the institutions ultimate objectives rather than the financial and technical feasibility of the project determines availability. Combined with negative interest rates in real terms, this has adversely affected credit discipline and the entire perception of the role of agricultural credit. Some borrowers reportedly harbor

reservations about paying interest. While farmers complain about lack of credit, short-term credit appears available at a cost; long-term credit appears much more difficult to obtain, and equity is the most frequently used source of long-term investment capital.

Future Outlook and Strategy

Future Prospects

26. Although agriculture in the OT suffers from structural problems, imbalances between production and demand and pressure to provide employment, there are some substantial assets.

- o First, the OT is blessed with temperatures which are ideal for many forms of agriculture, and while temperature variation within the OT area is considerable, in some areas temperatures give it a competitive edge in European markets compared to the rest of the region.

- o Second, the OT has no shortage of entrepreneurial talent.

- o Third, the technological basis for improved rain fed and irrigated production is well established, and much of the technology is in the public domain in Israel, some Arab countries, Europe and the United States.

- o Finally, given the strategic location of the area, and given the right financial climate, there are good prospects for attracting significant private capital flows into the sector from the expatriate Palestinian community, and international official assistance to help with investment and technical assistance.

27. A prerequisite for transforming the potential of the sector is the resolution of the long-standing political and security issues affecting the region. Removing the strategic uncertainty and the perception of risk through a political settlement would encourage private financial and entrepreneurial investment, notably in agro-industry and high tech agriculture. Equally important, access to external markets in the neighboring countries, the rest of the Arab world and Europe, is likely to be improved only with the advance of the peace process.

Elements of a Strategy for Agricultural Development

28. The future contribution of agriculture to economic development is highly uncertain, as it is dependent upon many factors, most of which themselves are difficult to predict. On the demand side key factors include future income and population growth in the OT, and the future trade relations, including access to external markets. On the supply side important aspects concern the competitiveness of OT production, which may include a reduction of regulatory constraints, improved access to natural resources, continued availability of relatively cheap labor, and introduction of a policy framework encouraging investment by the private sector. Ultimately, water is likely to be the key binding constraint, suggesting a relatively modest long term outlook about the potential of the sector. Nevertheless, in the short to medium term the sector will remain critically important for the local economy, not only in terms of income, but particularly from an employment point of view. In many areas in the OT, agriculture is a way of life, deeply ingrained in the social and cultural fabric. The future of the agricultural sector

should reflect those employment and cultural aspects, and this may enhance its dualistic character in the future. One part of the sector may evolve into a capital and knowledge intensive production system, focussed on external and local markets, economically and technologically highly efficient. The more traditional part of the sector would also improve its technology and efficiency, but would operate on a smaller scale, and be more labor intensive. While competitive in the local market, its products may not be able to compete in world markets.

29. While the sector has displayed considerable dynamism in the past, only some elements may be competitive internationally at present, while others are clearly not. Competitiveness, however, depends on various factors, many of which could be changed during the interim period and beyond. Competitiveness is also relative; the OT is currently competitive in the Israeli market for many products, but less so in Jordan. Ultimately the actual future of the sector is likely to depend on success in addressing some constraints and issues, and possibly little improvement in others. This in itself should temper assessments of the real potential of the sector, while it also suggests interventions which would lower the level of uncertainty, like clarification of access to natural resources and markets, improving the amount and quality of information, and simplifying the regulatory framework.

30. The guiding principle in agriculture, as in the rest of the economy, should be that production should take place only if farmers in the OT can grow and sell crops as competitively as others. As detailed in the macro report, the sector is particularly important for its impact on employment, as the employment creating potential of the other sectors, at least in the near and medium-term future, is limited. As the OT economy adjusts to a more sustainable growth path, the agricultural sector needs to avoid abrupt shocks which would cause rapid declines in employment. This implies that the agricultural sector should aim at growing as rapidly as economically feasible during the interim period, although this growth potential has to be seen in the context of resource and market constraints. Specifically, the following aspects should be considered:

(a) Access to markets should be improved.

(b) The efficiency and competitiveness of those parts of the sector with competitive potential in local and foreign markets should be restored or enhanced. Improving the supply side would require creating a policy framework conducive to growth, reducing the constraining impact of the regulatory environment, improving access to natural resources and strengthening sector support services.

(c) While phasing out uncompetitive crops is necessary, large adverse shocks through the sudden opening up of local markets or a rapid decline of production, should be avoided to limit major declines in employment. However, such adjustment should be managed without incurring excessive declines in efficiency, unsustainable financial support to the sector or the slowing down of the adjustment process during the transition.

Trade

31. Trade in agricultural products around the world is often more constrained and regulated than that of industrial products. In many instances changes in trade regimes are as much the result of negotiations as sector and market developments. Improved access to external markets, and improved trade relationships are critical for agriculture in the OT, and all avenues should be used to make the trade regime more favorable for OT farmers. Expanding access to external markets would not only be

important to achieve sustainable sector development, it would be even more vital if access of Palestinian labor to the Israeli market were to remain at the current restricted level. Shifting external economic relations to interdependence with a range of economies, including Israel, is clearly desirable for sustainable development.

32. Although demand in the local market may grow due to population and income growth, such growth will to a considerable extent depend on future migration to the OT. However, in economic and trade terms, the option of completely turning inward would clearly be a non-starter for a small economy such as the West Bank and Gaza, as it would result in major declines in production, income and employment. More specifically, if the sector remains largely dependent upon the local market, production is likely to initially decline from its current level, with serious implications for employment, and possibly declining local prices and, hence income levels. It is crucial for the long term development of agriculture in the OT to expand access to external markets. To maintain or expand current sector production levels and to give the sector time for structural adjustment, farmers need immediate access to markets in which there is already a relative competitive edge, and in which they could sell considerable quantities of products. The market that would offer immediate and sizable opportunities for the export of OT products at present is the Israeli market. Introduction of reciprocal trading arrangements for agricultural products between Israel and the OT may replace the current irregular transfers of agricultural products, or more fundamentally, become part of a form of customs union to be established, which could govern mutual access of a broad range of agricultural and other products. While the competitive edge of OT products in Arab markets at present appears more modest, the OT should similarly attempt to develop reciprocal trading arrangements with selected Arab countries, particularly Jordan.

33. There are three key institutional and policy areas where adjustments are needed in order to create a climate conducive to sustainable sectoral growth: (i) the legal and regulatory framework; (ii) management of natural resources; and (iii) the provision of sector support services. These are considered below.

Legal and Regulatory Framework

34. As noted earlier, future performance of the sector is critically dependent upon the private sector. Enhancing its potential requires creation of a legal and regulatory environment that supports private sector initiative, as detailed in the private sector report. Improving competitiveness through the removal of the most constraining regulations and practices, particularly liberalization of regulations affecting movement of products and people within the OT and across borders, the perceived insecurity of property rights and access to water and land should have high priority and will result in tangible increases in improved production and reductions in costs. Since the regulatory framework for the sector is extensive, and covers other economic activities, it is recommended that a study be undertaken to systematically review (i) what needs to be removed, adjusted or kept; and (ii) what new regulations are required in order to create a consistent framework conducive to efficient private sector and agricultural production.

Management of Natural Resources

35. The situation in the agricultural sector in the OT cannot be separated from the broad water picture involving limited sustainable resources, the riparian rights of countries, the sources of surface and groundwater and various categories of users over time. Consequently, farmers will have to continue with their efforts to maximize the returns from the limited water available to them through water saving

techniques and crop selection, and they will have to increasingly use treated waste water. Water pricing is currently being used by countries as a tool to influence competitiveness of their agricultural production. In the long run, absolute shortages will largely determine the cost of water, its real price and its most effective application.

36. While land resources are limited, land may not be as critical a variable as water. Nevertheless, with considerable areas of land in the OT not accessible to Palestinian farmers, increased access to land would assist future production.

37. While the question of access to natural resources ultimately depends on the outcome of the peace political negotiations, there are some measures that can be taken to ensure conservation and a better utilization of natural resources. Arrangements could be made for replacing or refurbishing worn-out Palestinian wells. The natural resource issue is also affecting animal husbandry; improved access to land for grazing would help the sub sector.

38. A long-term vision is needed on the management of forestry and marine fisheries resources. Forests have a particular role to play in the fragile ecosystems of the OT, and their expansion in combination with other forms of rain-fed production, would substantially assist erosion control and aquifer replenishment. There is obviously a clear role for some public sector involvement in the planning and managing of these resources. Resource management of fisheries requires long-term attention; access to fish resources in international waters to OT fishermen has recently been expanded, but further relaxation of regulations may be considered.

Public Sector Support Services

39. Private sector involvement in what traditionally are public sector activities, like agricultural extension, education and research, should clearly be encouraged. The private sector in the OT is dynamic and capable, and public sector resources, financial as well as administrative, are likely to be very scarce, at least for some time to come, suggesting a private sector role in these areas, in conjunction to the more traditional public sector role.

40. The OT needs improved governance or, specifically, a realistic agricultural policy; an effective public sector institution; selected public support services and infrastructure, like an export quality control and food safety service, a service to facilitate the transfer and generation of agricultural knowledge, and infrastructure to facilitate improved local and export marketing, like wholesale markets. Such a policy should, eventually, cover those aspects of agricultural operations which cannot be performed well by the private sector, or for which public regulation is essential. However, priority may be given to determining the future role of the public institutions, both within the sector, and in the exporting of agricultural products, in terms of providing sector support services, market information, quality and product safety regulations, trade and tariff policies for inputs and outputs and strategies to enhance sector competitiveness.

41. The nature of the governance function in the OT will be determined largely by the outcome of the peace process; establishing or improving institutions in the OT will also need to take into account the present setup. Once the framework is clear, the process of planning and implementation should start. Establishing public support institutions takes time. For example, while in the short term the knowledge base can be improved quickly by demonstration and sharing of publicly available information, in the medium term more fundamental changes are needed, like improving access to basic research results from

abroad, devising ways to create a coherent, effective and efficient extension service out of current activities, strengthening agricultural education and strengthening animal health and food safety and quality control services. In addition to time, such actions require policy decisions and well-prepared interim plans.

42. In terms of sector policy Gaza may well require specific arrangements which reflect its position in terms of size, population density, income level and more acute resource constraints. Efforts to cushion the impact of more open trade and restructuring of agricultural operations on employment should notably focus on Gaza. With half of its agricultural area irrigated, water shortages and costs will have a major impact suggesting specific measures to switch to the use of treated waste water.

43. Uncertainty, above all because of the nature of the peace process, will characterize the decision making framework for the sector. This uncertainty is particularly apparent with respect to future employment levels in the sector. In particular, young people in the OT may have expectations which the sector may not satisfy, and they will look for alternatives. Even if they do not find them, they may still be reluctant to go (back) to the farm. Maintaining agricultural employment may be difficult, as many Palestinians may want to leave for 'greener pastures'.

44. A multitude of scenario's could be developed to reflect what may or may not happen. How should the sector deal with such uncertainty. In principle, by focussing on actions and investments which would lower the level of uncertainty, from clarifying resource availability to assessments of external markets and products. For many farmers, understanding simplified rules of the game may well be of critical importance. Providing information and making rules and their application transparent should receive major and continuing attention throughout the interim period and beyond.

Sector Development Prospects beyond the Interim Period

45. The level and nature of agriculture production in the OT in the more distant future will depend on several factors, like access to foreign markets; the sector's efficiency in using and preserving scarce and costly water; the availability of cheap labor; and the efficient use of knowledge to compete in selected foreign and local markets. If international restrictions to agricultural trade further decline and trade policies liberalize, and the OT uses its limited resources to full advantage, a capital intensive technologically advanced section of the sector could compete in local markets, and expand exports of selected products to niche markets in the region and Europe. The more traditional sector would continue to supply local and possibly Israeli and Arab markets, depending upon the effect of future trade agreements on imports and exports, and on the ability of OT products to compete.

46. The role of the sector in the more distant future is subject to considerable uncertainty. A decrease of the sectoral share of GDP and a decline in the absolute and relative employment levels appears most likely on account of tightening natural resource constraints. Notably the role of rainfed agriculture may become more important in terms of playing an environmental as well as a productive role, enhancing water infiltration into aquifers. But while natural resource constraints will determine long term trends, annual growth will depend largely on the ability of the OT to sell in local and external markets. If a less constrained trade environment for agricultural products materializes, the impact on the traditional, rain-fed and irrigated production will differ somewhat. Growth of the traditional, rain-fed sector is closely tied to local demand; the OT's ability to compete with imported products will largely depend on its ability to maintain access to cheap labor - local and to a lesser extent foreign - and some key improvements in technology and efficiency. Continued use of family labor will likely be the key

determinant for future performance. Production levels of the irrigated sector will depend more on the competitiveness of OT products in local and foreign markets. In addition to foreign market access, technology and efficiency improvements appear of key importance, although continued access to cheap labor appears a close second, jointly with access to quality inputs at world market prices.

47. Future employment levels in the sector are difficult to predict. While in terms of long term trend formal employment in the sector will eventually decline in relative and possibly absolute terms, reflecting the well documented pattern of agricultural employment in developing economies, actual employment levels depend on a number of factors. Informal (family) employment in the traditional sector may well lag official employment declines, and stay closer to current levels. But much will depend on future migration patterns and growth and future income levels of employment in industrial and service sectors, and income expectations.

48. While external conditions will have a considerable impact on future sector growth, sectoral performance will also depend on the local policy environment, which should enhance efficiency improvements and export led growth. In addition, future growth will indirectly depend on the effectiveness of the future supporting role of the public sector. While such policy and public sector role should be initiated during the interim period, the success of its implementation and fine-tuning will have a considerable impact on future sector growth. Success in selling agricultural products in foreign markets depending on large private operators being active in the sector, and hence the ability of public policy to induce such operators to invest in the sector. In addition, smaller operators will need effective channels to export, and organizing such trade channels will need key attention. Public policy should also foster a viable financial sector and agricultural credit system, catering to the needs of both large scale and small operators. Finally, sector performance will ultimately depend on the ability of the sector to educate farmers and give them access to improved technology. Public sector effectiveness and efficiency in this area would do much for the sector to achieve most from its limited means.

Investment and Technical Assistance Needs

49. The sectoral agenda for investment and technical assistance prior to a peace agreement, during an interim period and beyond, should support the sector's supply response, increase its competitiveness, facilitate growth and increase exports. In the immediate future, technical assistance activities are suggested which do not require decisions in the peace negotiations. They include:

- strengthening the agricultural data base;
- studies to assess and improve the comparative advantage of OT agriculture vis-a-vis regional competitors and Europe, and preparation of action plans to facilitate agricultural trade, including assuring quality standards;
- surveys of the sector's infrastructure requirements, including means to reduce water losses from old distribution systems and expansion of future use of treated waste water in agriculture; and
- a study to assess the feasibility of fish culture in the OT.

50. During the interim period, the following technical assistance activities are suggested:

- a study to examine the role of public institutions, in guiding and monitoring agriculture sector development in OT and support for creation of the necessary institutions.
- developing programs for strengthening natural resource management;
- assistance to the private sector in developing agricultural markets.

The total costs of these technical assistance activities will be on the order of US$ 4.0 million; those that could be initiated in the immediate future may be less than half of that. Details are provided at the end of Chapter V.

51. During the interim period, private investment would concern rehabilitation of irrigation systems, processing facilities like slaughter houses and packing plants, and direct investment in enhancing value added in production and improve competitiveness. Given the major uncertainties concerning the future developments in the sector, no private sector investment estimates have been made, except for rehabilitating water supply (US$ 40 million). Public investment needs should be concentrated in three areas: sector support services like education, extension, applied research, food safety and animal health; the environment and natural resource management; and sectoral infrastructure, including, in particular, the facilities to ease agricultural trade across the Jordan River. These (public) investments during the interim period may total US$ 40 million, as detailed in Chapter V. In addition, a program of rural road improvement would be covered under the investment program detailed in the Infrastructure Report.

I. IMPORTANCE OF THE AGRICULTURAL SECTOR

Agricultural Share of GDP [8]

1.1 The agricultural sector has historically played an important role in the West Bank; prior to 1967 the economy was largely agriculture based, and focussed on local markets. Livestock production and rain-fed farming were the main activities. In the Gaza Strip agriculture was equally important at that time; irrigated and rain-fed citrus dominated production, comprising 50-60 percent of the total production value, with livestock production accounting for 16 percent. The Gaza Strip traditionally marketed citrus through Egypt for export to European markets.

1.2 Since 1967, the sector has maintained a key role. However, its structure and relative importance in terms of employment and income have fluctuated considerably, and the relative importance of the sector during the past 10 years has changed. The relative share of agriculture in GDP of the West Bank (calculated on the basis of fixed 1986 prices, and as a two-year average to deal with the major biannual fluctuations in olive production) declined from 39 percent in 1968/69 to 26 percent in 1982/83; since then, agriculture growth has been substantial [9]. The average share of agriculture GDP over the 1987-91 rose to about 33 percent. In Gaza, the agricultural share of GDP calculated in 1986 prices declined from 32 percent in the period 1968/69 to 23 percent in 1982/83, after which it rose only very slightly.

1.3 The graph on the next page of growth of agriculture GDP in constant prices, adjusted again for the peculiarities of the olive crop, suggests for an initial period of continuing growth until 1980. This was for the West Bank followed by a relatively short period of stagnation, after which growth resumed at a high pace, with the effects of the biannual olive crop becoming more pronounced; since 1983/84 sectoral GDP in constant prices effectively doubled in seven years. In Gaza the picture is much less optimistic, with modest agriculture GDP growth until 1976, followed by a slow declining GDP until 1984, after which modest growth resumed.

1.4 It appears relatively easy to explain the initial growth of sector GDP following the occupation, but it is more difficult to explain recent growth, particularly the high growth in the West Bank. Initial growth was fuelled by strong demand in external markets, including Eastern Europe, Arab markets and Israel, and a rapid and effective transfer of new technology and knowledge from Israel, notably in the area of water-efficient irrigation techniques and production under plastic. The growth took place from a modest production base, despite apparent shortages of institutional credit, apparently modest restrictions imposed on access to land and water and the loss of labor to Israeli markets. Since then a combination of factors has slowed growth. Declining demand in external markets had a considerable impact. It was caused by market and non market factors and declining competitiveness in key crops. Administrative regulations imposed as part of the occupation caused a deterioration of the general business climate.

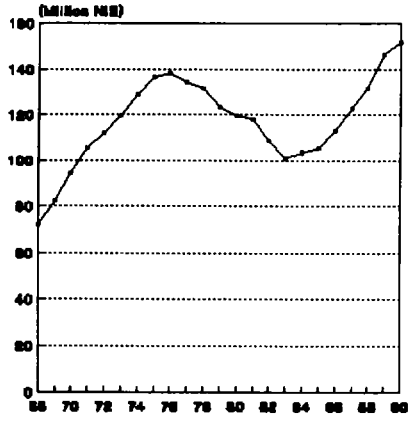
8/ Statistical data for the Occupied Territories in this report come from a variety of sources. Israeli sources largely depend on data published in the Statistical Abstracts and other publications of the Central Bureau of Statistics. The report also depends on Palestinian sources and on mission judgements, based on a variety of sources of information, some of which contradict each other. The report reflects our best effort in assessing these contradictory and often incomplete signals.

9/ Source: Israel, Central Bureau of Statistics, National Accounts of Judea, Samaria and Gaza Area 1968-1986 and following years.

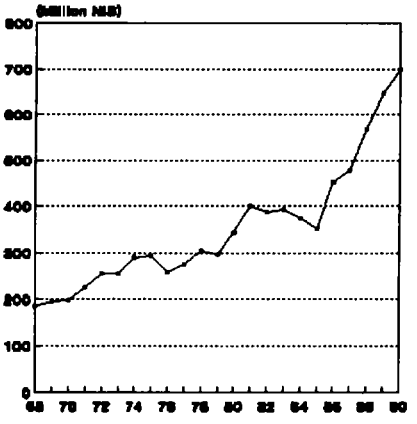
Competitiveness was also affected by a declining public institutional performance. Finally, lack of (long-term) credit may have played a role.

Agricultural GDP 1986 prices
(Moving 2 year-average)

Gaza



West Bank



Source: CBS, National Accounts of Judea, Samaria and Gaza Area; 1968-1986 and following years.

1.5 Improvements in sectoral growth performance since 1986, if they are as substantial as the data suggest, may in part reflect increased local demand for locally produced agricultural products on the part of Palestinians and the rapid expansion of the area under fruit trees and intensive animal husbandry production [10]. Some increase in exports, notably unreported exports to Israel, may also play a role. The upswing since 1986 presents a paradox in that agricultural production has been expanding despite an environment of declining external markets, a constrained regulatory framework, a declining level of public services available to the sector, and restricted access to natural resources. This paradox may also be explained by increasing sector employment, with the OT employing a much larger share of the work force than countries with comparable levels of income. The increase in the number of people forced to work in the sector because they lost their jobs in Israel and in the Gulf has induced production growth, but not necessarily an increase in income. The paradox ultimately reflects distortions in labor markets, external markets, trade arrangements and the impact of local policies and constraints.

Agricultural Income

1.6 Analysis of farm income developments is hampered by limited and conflicting data. Income patterns not only differ between Gaza and the West Bank, but also between rain-fed and irrigated crops and between farm owners and workers. According to Israeli data [11], average income per self-employed farmer in 1990 prices grew very substantially between 1967/68 and 1979/80, after which there was a

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10/ This reflects efforts to demonstrate land ownership and efforts to reduce OT dependence on Israeli animal products.

11/ Agricultural Branch Accounts in Judea, Samaria and the Gaza Area, Agricultural Statistics Quarterly, CBS, 1991.

considerable decline. Awartani [12], using the same Israeli data, calculates a slightly less rapid growth in farmer incomes (in 1980 US$) in the initial years of the occupation, a modest decline after 1980 until 1985 and considerable growth since then, both in the West Bank and Gaza. He also concludes incomes of farm workers have lagged far behind, being between a half and a third of farmer incomes in the West Bank, and about a fifth of incomes in Gaza. While high inflation in the early 1980s, the fast growth in the relative value of input prices versus output prices and declining export markets may have been responsible for a decline of the income of both farmers and workers in real terms, recent production growth may have helped farmer incomes, notably in the West Bank, to grow. On the other hand, worker incomes have remained under considerable pressure, possibly reflecting increasingly rapid labor absorption in the sector. There is circumstantial evidence that incomes of farmers raising irrigated crops, such as vegetables have been growing faster than those involved in traditional rain-fed crops. Without detailed farm survey data, absolute levels of income are a matter of conjecture at present.[13]

Food Consumption and Self Sufficiency in the OT

1.7 Although the area now constituting the OT was traditionally self-sufficient in food, before 1968 the population had begun to consume more than it produced. In 1986 it was estimated that the value of local consumption exceeded the value local production by 18 percent [14]. However, at present the impression is strong that local production exceeds local consumption for an increasing number of crops [15]. Rising incomes, living standards and population growth, as well as rapid increases in spending, have increased demand; nevertheless, local supply grew faster due to declining exports and rapid production growth. The degree of excess production over demand in local markets has been estimated [16]; total local production of fruits and vegetables, on average, exceeds local demand by about one quarter. Dietary standards have improved considerably since the occupation (by about 20 percent), and in the West Bank they are now close to those in Israel (2,931 cal/person/day and 3,059 cal/person/day, respectively); in Gaza, they lag by about 15 percent. Only in animal protein and fat do Palestinians lag Israeli consumption levels.

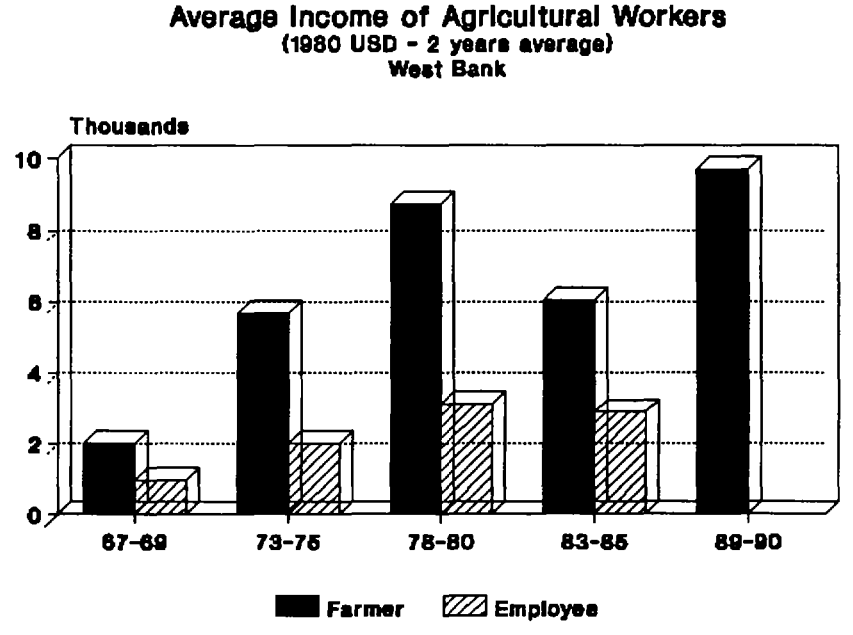
12/ Hisham Awartani, Economic Aspects of the Agricultural Sector in the Occupied Territories, 1992, (pp, IV-19).

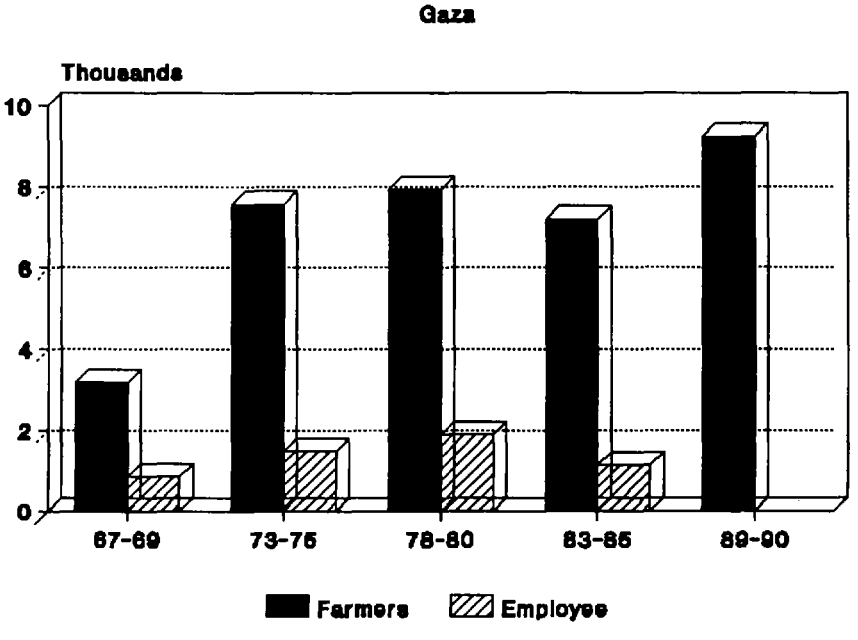
13/ Graph on following page.

14/ Hisham Awartani, calculated from Judea, Samaria and Gaza Area Statistics, 1986 (3), pp, 78-89.

15/ This conclusion does not cover wheat, barley, rice and sugar, products which the OT have traditionally imported.

16/ Development Perspectives for Agriculture in the Occupied Palestinian Territories, Society for Austro-Arab Relations, 1992.





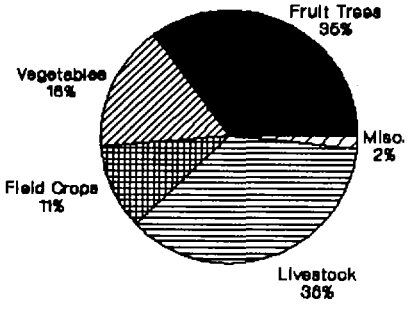
i) conversion to US$ at official 1980 exchange rate, 1989/1990 data converted at average exchange rate of those years (US$ 1 = NIS 2.0162 (1990); US$ 1 = NIS 1.9164 (1989));
Source: CBS, Agricultural Statistics Quarterly, 1990

II. SECTORAL RESOURCE BASE AND COMPETITIVENESS

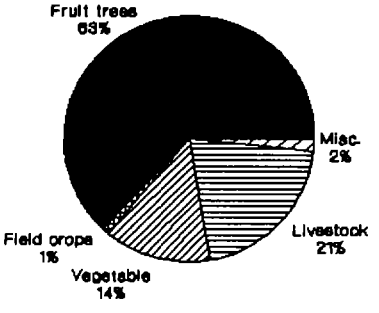
2.1 The agricultural sector is described in some detail in the Technical Annex A and B. This chapter deals with its resource base, productivity and competitiveness. The sector is characterized by its highly diverse nature, with seven agro-climatic zones in which about 60 crops are grown on at least 20 different soils. Total rainfall fluctuates between 100 and 700 mm annually, depending on the location. Since 1968, the composition of agriculture output in the West Bank and Gaza has changed considerably. Although traditional crops (citrus, olives) have, in the past, been an important factor fuelling growth, that role has been taken over recently by vegetables and animal husbandry. Although only 10 percent of the crop land is irrigated, crop production on irrigated land accounts for about 60 percent of total crop production value.

Value of Agricultural Output (Percentage)

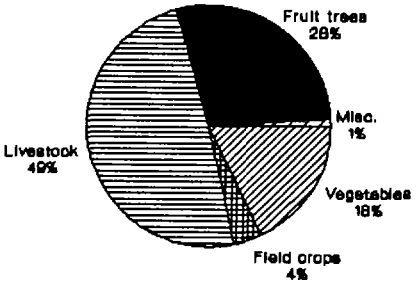
West Bank (1969-70)



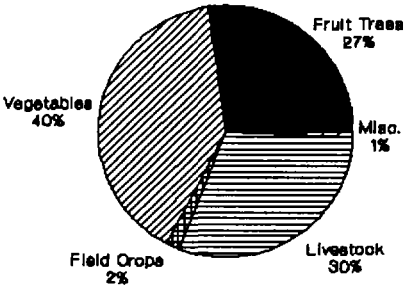
Gaza Strip (1969-70)



West Bank (1989-90)



Gaza Strip (1989-90)



Source: CBS, Statistical Abstracts of Israel

Natural Resource Use

2.2 About a quarter of the 6.16 million donums in the OT is cultivated; 1.5 million donums in the West Bank and .16 million donums in Gaza. The area under irrigation is about .20 million donums, of which .09 million are in the West Bank. The irrigated area in Gaza has increased from 60,000 donums in 1967 to 110,000 donums in 1991, while it fluctuated around 90,000 donums in the West Bank. Overall, the area under cultivation has declined by about 6 percent, all rain-fed land. Some 1.5-2.0

million donums of non-cultivated land have traditionally been used for grazing. According to the Civil Administration, the area available for grazing has been restricted; military zones are closed during exercises on selected dates, and restrictions apply in nature reserves. In the West Bank 1.16 million donums is military land, most of which in the eastern part of the area. While Israel does not transform cultivated lands into state land (except for purposes of general infrastructure, like roads) there is some uncertainty about what constitutes cultured land depending on the legal system being applied. In Gaza no land was converted to state land after 1967; state land comprises 109,500, or about one third of the area, of which Israeli settlements cover 15,000 donums. If state lands and nature reserves include Palestinian crop land, Israel allows the Palestinians to continue to cultivate these lands. Cultivated land of Palestinians has generally not been used for Israeli settlements, except in the Jordan Valley. Unknown quantities of cropland are also being used for expansion of municipalities, and for housing.

2.3 For the West Bank, the annual renewable water that is available as groundwater from the aquifers shared with Israel is 600-800 million cubic meter (MCM); for the Gaza, 50-70 MCM is available. From the shared aquifers in the West bank, Palestinians use about 15-20 percent; the rest is used by Israeli settlers and Israel. Agriculture uses about 70 percent of the water available to Palestinians in the West Bank, and 60 percent in Gaza. Before 1967 withdrawals from Gaza aquifers exceeded average renewable recharges by some 50 percent; this has been reduced to 30 percent at present. From 90 MCM, Israeli settlers use 2.3 - 2.5 MCM, which is compensated by supplies from Israel, which recently have increased to 6.0-6.5 MCM. Refugee camps currently receive the rest of the Israeli supplies. The Civil Administration has also drilled wells for the Palestinian population for municipal purposes.

2.4 Because of the relatively high costs of water (US$ 0.14-0.17 per m3) and limitations imposed by the Civil Administration, which basically restrict farmers to average water use levels slightly below those of 1970-1973, OT farmers have used water increasingly efficiently. In the West Bank, farmers currently use less water per donum and in total than in 1968 reflecting such improvement in efficiency. In Gaza, water use per donum has fallen by 58 percent since 1966. Water availability has also been affected by increasing levels of salinity, notably in some areas of the Gaza and the Jordan Valley.

Competitiveness

2.5 Assessing competitiveness of agriculture in the OT is difficult; micro-economic data are hardly being collected systematically; average incidental data may not reflect the highly diverse growing conditions. More important, current conditions are hardly optimal, and assessing the impact of the introduction of a optimal production and trade environment involves many, often subjective assumptions. Finally, neighboring markets impose trade restrictions and provide support to their own production.

2.6 In the OT, initial competitiveness depended on factor costs and then shifted to technological improvements. Unfortunately, the sector has not been able to sustain technology based growth. A discussion of competition requires a division of the sector in the traditional, largely rain fed, production, irrigated vegetable and fruit production and animal husbandry. Production from fruit trees and field crops, and possibly some forms of intensive animal husbandry, currently can not successfully compete on world markets; products are tailored to local tastes, and more efficient producers exist elsewhere. This applies to products like olives, grapes, wheat and barley and white meat. However, for cultural and social reasons this form of agriculture is likely to continue, supplying a captive local market which has clear preferences for these products. While some improvement in productivity and efficiency appear feasible, such changes are unlikely to elevate production efficiency and product quality to world market levels. However, in local, and possibly some regional markets competition may be feasible, provided external markets are not heavily distorted.

2.7 Irrigated agriculture and extensive animal husbandry appear to have more potential. Some crops are currently not competitive in external markets [17], and even under the best of circumstances may be unable to compete except in protected markets. Others, like selected vegetables and seedlings are already regionally competitive. To maintain such competitiveness in the future and to make other crops competitive some key conditions need to be met: (i) farmers have access to up-to-date knowledge and to efficient public and private services; (ii)products can be freely traded to selected markets, and competent and efficient marketing institutions and trading arrangements exist; (iii) the regulatory environment normalizes; (iv) direct and indirect tax levels and inputs costs are not excessive compared to competitors, while land and water are available at economic cost; and (v) the OT concentrates on niche markets and products.

2.8 Jordan, Israel, Egypt and the OT share climatic conditions allowing them to access the European markets early. Jordan, which has remarkably similar external marketing problems, has become increasingly competitive, and enjoys some cost advantages: (i) water in the Jordan valley costs less than 10 percent of water in the OT; (ii) labor rates for manual labor are about one third of OT levels, as Jordanian farmers increasingly work with Egyptian and Pakistani labor, while (iii) certain types of fertilizer is less taxed as in the OT, while (iv) real estate laws suppress land speculation and land prices (in the Jordan Valley [18]); and (v) credit is also cheaper and more easily available. These advantages were further accentuated by last year's devaluation of the Jordan Dinar. In the long term agricultural production in Jordan may be most affected by water shortages and high water costs if the current division of the regional water resources is being maintained. With water costs in real terms increasing, Jordan's ability to maintain viable production will largely depend on how effectively it can access new markets, improve its technology base, including waste water based production systems. Egypt has much more water, and although virtually all is currently being used, major water efficiency use improvements are potentially feasible. However, it has so far only been modestly effective in adopting production and marketing technologies, an export oriented policy framework, and enforcing quality standards. Israel's current comparative advantage is in large-scale capital intensive operations and production of crops which reflect a high research input and sophisticated farming techniques aimed at affluent markets. Future comparative advantage will be determined by: (i) the continued effectiveness of Israel's agricultural and market research, including its ability to further develop water saving techniques and cropping systems which tolerate the use of brackish water or treated waste water; (ii) the sector's ability to reduce labor

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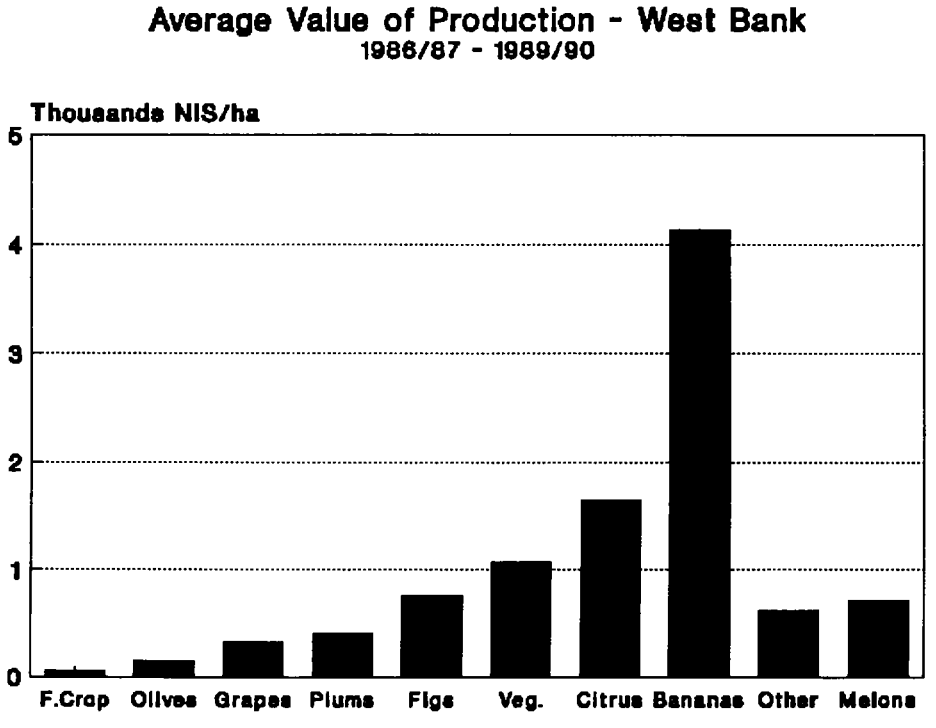
17/ For example, even if major improvements are made in technology and varieties, citrus' considerable water (Annex C, Table VI-A), land and labor requirements virtually precludes future world market competitiveness, although it may continue to compete in markets with protected access. Current gross benefits are reportedly about half of the reasonable costs to fertilize, irrigate and harvest the crop. In Gaza farmers are currently selling their land, of which the values have skyrocketed to US$ 100,000-500,000 per donum. By comparison, despite much higher productivity levels, gross benefits are also well below direct production costs in Israel. Israeli farmers do not own their land, but rent from the State, and thus have fewer incentives to completely stop production; instead, they are looking for more profitable crops, including citrus varieties with better markets.

18/ Jordan exported about half of its about 1 million ton fruit and vegetable production to Arab markets prior to 1989, after which exports dropped dramatically. To diversify exports, Jordan may now concentrate on developing markets and marketing strategies for a limited number of products for East and West European markets, for which it considers to have a competitive advantage.

requirements and costs; and (iii) the continued effectiveness of the regulatory framework. In all three countries programs are underway to liberalize the sector, reduce public support, open markets and price natural resources in relation to scarcity. Israel expects to complete the program in 1998, Egypt and Jordan may need more time to take politically difficult decisions. The OT can expect continuing competition from products of all three countries over time.



Source: H. Awartani, Economic Aspects of the Agricultural Sector in the OT.

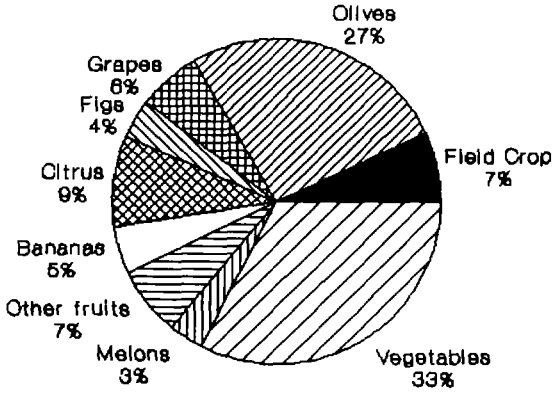
Productivity

2.9 Rain-fed agriculture dominates the West Bank; because of the uncertain precipitation, many crops are grown using a traditional, low-risk, low input technology. Because of lower rainfall, Gaza rain-fed agriculture is less important and demonstrates the same risk-averse production pattern. In irrigated areas in Gaza and the West Bank, a modern, water efficient, protected and open cultivation system predominates, notably for vegetables. Although productivity levels are well below those in Israel, the USA and selected Western European countries, they are comparable to or exceed those in neighboring Arab countries. Some yields have doubled or tripled since 1968. For a number of crops, current yield levels can be substantially improved by introducing improved varieties, better husbandry and better input use; quality can be enhanced by improving post harvest handling and packing.

2.10 Although agriculture has been characterized by its diversity, changing cropping patterns, production growth and yield increases, the sector has major components with a less progressive history. Tree crops, due to the long-term nature of the production process, have been the least able to adjust to changing circumstances and have shown low profitability, only modest increases in yield and limited technological progress. Citrus, grape and almond production has been slow to adjust to new circumstances and declining profitability. Olive production has expanded, but mostly for non-economic reasons; profitability remains marginal. However, the crop remains important. Olive trees cover almost

50 percent of the cultivated area in the West Bank, most of it marginal land, and is important in terms of food security.

Value of Total Agr. Production, West Bank
1986/87 - 1989/90



2.11 Vegetables, and related products like seeds and seedlings, hold, in more than one sense, the key to future development in agriculture; in the past, modern technology has impacted most on vegetable production, and adjustment to market developments has been quickest. Vegetables have been one reason why the OT have been successful in dealing with the constrained availability of water and the loss of some agricultural land. While the climate in the OT favors off-season vegetables, the sector has had problems developing new markets for these products. Nevertheless, despite the constraints, vegetables have been the crop most farmers shifted to when traditional crops fail to perform; they account for about 50 percent of total value of production in Gaza, compared with 11 percent in 1978.

2.12 Although generalizations are difficult, as so many factors determine the relative productivity and competitiveness of crops in the OT, future successful crops would need: (i) expanding local or external markets, which are not excessively sensitive to transport delays or costs; (ii) production that can be adjusted quickly to demand; (iii) production that requires a technological and innovative edge; (iv) production that generally requires modest water inputs; and (v) production that is not dependent upon downstream processing, which requires major investments or high risks. For example, asparagus, green beans, peppers, eggplants and nectarines should do relatively well in the future. In the long term the competitiveness of OT products in international markets may have to depend on innovative new crops and technologies, rather than factor cost advantages.

2.13 Animal husbandry accounts for well over a third of agricultural output; in the West Bank, it accounts for 50 percent. Operations have traditionally been focussed on local markets and family consumption. The performance of the livestock sector has been affected by the occupation. Animal husbandry production growth, notably intensive production of poultry during the past eight years, has been rapid in many areas, but could even have been faster if licensing for hatcheries had not been limited until recently. Extensive livestock operations have been affected by reduced access to grazing lands for the extensive, bedouin-managed rearing of sheep and goats. Until the mid 1980s milk and poultry production in the OT have been constrained by strong competition from subsidized Israeli products; subsidies have substantially declined over time. Poultry production expanded rapidly once licenses became readily available. Livestock production in general has received a major impetus from the Palestinians preference, following the start of the Intifada, for OT-raised livestock over imported products. Reduced employment opportunities in Israel and the Gulf have also increased the number of animal farmers and production substantially during the past six years.

2.14 Animal husbandry has been particularly affected by quality and food security issues. Palestinian farmers are dependent on Israel for high-yielding cattle and sheep. Israel's herd needs to cull its lower quality animals, which were often bought cheaply by OT farmers, affecting production performance of the herd in the OT. Although the general decline in public services for the agricultural sector affected veterinary services to a lesser degree, present (public and private) arrangements to contain animal disease problems appear deficient, and Brucellosis disease has reportedly assumed major proportions. Similarly, quality deficiencies affect dairy plants and private slaughter due to the lack of effective control and quality inspections.

2.15 International competitiveness is less of an issue in animal husbandry. Local demand for animal products exceeds supply, and appears to be growing rapidly; while local consumers strongly favor local production demand is being satisfied with fresh and frozen imports. Extensive forms of animal husbandry, using sheep and goats in combination with local rain-fed barley, and other feeds, appears competitive and cost effective, even from a regional perspective. More intensive forms of production of red and white meat and dairy products may be less competitive internationally but, given the preference for locally produced milk and freshly slaughtered meat, may remain competitive in local markets. In addition, Gaza and the West Bank may well be competitive in culturing fish.

III. KEY DETERMINANTS OF SECTOR PERFORMANCE

3.1 The following selection of five key determinants of past sector performance have affected the performance of many crops and products; their relative importance over time is uncertain, and determining that would require analysis well beyond what can be provided in this report. These determinants are: (i) markets; (ii) agricultural technology; (iii) agricultural supporting services; (iv) access to natural resources; and (v) employment and labor productivity. The impact of the occupation on sector performance has not been chosen as a separate determinant, although its impact has been profound. Describing sector performance in terms of the documented impact of the occupation still requires analysis in terms of what factors were impacted, and that is what has been done in this report.

Markets

3.2 Of all factors determining the viability of agriculture and the direction of its development in the OT, market demand for agricultural products appears to have been among the most potent. The OT currently produce considerably more agricultural products than can be absorbed by its local markets. Some products are exported. Given the circumstances, the OT have done remarkably well in the past, in around 1980 exporting close to half of total production. However, three factors have most contributed to a substantial decline in exports, and have increased competition in local markets. Demand for agricultural products has changed in external markets, quotas have been imposed on imports of agricultural products by Jordan, and the competition in local and foreign markets have all contributed.

Local Markets

3.3 Physical market infrastructure in the OT is limited, and serves local requirements only in a basic way. Several of the 16 wholesale markets lack facilities for temporary storage and administrative facilities for local traders. The storage facilities that are available are used predominantly for Israeli products. Packing materials are standard [19]. Markets allow farmers to sell their products through a system of auctions organized by commission agents, who sometimes also perform short-term credit services, arrange input supply and provide forward contracting services. Some commission agents have very substantial operations in each of these areas. Local markets function largely independently; while the Civil Administration has very limited control, cooperatives are administratively involved in regulation and sometimes supervision of marketing operations, including issuing permits for export to Jordan. Three other registered organizations [20] are involved in marketing, and their role has been more effective in organizing marketing efforts. Nevertheless, in the area of marketing the OT suffers from lack of policy direction, specifically, the legitimate role of the authorities is unclear. This deficiency is most visible in

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19/ A single party has the monopoly for plastic containers which farmers are obliged to use for local marketing of all products. For export simple wooden boxes rather than more appropriate product specific containers are used, reflecting Jordan's refusal to accept containers of Israeli origin, and security related constraints on the return into the OT of packing materials, and, until recently, the lack of local industries producing suitable packing materials.

20/ The West Bank Agricultural Cooperative Union, the Benevolent Society of the Gaza Strip, and the Citrus Producers Union of the Gaza Strip.Two of these organizations have signed an agreement with the Israeli Government concerning direct exports to Europe.

the area of food safety and quality control services, where ineffectiveness is an acute problem, notably regarding livestock products [21].

3.4 The efficiency and cost effectiveness of local marketing is hampered in terms of time and added costs by numerous regulatory and administrative regulations. Transport of products to and from the West Bank and Gaza requires at least five permits [22], and for a typical load of oranges transport costs total about 15 percent of shipment value [23]. Lorries commuting between West Bank and Gaza are required to use specified roads linking Gaza to the edge of Hebron District. Marketing activities are frequently affected by security related curfews, and bans on the entry of OT citizens to Israel. Although some of these regulations by themselves are costly or cause loss of time, in combination they provide a serious dis-incentive to optimal marketing.

Export Markets

3.5 Prior to 1968, production in the West Bank was largely focussed on the local markets; however, Gaza has traditionally produced and exported citrus. Since 1968 exports of OT products expanded rapidly and then declined. Traditional markets in Eastern and Western Europe for citrus from Gaza also flourished and then declined in importance as did exports of fruits and vegetables to Jordan and the Gulf. Markets in some Arab countries, Israel and Eastern Europe have declined or been lost due to the Iran-Iraq war, economic adjustments in Eastern Europe and more recently the Gulf war. In those markets where OT products continue to have access, trade is constrained by relatively high production and marketing costs, quality concerns and inappropriate institutional arrangements for marketing. Although the OT did remarkably well in the 1970's, at one time exporting close to half of its total production, the changing requirements and increased competition in external markets, and the increased restrictions imposed by the Israeli and Arab authorities have reduced exports to a fraction of past levels. The OT have also developed official and unofficial markets in Israel, which, in terms of volume, may well be the most important outside the home market.

3.6 Trade of agricultural products between the OT and Israel is governed by unconstrained entry of Israeli products into the OT; reciprocal entry is selective, and based on permits issued by Israeli authorities. The existence of this arrangement reflects the importance of the OT market for the selective disposal of excess Israeli produce and the structure of the Israeli market, which is detailed in Technical Annex C.

21/ Although in theory Israeli health and quality control standards apply in the OT, in practice the Civil Administration veterinary and health institutions are under-staffed and -funded, and alone or in cooperation with other agencies involved in this area, appear ultimately neither efficient nor effective in ensuring minimum quality and health standards for agricultural products. Brucellosis has reportedly spread widely; meat is often offered in many communities without proper inspection. Hygienic deficiencies concerning dairy product have reportedly assumed serious levels since a number of mini-dairies have started operations four years ago.

22/ (i) Personal clearance from VAT, income tax, police, (ii) Vehicle pass, contingent upon owner having obtained clearances concerning VAT, income tax, real estate tax, local municipality and police, (iii) Driver to obtain magnetic card (Gazans only), (iv) produce permit, and (v) departure of product permit (to be obtained 24 hours prior to transport).

23/ Source: Private Sector Report.

3.7 Official exports of OT agricultural products to Israel consists mainly of citrus for the Israeli juice industry and re-export, cucumbers for Israeli pickling plants, and grapes for wineries. In terms of volume, some 40-60,000 tons of product are currently involved. Variable quantities of vegetables and fruits are permitted for export to supplement occasional shortages in Israeli markets, as indicated by various Marketing Boards. But these official imports are modest compared to the 'unreported' trade. Current unofficial transfers of OT products to the Israeli market appear considerably larger than official imports [24]. The practice appears widespread, regular and increasingly well organized between private parties, despite widely reported large numbers of confiscations of truckloads. The volume of this trade also suggest that a considerable Israeli market does exist for lower quality and low priced products.

3.8 Exports of Israeli products to the OT include virtually all purchased inputs and in addition wheat, sugar, rice, meat and milk products, which the OT currently is unable to obtain from other sources. Wheat-flour, rice and sugar are not produced in Israel; imports through Israel reached about 160,000 tons in 1989/90. In addition, variable quantities of Israeli fruits, vegetables and other agricultural products are sold in OT markets, which may well reach 100,000 tons annually [25]. The trade has a major impact on OT markets; shipments are often concentrated during the period of the year when OT growers harvest their crop, often adding to already oversupplied markets.

3.9 Trade with Jordan, including the transit trade to other states around the Gulf has been most affected by Jordanian and Israeli trade restrictions, and quotas and time restrictions introduced the Jordanian government, which have passed through numerous stages since 1967. The current situation is characterized as follows:

(i) No Israeli product is permitted entry across the bridges, necessitating certification by West Bank authorities of the local origin of produce of individual farmers in the OT. This task is handled by local authorized liaison officers, who consult with marketing authorities in Jordan.

(ii) Import quotas and time limitations, which are negotiated annually, limit the amount of West Bank farm produce that may enter Jordan, while citrus from Gaza is allowed on the premise that it transits to other markets.

(iii) Israel does restrict imports of Jordanian products into the OT.

3.10 Until the early 1980s, fewer restrictions existed, and they did not noticeably reduce flows of product; neighboring countries suffered acute shortages of domestic supply. For example, close to 200,000 tons of citrus and 100,000 tons of vegetables crossed the bridges in 1978/79, in 1984 total exports still exceeded 220 thousand tons.[26] Nevertheless, the outbreak of the Iraq-Iran war severely restricted citrus and vegetable exports. Meanwhile Jordanian agricultural production witnessed

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24/ By some estimates, current unlicensed transfers to Israel have picked-up after initial declines in 1987. Despite stronger enforcement of existing regulations, they may currently amount to some 75,000 tons of products, or some 10-12 percent of total OT production, compared to an estimated 40-50,000 tons in 1987-88.

25/ In 1986/87, the latest year for which official Israeli data are available, Israeli exports to the OT of fruit and vegetables only (and excluding olives) already reached over 90,000 tons.

26/ Agricultural Statistics Indicators, 1981-1988, Amman; Ministry of Agriculture, Amman, 1989.

unprecedented expansion in the 1980s; it suffered the loss of some of the same markets as the OT, which resulted in further competition in Jordanian markets for exports from the OT. Jordan itself is being severely affected by a declining market share and heavy competition in its traditional markets in the Gulf. Combined with the Jordanian disengagement policy in 1988, which included the introduction of annually negotiated import quotas, and marketing windows, this resulted in an increasingly restrictive attitude of the Jordanian authorities in issuing import licenses.

3.11 Two other factors severely restricted exports to Jordan. First, Jordanian production has become increasingly competitive, as detailed in para 3.9. Second, transport across the bridges, including all related administrative and security arrangements, is not only extremely expensive and time consuming, it prohibits OT farmers from fully exploiting all marketing opportunities as their representation in Jordan and beyond is weak. The costs per ton of product for a single truck shipment of 8-10 tons across the bridges is estimated at US$ 500 - US$ 900 per truck, provided it returns within 24 hours. The costs are affected by current security arrangements; in addition, a de-facto cartel of truck owners which operate across the river has been created, the indirect result of licensing arrangements of the Jordanian authorities and the Israeli security requirements[27]. OT producers are often dependent upon traders in Jordan to handle and sell their products, which may not be of advantage to producers.

3.12 *Trade with Europe*. The OT have traditionally exported to Europe; in 1976 Gaza exporters channeled some 62 thousand tons of citrus to mainly Eastern Europe. AGREXCO, an Israeli national cooperative granted the monopoly for vegetable exports, and the Israeli Citrus Marketing Board have been involved in handling OT products to the EC for some time. Both established close working relations with growers. AGREXCO was most active, and initiated new plantations for herbs and onion seed, and also bought high quality vegetables. Nevertheless, total volume never exceeded 1,500 tons, and AGREXCO was accused by OT farmers of being selective in its pricing and rejection practices, although this is contested by Israel, which asserts the absence of any discriminating treatment. The Citrus Board operated less permanently in the market, and with Israeli citrus exports currently in considerable difficulties, their operations in Gaza are relatively modest.

3.13 In 1987 agreement was reached between the European Commission, Israeli authorities and Palestinians in which Israel consented to Palestinian exporters having a 'free choice to negotiate and establish direct links with buyers in the EC market.' Since then, a number of trial shipments have been made, which have revealed that the OT initially had very little experience dealing directly with the EC market; OT exporters have gained some experience with EC market requirements in terms of quality, prices and reliability. However, they have been unable to create the necessary institutional structures to successfully operate in the EC[28].

27/ These trucks, all of 1967 vintage, are completely stripped down to facilitate security inspections; they sometimes do not receive the regular security checks upon return within the same day they left the OT. Special security checks require trucks to be completely disassembled, taking the truck out of circulation for some 5 days. The uncertainty of random security requirements forces truck owners to ask for payments for transport jobs on the assumption of performing only 4 trips per month. All produce is completely searched prior to crossing the bridge; according to Palestinian traders this search sometimes damaging the produce. In practice trucks need to line-up the previous day to ensure crossing and return the same day, further adding to costs and reducing product quality.

28/ These shipments also show the impact of current administrative and security arrangements to pack and ship products through Israeli ports or airports on marketing to a market as

3.14 Export to Eastern European Countries has generally not been viewed as particularly attractive to Palestinian exporters, although volumes have been substantial. Conducted initially on a barter basis, arrangements became increasingly problematic in the late 1980s, when less than 10,000 was shipped; current shipments are even smaller. With Gazan exporters having experience in these markets, expansion is possible if institutional arrangements can be improved to handle the barter arrangements, and competitiveness can be enhanced.

3.15 *Conclusion.* With a relatively small local market, declining competitiveness and trade restrictions reducing exports, the sector's vulnerability to external shocks has affected sectoral performance. The OT have increasingly lost control over their exports, with Jordan, other Arab countries and Israel de-facto deciding what and how much the OT can export. While official exports have substantially declined, informal exports to Israel appear to have increased. To maintain and expand sector production, exports to existing markets need to be enhanced, and new markets will need to be found; demand in the local market appears currently largely satisfied[29]. Future growth in demand in local markets is uncertain, being highly dependent upon future migration patterns, income and population growth.

Agricultural Technology

3.16 In terms of technology, agriculture in the OT runs the full gamut from highly traditional rain-fed agriculture to modern drip irrigation technologies. Farmers in the OT currently have access to a fairly wide array of technologies and use them, but often in a less than optimal fashion. Cutting edge technologies are almost never applied at present. In most countries, the level of agricultural technology is critically dependent upon agricultural support services, like research, extension and training from private and public sources. In the OT some information reaches farmers from private sources. However, access of farmers to knowledge has been increasingly reduced as public agricultural research, extension and agricultural education services have declined over time, as described in detail in Technical Annex A. A multitude of organizations has taken an interest in substituting these functions; some are quite effective, but, in general, the uncoordinated and piecemeal character of these services have substantially reduced the efficiency of this form of farm support service.

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demanding as the EC. According to Palestinian exporters the ultimate costs of security checks including the reduction of product quality when security checks are carelessly carried out or delayed, and the uncertainty of timely shipment have on occasion been substantial; Israel disputes the frequency of such claims.

29/ Consumption and available sources of supply of major food items in local markets has been analyzed in two recent reports: (i) Society for Austro-Arab Relations, Development Perspectives for Agriculture in the Occupied Territories; and (ii) H. Awartani, Economic Aspects of the Agricultural Sector. Not surprisingly, both conclude that as of 1987/1990 considerable gaps exist between local production and consumption for those products regularly imported from Israel. The latter report concludes that ignoring the products which the OT and Israel do not produce (wheat flour, sugar, rice) the OT suffers deficits in eggs, poultry, red meat and potatoes, but that some of these deficits appear to be getting smaller. In the judgement of the mission the OT is currently oversupplied with most vegetables, most fruits and olive related products, while for most other major product groups local production and imports largely satisfy local demand. Occasional high seasonal prices for fresh red meat, fish and bananas suggest unsatisfied demand during parts of the year.

3.17 Farmers in the OT are knowledgeable about farming, often from long practice; however, few obtain the kind of yields and quality that farmers in other parts of the world achieve, lacking knowledge that would keep their operations competitive. Obviously, the requirements of the sector for knowledge differ, and the impact of having full access to available knowledge on production will vary between crops. Irrigated vegetables and fruits and animal husbandry may benefit most from improved access; it would allow farmers to increase profit margins and reduce risks, provided markets exist for expanded production. For the rain-fed sub sector, benefits would largely accrue in improving productivity and quality, allowing profit margins of some crops to recuperate to levels that may sustain this type of production in the future.

3.18 Improving the knowledge and skill levels of the farmer in the OT is not only a matter of expanding education, strengthening curricula, running technical training programs, supporting some forms of research and creating a more coherent extension system. It requires policies and institutions that focus on knowledge creation and transfer as a key factor in maintaining agricultural development and competitiveness and that clearly differentiate between the demands of individual groups of farmers and how they can be satisfied. Large-scale farming operations generally could obtain information through commercial channels. Smaller farmers may need information and training/education from the public sector, as well as commercially available knowledge. Traditional farmers may need more intensive forms of public information transfer.

3.19 *Conclusion.* Much information existing worldwide is not easily available to the OT farmer; the existing system for collecting, creating and disseminating information and training needs is modest and only partly effective. Improvement is necessary if agriculture in the OT is to achieve its technological potential. Obviously knowledge is but one factor in the production system. When access to information improves, its impact on production and profitability may be restrained by other factors, notably a lack of markets for expanding production.

Agricultural Supporting Services

3.20 The current state of agricultural extension, research and education, or for that matter quality control, food security and marketing support, are a reflection of the more general problems of governance in the OT. For the agriculture sector, three areas of public performance are important: the policy and regulatory framework, public services and institutions and finance. Each will also be discussed in more detail in the accompanying reports dealing with the Macro-framework and the Private Sector.

Policy

3.21 The agricultural policy of the civil administration is formulated by committees comprising Israeli and Palestinian officials; implementation is delegated to Israeli officials in the civil administration, who use Palestinian staff in district offices for field-level execution. The main direction of policy has passed through at least three stages during the past quarter century. Initially, a highly successful expansionary and growth-oriented policy prevailed, encouraging agriculture to modernize quickly, on the basis of technology developed in Israel. Annual sectoral growth rates of over 15 percent and the rapid expansion of exports were the immediate results. Economic setbacks in Israel, in combination with the rise of the OT as a more potent force in Israeli markets and the emerging potential of the local OT market initiated a more constrained policy framework, which prevailed until several years ago when Israeli policy objectives and strategies for the OT again became more development-oriented. However, the impact of these latest changes on sector performance appears uncertain.

3.22 Current policies are a mixture of constraints and encouragement and support. They still discourage any expansion of the area under active permanent cultivation and in military areas some restrictions apply to the traditional utilization of grazing lands. Policies include the promotion of seasonal crops, like vegetables and grain, to conserve water, but not permanent crops, like olives and grapes, and active support for the uprooting of citrus grooves and replacement with the more profitable vegetables. Full Israeli control over all water resources in the OT is being maintained. However, efforts are also being made to reduce Palestinian dependency on some key Israeli inputs; constraints on the production of some high-value products, which may directly compete with Israeli products or for which production is controlled in Israel, are being dismantled or no longer applied. Entry restrictions of OT products into Israel are officially maintained but widely circumvented in practice. Public support for the sector, in terms of budgets, staff, and public support services remains extremely modest.

The Institutional framework of the Public Sector

3.23 The role of the Government can be defined as facilitating policy-making and executing, either by itself or through others, and by providing public services. The OT require action in all three areas. The process of designing policy exists at present in the civil administration and, to some extent, in non-governmental organizations involved in the sector. Attempts to initiate a policy design process through a programming committee of the Palestinian Agricultural Engineers Association have recently started. Since political considerations are part of the process of policy-making, creating a system that designs sector policy will require agreement, as part of the peace process, on the framework in which such policy can be developed. Once such agreement on the limits of the system has been agreed upon, three processes should start: (i) creating an institution charged with developing policy objectives and policies; (ii) having such an institution determine the future role of public institutions in the sector; and (iii) designing a process through which these new public institutions will be created or formed.

Regulatory Environment

3.24 The regulatory environment is detailed extensively in the private sector paper, and the conclusions reached apply to agriculture.

Cooperatives

3.25 Prior to and during the initial years of the occupation, cooperatives have played a significant role in agriculture in the OT,[30] but their role appears to have changed and declined over time. Most operate in rural credit, olive oil production and animal husbandry, in addition to marketing, machinery operations and irrigation. Few formal cooperatives continue to operate in the production field; most are inoperative or operating at very low capacity. Service cooperatives have fared somewhat better; however, many have been affected by adverse economic factors, poor management and the effects of the occupation. Non formal cooperatives like Palestinian Agricultural Relief Committees (PARCs) and Agricultural Work Committees appear increasingly active; many of their activities combine semi-public

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30/ There are 366 registered cooperatives in the OT, and 6 in Gaza. Formal cooperatives in the West Bank have been established in accordance with Jordanian Cooperative Societies Law, which is still in existence. They maintain a formal relation with the Jordanian Cooperative Organization. Formal cooperatives in Gaza have a different legal status, they were incorporated with Palestinian Mandate Law and its amendments. Non formal cooperatives, like Palestinian Agriculture Relief Committees (PARCs), were established by various Palestinian groups, but not in accordance with Jordanian or Palestinian Mandate Law.

functions like agricultural extension and social welfare with productive activities. Although there are a number of success stories, the economic impact of many cooperatives over time appears to have been modest, although their role in extension and particularly social functions appears to have satisfied considerable needs.

Agricultural Credit

3.26 As detailed in the Private Sector report, and in Technical Annex A, at present the private sector relies on informal credit sources and equity for a considerable portion of its short-term funding requirements; long-term investments are largely self-financed. While lack of credit is consistently mentioned as a key constraint to development, and the level of official financial intermediation in the OT is less than 2 percent of GDP (surely one of the lowest in the world), many sources suggest that there is no lack of money in the economy. Informal sources of credit have developed; while generally of a short-term nature, they reasonably satisfy a considerable portion of short-term credit demand. For longer-term investments, very little credit is available, and equity is the preferred form of financing. Nevertheless, these forms of financing have their limitations; short-term credit in the OT is not cheap, and equity resources have often constrained the size of individual investments, notably for agro-industries, to suboptimal levels. The lack of medium-term institutional agricultural credit has been a constraining impact on new investment in the sector. The actual supply of credit to the agricultural sector in the OT includes about US$ 5 million at subsidized interest rates from official sources and an even smaller, but undetermined amount from various cooperatives and PARCs. The bulk of the credit is provided by wholesalers, money lenders, supplier of agricultural inputs and land owners at interest reported between 2 and 4 percent per month. Interest rates fluctuate, and sometimes are not directly charged [31]. Because funds available from institutional sources are a small fraction of demand, subjective allocation procedures, often linked to the institutions ultimate objectives rather than the financial and technical feasibility of the projects, determine availability. Subjective allocation, the subsidized interest rates charged, and weak loan recovery procedures have negatively affected credit discipline and initiated an unhealthy perception among borrowers of institutional credit being 'grant' money.

3.27 Current and future demand estimates for agricultural credit vary widely, depending on the source [32]. Most estimates appear very high, and current short-term credit demand probably does not exceed US$50 million, and may well be substantially less. Future policies should include efforts to create the framework for financial intermediation, particularly in rural areas. Agricultural credit policies suffer from pressure from two sides: farmers ask for low interest rates, while banks complain about the high

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31/ For example, a wholesaler advances about 75 percent of the value of required inputs to the farmer, charges 10 percent more for the inputs, and receives a 7 percent commission of the sale of the produce.

32/ An estimate of the Agricultural Development and Credit Company, the largest credit source for the sector, suggests that annual costs of inputs total about US$100 million, mostly obtained with borrowed money. A recent study by Australian and Palestinian credit experts concluded that based on average credit requirements of US$ 300 and US$50-60 per donum per growing season for irrigated and rain-fed crops respectively, and assuming 1.5 and 1 crop per donum, total requirements would appear to be close to US$190 million, or 30 percent of the total value of agricultural output (US$650 million in 1990). These estimates appear extremely high in the current environment; in the judgement of the mission present demand for agricultural credit may be between US$ 25 and US$ 50 million.

costs of operating in a rural environment, including small loan sizes and high risks. Therefore, a future financial policy framework should allow banks to charge more for rural loans, while enhancing their ability to recover loans, particularly through the implementation of a proper legal framework to facilitate the mortgaging of land and crops, foreclosures, and informal means to exclude farmers with poor repayment habits. Given the high level of interest rates of the informal sector, agricultural operating margins of institutional sources can be made adequate. Most important, providing agricultural credit should be open to banks and cooperatives alike, and each institution should be allowed to obtain deposits as the main source of its funds. Because agricultural credit involves more risks than some industrial or consumer loan operations, special assistance may initially be provided in terms of technical assistance to encourage banks and cooperatives to initiate or expand operations.

3.28 *Conclusion.* Public policies, the regulatory framework and institutional support services are currently not conducive to optimal sector development. Sector policies, including trade policies often constrain sector development, are ambiguous or unclear. The regulatory environment, including taxes, licenses, the legal and administrative framework, and above all the atmosphere of ad-hoc enforcement require substantial adjustment to facilitate the sector to achieve its potential. The current public institutional services framework is deficient in many respects; while alternative systems occasionally are efficient, the overall arrangements for non-public support services are not effective. Finally, while financial services are available to the sector, services are limited, and essentially only cover short-term credit, sometimes at considerable costs. The OT needs a financial framework which will facilitate existing organizations to become more effective and interested in rural financial intermediation, creating a more competitive environment, and enhancing the availability of term credit.

Access to Natural Resources

3.29 Land and water are probably the most sensitive and charged issues in the relations between Israel and the OT. The loss of Palestinian land ownership and traditional legal rights, Israeli settlement policies in the OT and restricted Palestinian access to water have, more than virtually any other factor, characterized and dominated relations between the two parties. This report will not attempt to analyze the many aspects of the situation, which are being discussed and reviewed as part of separate bilateral negotiations of the peace process. However, some of the technical and practical aspects of the current situation, as they impact on agricultural sector efficiency, are briefly discussed below.

3.30 Current Israeli natural resource use policies are being perceived by the Palestinians as key factors determining the performance of the agricultural sector. As discussed in the beginning of this Chapter, many factors have shaped the current form of the sector, and assessing relative importance is exceedingly difficult. Some general comments can be made: access to more abundant and higher quality water would allow Palestinian agricultural operations in areas where they have been reduced or not expanded due to the lack of water or high salinity. Fewer restrictions on access to traditional grazing areas would allow the extensive animal husbandry operations to expand beyond current levels [33]. Crops grown on land occupied by Israeli settlers could support Palestinian farmers. However, the effect of restrained access to natural resources in many instances cannot be separated from other factors that have constrained or enhanced production, some of which appear to be equally or more dominant: changes in markets and demand, the economics of production of certain crops has forced many Palestinian farmers, notably in marginal rain-fed areas, not to expand some of their operations, etc. Restrained natural resource access has also had unexpected effects. Restrictions on access to water have been a major factor enhancing the water use efficiency of Palestinian farmers, notably in comparison to neighboring Arab

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33/ Local demand for fresh red meat and goat milk products reportedly still exceeds current local supply, although in some cities cheaper frozen meat has been accepted.

countries. Restricted access to grazing land has led to increased small farm animal husbandry operations, creating strong demand for locally grown and highly profitable animal feeds like vetch.

Land

3.31 Since 1967, land has been withdrawn from agriculture activities. As detailed in para 2.3, the area under cultivation has declined during the occupation by about 6 percent, all rain-fed land, while the area available for grazing has also been restricted. Loss of cropland is increasingly important near population centers, as it is being used for expansion of municipalities, and for housing.

3.32 Current Israeli policies concerning land use and transfers have created an environment in which traditional legal titles to land may have lost value in protecting the owner against loss. The issue of definition has become important [34] as farmers increasingly believe that actual land usage improves protection against loss, enhancing the use of non economic reasons for agriculture production decisions. Notably, current efforts to expand the area under cultivation have particularly affected marginal rain-fed areas in the western hills, an area in which clearing costs are particularly high, infrastructure, like rural roads and rain cisterns, is inadequate, and for which few clearly profitable agricultural production packages are available at present.

Water

3.33 The situation in the agricultural sector in the OT concerning water cannot be separated from the broad water picture involving the riparian rights of countries, several sources of surface and groundwater and various categories of users. While water in the OT belongs to a complex system of surface and groundwater resources and usage systems covering parts of Israel, Lebanon, Syria and Jordan, the Palestinian farmers with irrigated land utilize primarily ground water and water from springs. A more detailed description of the comprehensive water situation is provided in Technical Annex B.

3.34 The authorities have between 1973 and 1975 imposed production limits slightly above recorded 1972 water usage on individual wells, producing water for agriculture purposes. These limits were maintained until 1986, when all wells in Israel and the OT had their quota reduced across the board by 10 percent due to acute drought conditions; since then, no changes have been made [35]. Strictly enforced production limitations are but one limitation on water use. Other constraints include:

(a) Permits for new wells, or for the rehabilitation of existing wells have been granted only to a limited number of well owners. About 100-120 licenses for well rehabilitation were issued in the West Bank. In those cases that permits have been provided, virtually no actual work has been done as employing excessively expensive Israeli drilling contractors

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34/ The definition of what constitutes cultivated land is complicated by the way land is being used, notably in rain-fed areas:
(i) considerable areas of the western slopes of the West Bank are traditionally sown with cereal grains, but a crop is only harvested if sufficient rain is available;
(ii) recently, extensive areas of rocky slopes have been planted with olives and almond trees;
(iii) large areas (about 20 percent of total cultivable area) are left fallow each year.

35/ Restrictions on water use are not restricted to the OT; Israel has implemented measures to reduce water use for specific crops by a multitude of measures.

is a condition of the permit [36]. In addition, private well owners have been unable to obtain financing from existing institutions. As a result, most Palestinian pumps and well casings have not been refurbished for 30 years; use highly fuel inefficient engines to power pumps; and wells have not been redeveloped or replaced. Lack of funding has also affected rehabilitation of distribution systems; many of which leak considerably (by one account losses may total 20 percent of total production).

(b) About 13 percent of the about 375 wells in use in 1968 have stopped operations.

(c) Mekoroth, the Israeli water company, has drilled about 32 new wells in the West Bank, of which 12 during the past ten years, which reportedly largely supply settlements. In addition, municipalities have drilled eight wells for municipal purposes. These wells reportedly access deeper aquifers and produce about 52 MCM or 47 percent of all water discharged from West Bank wells, compared to 53 percent from Palestinian-owned wells. In Gaza over pumping started well before 1967, and exceeded sustainable production by some 50 percent at that time; currently it exceeds sustainable production by about 30 percent. In 1991, about 1,791 (mostly shallow) wells were reportedly in operation, pumping a total of 97 MCM (of which 68 MCM were for agriculture), compared to 120 MCM in 1980. The negative water balance has caused some serious salinity problems. Chlorine levels of up to 2,000 mg/l can be found in coastal areas in the middle of the strip; in the northern (50-400 mg/l) and southern sections (200-2000 mg/l) chlorine levels have been more moderate.

(d) Over pumping appears to have also resulted in a lowered water table and the deterioration of groundwater quality in the Jordan Valley. Average water tables have dropped 16 m since 1969 in the Jordan valley, causing 26 wells to dry up. Total chlorine concentration increased between 1982 and 1991 by 50 percent, to about 440 mg/l in the northern section, and up to 1,700 mg/l near Jericho.

3.35 While the West Bank and Israel contain large aquifers with considerable water resources, and over-pumping is not a problem at this stage, in Gaza the water situation for agriculture and domestic use is considerably worse. Water use has also declined because strict quotas of water for specific crops have been introduced. Some citrus farmers in the area have switched to annual crops, and farmers have been actively encouraged to introduce modern (drip) irrigation techniques. On 88 percent of the irrigated land, these techniques are being used, compared to 56 percent in the West Bank.

3.36 For individual farmers, demand control may have contributed to reduced consumption. Virtually all wells are private, owned by individual land-lords or groups of farmers, and the profitability of wells is an ongoing concern. Although water prices charged by well owners fluctuate widely, high priced water has curbed consumption because water, rather than land, is often the limiting factor. Average water prices in the West Bank amount to about US$0.17 per m3; the more shallow wells in Gaza charge an average of US$0.14 per m3. By comparison, Israeli farmers pay about US$0.14, reflecting (declining) subsidies, while in Jordan farmers in most areas pay about US$0.07 per m3. Irrigation water on the Jordan side of the Jordan Valley is heavily subsidized and costs only US$0.01 per m3. Although water pricing is being used by countries as a tool to influence competitiveness, in the long run absolute shortages will largely determine the cost of water and its most effective application.

36/ The costs of well drilling in Israel is reportedly 3-4 times higher than in Jordan.

3.37 In the medium to longer term, the whole region, including Israel, Jordan, northern Egypt and the OT, will continue to face water shortages. It would be wrong to assume that the water available for irrigation could be increased substantially; in the future, agricultural water users will have to compete with water users in other sectors, who may produce higher value products per unit of water and who would be able to pay more for water. Consequently, farmers will basically have only two options. They will have to continue with their efforts to maximize the returns from the limited water available to them through water-saving techniques and crop selection, or they will have to use treated waste-water which will be available in increasing quantities; however, even treated waste-water will not be available free of charge.

3.38 *Conclusion.* Restrictions on access to natural resources has affected agriculture production in the OT. While economic factors have been the most important factor in some rain fed areas, constraints on land use have affected animal husbandry production, and have restricted Palestinian agricultural production in areas currently farmed by Israeli settlers. Limitations imposed on water use have limited the area under irrigation. Restrictions on water use have had other effects as well, forcing farmers to use water more efficiently. Although, from an overall perspective, the lack of water may be a binding constraint for some crops, and certainly individual farmers are directly affected by restrictions, limited access to water may not have been the ultimate constraining factor for growth; the lack of competitiveness and markets may have been more important.

Employment and Labor Productivity.

3.39 Of the total number of officially employed persons in the OT in 1991 (189,700), 25.8 percent worked in agriculture; of the total number reportedly working in Israel (97,800) only 12.0 percent worked in agriculture [37]. Employment levels in agriculture in the OT have historically been high; the sector has played the role of residual claimant of labor. Agriculture has shed labor in periods when abundant labor opportunities existed outside the sector, as in the early 1980s when the relative share of agriculture employment declined quite sharply; it has alternatively absorbed excess labor, notably during the past six years.

3.40 Prior to 1967, the agricultural labor market reflected a typical employment pattern of regions at a similar junction of their development: in the West Bank a reported 40 percent of the male labor force worked in agriculture and produced less than 20 percent of GDP. Following the occupation, major changes took place; OT workers were allowed to seek employment across the "Green Line", which ultimately created a massive drain of people out of the agricultural sector. Higher production achieved with less labor (the number of agricultural laborers declined between 1969 and 1987 between respectively 38 and 48 percent for the West Bank and Gaza) was partly instrumental in creating impressive rises in labor productivity. During this period, the average agricultural GDP of male OT agricultural workers rose by a factor of 7.4 and 5.8 in the West Bank and Gaza, respectively, compared with only 3.1 for Israeli agricultural workers [38]. Measured against the total male OT work force, the decline of the sectoral share is even more striking. Most important, the number of farmers declined faster than the number of workers, a result of the occurrence of the "weekend farmer". A 1981 study suggested that

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37/ CBS, Statistical Abstract of Israel, 1992, Table 27-22.

38/ Sources: Statistical Abstract of Israel, 1972 (pp 167, 314, 659, 662, 664), 1986 (pp 108, 723), Judea, Samaria and Gaza Area Statistics, 1986 (pp 81, 89).

about 70 percent of all agricultural labor in the West Bank was provided by women, and 10-15 percent by school age children and old members of the family [39].

3.41 Since 1987 the traditional role of agriculture in absorbing residual labor has returned; absolute levels of sectoral employment in the OT have increased from 38,400 in 1987 to 50,200 in 1990 [40]; as a consequence of drastic disruptions in employment in Israel and the Gulf, many Palestinians started to take up farming as their profession, creating a substantial increase in the percentage of farmers. There are some indications that since 1987 two things have happened, workers who previously had permanent and legal employment in Israel have resumed their occupations, while those who previously only occasionally worked in Israel, often without a license, have not. The group which remained in agriculture in the OT may have particularly focussed on tree crop production in rain fed areas and on animal husbandry; this may explain some of the rapid growth of production in recent years in these areas.

3.42 While employment and labor productivity have been important determinants of sector performance, their ultimate importance lies in the future. First, the use of family, and cheap contract labor is currently crucial to maintaining local competitiveness, notably in rain-fed farming and for selected irrigated crops [41]. Cheap labor has helped the more economically marginal components of the sector weather the impact of adverse markets and market access, lower prices and reduced access to natural resources; in many instances, income from the weekend farmer also supported the cash-flow of the traditional farm. While some technological improvements could enhance the competitiveness of these crops, maintaining this form of production in the future, requires continued availability of relatively cheap labor.

3.43 What happened in the past six years in the OT is highly unusual, reflecting the acute labor pressures of returnees from the Gulf and people losing access to the Israeli job market. However, the process of labor absorption has limits, even in a rapidly expanding sector. The increase in sector employment was possible because the new entrants had modest income expectations. The labor influx accelerated production growth, assisted by increases in demand as Palestinian consumers increased demand for locally produced products as part of the Intifada, and imports, notably of animal husbandry products, were replaced by local production. But these were one time events, which are unlikely to be repeated.

3.44 Should one expect that the sector will offer opportunities for further increases in sector employment and, if so, on what terms? Obviously, the overall rate at which demand and production may grow will have an impact on future employment levels: although no data and models are available to determine the optimum level of growth ot achieve the maximum impact on employment, it appears that

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39/ H. Awartani, Agricultural development of the West Bank, PhD Thesis, Bradford University, 1981.

40/ Statistical Abstract of Israel, 1971 (pp 637), 1991 (pp 731).

41/ Certain labor intensive crops, like some vegetables and fruits and even olives, and many small rain-fed farming operations in general would be less profitable or incur losses without access to such cheap labor. This is not a typical problem of the OT; in many countries labor intensive forms of agriculture cannot remain competitive and survive without cheap labor, even in the West. Israel used Palestinian labor; Jordan uses Egyptian and Pakistani labor; Western Europe uses labor from North Africa and Poland, and the USA labor from Central America.

high growth levels are a sine-qua-non to maintain maximum levels of employment. However, the ability of the sector to generate employment growth is inherently modest, and even a highly competitive and rapidly growing sector is unlikely to create the large numbers of new jobs to which the OT got accustomed recently. The more traditional rain fed sub-sector is likely to remain financially marginal, while production may increase on account of local demand, the effect on employment is likely to be very limited, as employment in this sub-sector is already very high [42]. While in the more distant future employment in this sub-sector most likely will decline [43], in the more immediate future the key issue is how production and, hence, employment in this part of the sector can adjust to a less distorted trade, policy and regulatory sector framework. Notably, introduction of a more liberal trade regime, and further exposure to imports should be carefully timed to avoid immediate employment shocks during the transition.

3.45 Other parts of the sector have better prospects for growth, technology improvement and the development of new markets, although their competitiveness, at present, is limited. To remain competitive, labor use and costs will need to be carefully controlled and remain relatively modest. Future sector growth will, to a considerable extent, depend on the ability of the sector to mobilize better educated farmers and other workers, using more technologically advanced production systems, which in turn need more elaborate public and private support systems. Demand for highly skilled labor may increase in a medium-term growth scenario, but will ultimately reach a plateau and follow the general tendency of modernizing agricultural sectors to reduce the share of sector employment.

3.46 *Conclusion.* The agricultural sector initially shed and later reabsorbed large numbers of workers, and higher labor participation has been a factor in the recent growth of agricultural production. The ability of the sector to continue absorbing labor appears modest, even under high-growth scenarios. Labor absorption in the more distant future is likely to be negative and the sectoral share of economy wide employment will, ultimately, decline. The speed with which this will take place will to a considerable degree depend on prevailing renumeration levels inside and outside the sector.

42/ The issue is whether this should be provided by family labor, cheap hired local labor, or labor imported from abroad, like in Jordan. In the more distant future, the willingness of Palestinians to work in the sector at low renumeration levels, and future arrangements for the (part-time) importation of cheap labor, will in part determine whether it is feasible to continue such production.

43/ Particularly young people in the OT may have expectations which the sector may not satisfy, and they will look for alternatives. Even if they do not find them, they may still be reluctant to go (back) to the farm. Maintaining agricultural employment may be difficult, as many Palestinians may want to leave for 'greener pastures'.

IV. Future Outlook and Strategy

Future Prospects

4.1 Although agriculture in the OT suffers from structural problems, imbalances between production and demand and pressure to provide employment, there are some substantial assets.

- o First, the OT is blessed with temperatures which are ideal for many forms of agriculture, and while temperature variation within the OT area is considerable, in some areas temperatures give it a competitive edge in European markets compared to the rest of the region.

- o Second, the OT has no shortage of entrepreneurial talent.

- o Third, the technological basis for improved rain fed and irrigated production is well established, and much of the technology is in the public domain in Israel, some Arab countries, Europe and the United States.

- o Finally, given the strategic location of the area, and given the right financial climate, there are good prospects for attracting significant private capital flows into the sector from the expatriate Palestinian community, and international official assistance to help with investment and technical assistance.

4.2 A prerequisite for transforming the potential of the sector is the resolution of the long-standing political and security issues affecting the region. Removing the strategic uncertainty and the perception of risk through a political settlement would encourage private financial and entrepreneurial investment, notably in agro-industry and high tech agriculture. Equally important, access to external markets in the neighboring countries, the rest of the Arab world and Europe, is likely to be improved only with the advance of the peace process.

Elements of a Strategy for Agricultural Development

4.3 Agriculture in the OT operates in an environment of considerable uncertainty, which will only be increased in the process of transition. This is even assuming the OT enter into an interim phase following an initial peace agreement in which considerable freedom to take decisions concerning policies, regulations and institutional development is granted. In addition, the findings of this report concerning past sector performance, while based on the best data available, may not cover all aspects, some data may not be complete and others are just not available [44]. This may wrongly color perceptions of feasible future developments.

4.4 The future contribution of agriculture to economic development is highly uncertain, as it is dependent upon many factors, most of which themselves are difficult to predict. On the demand side key factors include future income and population growth in the OT, and the future trade relations, including access to external markets. On the supply side important aspects concern a reduction of regulatory constraints, improved access to natural resources, continued availability of relatively cheap labor, and introduction of a policy framework encouraging investment by the private sector. Ultimately, water is likely to be the key binding constraint, suggesting a relatively modest long term outlook about the potential of the sector. Nevertheless, in the short to medium term the sector will remain critically important for the local economy, not only in terms of income, but particularly from an employment point

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44/ To improve the sectoral data collection in the future, technical assistance is being proposed to set up a local system for collection and analysis of data.

of view. In many areas in the OT, agriculture is a way of life, deeply ingrained in the social and cultural fabric. The future of the agricultural sector should reflect those employment and cultural aspects, and this may enhance its dualistic character in the future. One part of the sector may evolve into a capital and knowledge intensive production system, focussed on external and local markets, economically and technologically highly efficient. The more traditional part of the sector would also improve its technology and efficiency, but would operate on a smaller scale, and be more labor intensive. While competitive in the local market, its products may not be able to compete in world markets.

4.5 While the sector has displayed considerable dynamism in the past, only some elements may be competitive internationally at present, while others are clearly not. Competitiveness, however, depends on various factors, many of which could be changed during the interim period and beyond. Competitiveness is also relative; the OT is currently competitive in the Israeli market for many products, but less so in Jordan. Ultimately the actual future of the sector is likely to depend on success in addressing some constraints and issues, and possibly little improvement in others. This in itself should temper assessments of the real potential of the sector, while it also suggests interventions which would lower the level of uncertainty, like clarification of access to natural resources and markets, improving the amount and quality of information, and simplifying the regulatory framework. For example, the liberalization of regulations affecting movement of products and people within the OT and across borders, access to water and land and regulations affecting labor mobility [45] would particularly benefit competitiveness. Since the regulatory framework for the sector is extensive, and covers other economic activities, it is recommended that a special task force be created to systematically review for the private sector in general, with sub-group dealing with agriculture: (i) what needs to be removed, adjusted or kept; and (ii) what new regulations are required in order to create a consistent framework conducive to efficient private sector and agricultural production.

4.6 The guiding principle in agriculture, as in the rest of the economy, should be that production should take place only if farmers in the OT can grow and sell crops as competitively as others. As detailed in the macro report, the sector is particularly important for its impact on employment, as the employment creating potential of the other sectors, at least in the near and medium-term future, is limited. While the economy as a whole should avoid economy-wide welfare declines during the transition, the agricultural sector needs to avoid abrupt shocks which would cause rapid declines in employment. This implies that the agricultural sector should aim at growing as rapidly as economically feasible during the transition, although this growth potential has to be seen in the context of resource and market constraints. Specifically, the following aspects should be considered:

(a) Access to markets should be improved.

(b) The efficiency and competitiveness of those parts of the sector with competitive potential

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45/ Among the many aspects of the regulatory environment, the following should receive priority attention. The suitability of the current tax code should be assessed; the legal framework for foreign and local investors, reviewed; and the need for special policies for the pricing of natural resources assessed. Current import taxes and other levies on key imported inputs, notably fertilizers, seeds and pesticides may be brought in line to levels prevailing in competing countries. Many of these regulations may have to be discussed as part of the peace process; more specifically, affect the future relation of the OT with Israel. Others have security connotations; for example, regulations affecting the movement of products and people within the OT and across borders; access to water and land; and regulations affecting labor.

in local and foreign markets should be restored or enhanced. Improving the supply side would require creating a policy framework conducive to growth, reducing the constraining impact of the regulatory environment, improving access to natural resources and strengthening sector support services.

(c) While phasing out uncompetitive crops is necessary, large adverse shocks through the sudden opening up of local markets or a rapid decline of production, should be avoided to limit major declines in employment. However, such adjustment should be managed without incurring excessive declines in efficiency, unsustainable financial support to the sector or the slowing down of the adjustment process during the transition.

Trade

4.7 Trade in agricultural products around the world is often more constrained and regulated than that of industrial products. In many instances changes in trade regimes are as much the result of negotiations as sector and market developments. Improved access to external markets, and improved trade relationships are critical for agriculture in the OT, and all avenues should be used to make the trade regime more favorable for OT farmers. Expanding access to external markets would not only be important to achieve sustainable sector development, it would be even more vital if access of Palestinian labor to the Israeli market were to remain at the current restricted level.

4.8 Although demand in the local market may grow due to population and income growth, such growth will to a considerable extent depend on future migration to the OT. But focussing on a protected local market appears not realistic and undesirable. In economic and trade terms, the option of completely turning inward would clearly be a non-starter for a small economy such as the West Bank and Gaza, as it would result in major declines in production, income and employment. To maintain or expand current sector production levels and to give the sector time for structural adjustment, farmers need immediate access to markets in which there is already a relative competitive edge, and in which they could sell considerable quantities of products. The market that would offer immediate and sizable opportunities for the export of OT products at present is the Israeli market. Introduction of reciprocal trading arrangements for agricultural products between Israel and the OT may replace the current irregular transfers of agricultural products, or more fundamentally, become part of a form of customs union to be established, which could govern mutual access of a broad range of agricultural and other products. While the competitive edge of OT products in Arab markets appears more modest, the OT should similarly attempt to develop reciprocal trading arrangements through Jordan with selected Arab countries.

4.9 From an Israeli point of view, the impact of increased OT imports on local markets and production may be relatively modest [46]; however, selected activities may be disproportionally affected, like independent vegetable producers, poultry production, etc. In addition, having relatively little experience with larger-scale official agricultural imports, the Israeli regulatory environment may need some adjustment while, similarly, arrangements will be needed in the OT to satisfy legitimate Israeli demands concerning food quality and safety. Finally, institutional arrangements may be needed to minimize the disruption of OT imports on the regulated market process prevailing at present in Israel. It is proposed that the detailed consequences of changes in the trade regime between Israel and the OT be studied in more detail once initial indications have been received from the peace process that adjustment of the trade regime could be acceptable.

46/ Current unreported imports into Israel from the OT may be less than 4 percent of total agricultural production, but given the considerable price differences between the OT and Israel, this percentage should go up significantly with liberalization of agricultural trade.

4.10 Depending on a single external market is never advisable, and heavy dependence of the OT agricultural sector on the Israeli market, itself in the process of liberalization, should clearly be seen as a temporary measure to assist the agriculture sector in the OT during the interim period. Once OT products become more competitive, other markets should be vigorously explored. The most logical, in terms of product quality requirements and historical experience, are the Eastern European markets, which currently lack fresh fruits and vegetables in winter but many of its consumers may also lack the purchasing power to buy relatively expensive Western European products. In addition, some countries are short of foreign exchange and may require barter agreements for payment.

4.11 However, these markets also have substantial advantages: they are relatively close to the OT, have modest quality requirements and produce equipment and goods the OT may need in the future. Barter arrangements are being established regularly and do not need to hamper operations, provided they are arranged carefully. Developing these markets, and the institutions in the OT to service them will require technical and commercial expertise not available in the OT at present. Israel has institutions with some experience in this area; alternatively, the OT may develop these institutions themselves, with technical assistance from other sources ; Jordan is in the process of initiating trade ties with Eastern Europe. The OT also need to address, at an early stage, the current administrative constraints affecting exports. They need to strengthen export related infrastructure, notably access to port, road and airfreight facilities under a peace agreement, and, if necessary, arrange for effective transit arrangements for its export products through Israel, Syria and Jordan. Technical assistance and investment is suggested to deal with these requirements.

4.12 Arab markets may also provide some opportunities for selected agricultural products too, but the potential for considerable expansion of such trade should be assessed in terms of relative competitiveness and trade arrangements. Although some liberalization of trade among Arab countries is taking place, future trade may continue to depend on country-to-country arrangements, reflecting national and regional interests. Access to individual markets will need to be negotiated at a bilateral and multilateral level. If more liberal access arrangements materialize, the key issue is whether the OT can operate profitably and effectively in those markets, and compete against Jordanian and other imports in its own market. With strong competition from Jordan, Turkey, Syria and Egypt likely, the opportunities for OT exporters to expand in these markets appear modest, notably in the near future, when OT farmers may not yet be able to compete quality and cost wise. If unrestricted imports would commence before the OT has had time to enhance the competitiveness of its own production, the impact on local employment and income may be serious. Nevertheless, efforts should be made, as part of the peace process, to explore reciprocal access of agricultural products and inputs between the OT and Jordan and other Arab countries, possibly along the same lines of a more open trade regime with Israel.

4.13 The issue of competitiveness also affects future exports to the EC, and it should temper high hopes for substantial future export opportunities. Future EC access will also require negotiations when OT relations with Israel are normalized. While the climate in the OT will allow production of very early fruits and vegetables, the competitive position of the OT for those products in the EC would highly depend on strong marketing institutions, and having access to the competitively priced inputs, knowledge and innovation. Successful exports to the EC may initially only be feasible for large, capital-intensive, integrated companies, which would not be very dependent on public services and would mainly require a suitable regulatory framework and appropriate infrastructure for transport. To allow smaller farmers a similar access would require sophisticated public support services, an effective regulatory framework and the existence of specialist export institution(s) to coordinate and guide farmers. New marketing institutions may need to be created or existing ones better utilized for that purpose. Ultimately, the success of export efforts would depend on the ability of OT farmers to maintain quality, remain innovative and produce highly cost-effective crops.

4.14 While an expanding local market, exports to Israel and Arab countries, and, ultimately, exports to Europe would create major incentives for growth, some crops will only be competitive in local markets or not at all. If a rapid restructuring of those operations is unavoidable, temporary support may be contemplated to allow the decline in employment to take place gradually. It is recommended that such assistance not distort market prices, resource use or the restructuring process. Support should also be transparent in the budget and, clearly, have a temporary character. Support may be targeted to sector segments with relatively high absolute levels of employment, like rain-fed fruit production, which, in order to improve competitiveness, require the introduction of more productive varieties needing long lead times before they bear fruit. Support should also target segments with the potential to remain competitive, at least in local markets. Crops without a clear future should be allowed to gradually decline in importance, and public policies should encourage replacement with more competitive crops.

4.15 Exporting and competing in an imperfect world, in which public support distorts the competitiveness of producers in competing countries, will require special OT policies. Creating a level playing field should be attempted first through negotiations; with most countries in the region in the process of adjusting their sector support programs, overall public support levels are likely to decline over time. If major distortions remain, the OT should review whether it should adopt policies for support to its own producers, which may be costly, or accept declining exports. As with support to farmers during structural adjustment, support to create a more level playing field should balance fiscal feasibility with the need to be transparent, temporary, encourage or maintain sectoral employment and have a minimal impact on market prices and resource use.

4.16 There are three key institutional and policy areas where adjustments are needed in order to create a climate conducive to sustainable sectoral growth: (i) the legal and regulatory framework; (ii) management of natural resources; and (iii) the provision of sector support services. These are considered below.

Legal and Regulatory Framework

4.17 As noted earlier, future performance of the sector is critically dependent upon the private sector. Enhancing its potential requires creation of a legal and regulatory environment that supports private sector initiative, as detailed in the private sector report. Improving competitiveness through the removal of the most constraining regulations and practices, particularly liberalization of regulations affecting movement of products and people within the OT and across borders, the perceived insecurity of property rights and access to water and land should have high priority and will result in tangible increases in improved production and reductions in costs. Since the regulatory framework for the sector is extensive, and covers other economic activities, it is recommended that a special study be executed to systematically review (i) what needs to be removed, adjusted or kept; and (ii) what new regulations are required in order to create a consistent framework conducive to efficient private sector and agricultural production. Particular attention need be paid to ensuring encouragement for private sector marketing. In addition, priority attention needs to be paid to the issue of institutional arrangements for export marketing. With countries like Cyprus, Israel and Jordan having adopted very different institutional arrangements for their exports of vegetables, fruits and other agricultural products, notably to Europe, the OT should carefully assess positive and negative experiences of each solution before deciding on its own solution.

Management of Natural Resources

4.18 The situation in the agricultural sector in the OT cannot be separated from the broad water picture involving limited sustainable resources, the riparian rights of countries, the sources of surface and groundwater and various categories of users over time. Consequently, farmers will have to continue with

their efforts to maximize the returns from the limited water available to them through water saving techniques and crop selection, and they will have to increasingly use treated waste water. Water pricing is currently being used by countries as a tool to influence competitiveness of their agricultural production. In the long run, absolute shortages will largely determine the cost of water, its real price and its most effective application.

4.19 While land resources are limited, land may not be as critical a variable as water. Nevertheless, with considerable areas of land in the OT not accessible to Palestinian farmers, increased access to land would assist future production. With overgrazing in selected areas become more serious, rangeland management should receive careful attention. Current private sector efforts at land reclamation should be encouraged and expanded; an estimated one sixth of the land area of the West Bank has soils suitable for agriculture.

4.20 While the question of access to natural resources ultimately depends on the outcome of the peace political negotiations, there are some measures that can be taken to ensure conservation and a better utilization of natural resources. Arrangements may be made for replacing or refurbishing worn-out Palestinian wells. The natural resource issue is also very acute for animal husbandry; improved access to land for grazing would considerably help the sub sector, as it would help reduce current overgrazing of selected areas still accessible for grazing.

4.21 A long-term vision is needed on the management of forestry and marine fisheries resources. Forests have a particular role to play in the fragile ecosystems of the OT, and their expansion in combination with selected forms of rain-fed production, would substantially assist erosion control and aquifer replenishment. There is obviously a clear role for some government involvement in the planning and managing of these resources. Resource management of fisheries requires long-term attention and regional cooperation; access to fish resources in international waters has recently been improved for OT fishermen.

Public Sector Support Services

4.22 The OT needs improved governance or, specifically, a realistic agricultural policy; an effective public sector institution; selected public support services [47] and infrastructure, like an export quality

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47/ In the short term, the knowledge base can be improved quickly by demonstration, in the medium-term, more fundamental activities are needed. Devising ways to create a coherent, effective and efficient extension service out of the current activities requires basic decisions on the role of the public sector in agriculture. While large, capital intensive farming operations may rely entirely on commercially available knowledge sources, small farmers may need more traditional public extension services. Similarly, improving access to basic research results from abroad, and carrying out applied research in the OT should receive priority. Two issues need to be addressed in the research area: (i) while it is clear that for a small area like the OT fundamental research should be given low priority, how much applied research should be carried out to support the considerable current demand for technological improvements in many of the area's agro-ecological zones and crops, and (ii) should agricultural research be entirely in the public domain, or should most of it remain in private hands? To address the backlog of research, substantial initial efforts appear to be needed; with only limited capabilities in private research in the OT at present, future research policy should consider collaborating with existing research institutes in Israel, Jordan and Syria for specific research tasks. Local capabilities should be developed to satisfy applied research demands in the more distant future. Strengthening education could

control and food safety service, a service to facilitate the transfer and generation of agricultural knowledge, and infrastructure to facilitate improved local and export marketing, like wholesale markets [48]. Such a policy should, eventually, cover those aspects of agricultural operations which cannot be performed well by the private sector, or for which public regulation is essential. However, priority may be given to determining the future role of the public institutions, both within the sector, and in the exporting of agricultural products, in terms of providing sector support services, market information, quality and product safety regulations, trade and tariff policies for inputs and outputs and strategies to enhance sector competitiveness.

4.23 Private sector involvement in what traditionally are public sector activities, like agricultural extension, education and research, should clearly be encouraged. The private sector in the OT is dynamic and capable, and public sector resources, financial as well as administrative, are likely to be very scarce, at least for some time to come, suggesting a judicious mix of public and private sector efforts in these areas. In agricultural extension, education, and research the public sector should find a balance between the traditional approach in which these activities are fully in the public domain, and recent efforts in some countries to largely privatize these activities. The role of the public sector may therefore be limited largely to services benefitting mostly smaller farmers, and setting policy, while the private sector may concentrate on commercial (product) extension services, most (contract) applied research, and selected short-term training activities. The nature of the governance function in the OT will be determined largely by the outcome of the peace process; establishing or improving institutions in the OT will also need to take into account the present setup. Improving access to basic research results from abroad, devising ways to create a coherent, effective and efficient extension service out of current activities, strengthening agricultural education and strengthening animal health and food safety and quality control services require policy decisions and well-prepared interim plans. To support this process, establishment of an agricultural task force is suggested, to be supported by technical assistance, to handle the creation of public institutions in the sector.

4.24 In terms of sector policy Gaza may well require specific arrangements which reflect its position in terms of size, population density, income level and more acute resource constraints. Efforts to cushion the impact of more open trade and restructuring of agricultural operations on employment should notably focus on Gaza. With half of its agricultural area irrigated, water shortages and costs will have a major impact suggesting specific measures to switch to the use of treated waste water.

4.25 Uncertainty, above all because of the nature of the peace process, will characterize the decision making framework for the sector. This uncertainty is particularly apparent with respect to future employment levels in the sector. In particular, young people in the OT may have expectations which the sector may not satisfy, and they will look for alternatives. Even if they do not find them, they may still

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be started soon, provided funding can be secured on a sustained basis. As with research, the approach should be pragmatic; although technical and lower-level education for men and women may not have the appeal of university-level education, it should clearly receive priority in terms of resources and policy. With respect to higher education, future policy should balance the need to provide relatively expensive local education to youngsters in the OT with the requirements and costs of attracting agricultural graduates from abroad.

48/ Technical assistance for a survey of infrastructure requirements is proposed, to be followed by design of facilities and construction.

be reluctant to go (back) to the farm. Maintaining agricultural employment may be difficult, as many Palestinians may want to leave for 'greener pastures'.

4.26 If crucial conditions for improving competitiveness and opening access to markets can not be achieved, sector production and employment will likely suffer. Not being able to negotiate some form of customs union with Israel and increasing exports to Arab and eventually to European countries would have considerable consequences during the interim period. Having no increased access to external markets would force the sector to reduce production, expand unreported trade, or face rapidly declining local price levels, putting increasing pressure on marginal operations and sector income levels and employment. It would make high sector growth virtually impossible to attain, particularly in the near future, when employment is a crucial issue. Having no access to additional natural resources would force farmers to operate within artificially tight limits, increasing their relative water and land costs and reduce competitiveness of production. Continuation of the current regulatory framework would affect external competitiveness and maintain relatively high local production cost levels.

4.27 A multitude of scenario's could be developed to reflect what may or may not happen. How should the sector deal with such uncertainty. In principle, by focussing on actions and investments which would lower the level of uncertainty, from clarifying resource availability to assessments of external markets and products. For many farmers, understanding simplified rules of the game may well be of critical importance. Providing information and making rules and their application transparent should receive major and continuing attention throughout the interim period and beyond.

V. AGENDA FOR TECHNICAL ASSISTANCE AND INVESTMENT

Technical Assistance

Immediate Future

5.1 Proposals to address several of the important issues and concerns relevant to the agriculture sector are included in reports by the Private Sector and the Infrastructure Teams. These include, in particular, studies for reforming the current regulatory environment and for strengthening the infrastructure facilities for exports. In addition, the following activities need to be taken up on a priority basis:

- Strengthening the agricultural data base for the OT to address data gaps which currently constrain agricultural policy formulation. The study would collect existing data from data bases in the Israeli CBS and in Palestinian institutions[49], review the way they have been collected, assess their validity, determine which data should be collected in addition, and set up a temporary data collection and analysis system to overcome the most critical data gaps. (US$ 300,000)

- With respect to infrastructure requirements in the OT, a study is proposed to assess the role of the public sector in facilities like wholesale markets and slaughterhouses. The assessment of the need for facilities needed to market products particularly rural roads, port and airport facilities for the agricultural sector would be undertaken as part of related studies discussed in the infrastructure report.) In addition, this study should also assess the needs for landing facilities for the fishing fleet. If a public role is deemed essential, the design of facilities should be carried out. Options to simplify and reduce the costs of transferring agricultural products across the Jordan River also need to be studied. (US$300,000)

- A survey of the rehabilitation needs of wells in the West Bank and Gaza, including a review of well rehabilitation; canal linings; conversions from canals to pipes; and arrangements for funding, such as for rehabilitation, including the provision of securities for commercial financing and the simplification of arrangements to obtain licenses and permits for such rehabilitation. This study should also assess the need for a public role in future water supply programs for agriculture, notably if deeper aquifers will be involved. Finally, this study should look into opportunities to reduce the costs of drilling wells. (US$300,000)

- One of the key issues affecting agriculture competitiveness will be the ability of the sector to treat waste water cheaply and use it effectively in agricultural production. Hence, a study should specifically review what sources of raw material would be available in the future; which treatment technologies would be appropriate, including whether treatment systems could provide other benefits; and what specific research in the OT would be needed to develop local technologies and design facilities and conveyance systems as part of efforts to distribute water. (US$300,000)

49/ The study should include an assessment of the current and future role of organizations involved in data collection, like the Applied Research Institute, Cooperative Marketing Union, Agricultural Departments of the Civil Administration and the Arab Thought Forum.

- With olives playing a crucial role in agriculture in terms of employment and income, a study would assess ways to improve its contribution to Palestinian farmers, by assessing technological improvements in producing olives, efficiency improvements in growing, harvesting and processing olives, and collecting and assessing research results from abroad and their relevance for the OT. (US$ 100,000)

- To enhance fish production, the OT would set up a pilot operation to assess the feasibility of fish culture (possibly in conjunction with waste water treatment technologies). This technology may be viable in Gaza and, possibly, in the Jordan Valley. (US$200,000)

The Interim Period

5.2 During this period, a few technical assistance activities are proposed to facilitate a smooth transition. These deal with the creation of public institutions, strengthening of the export institutions and natural resource management.

- As soon as the outlines of the framework for the financing and operation of a Palestinian public sector are available, an agricultural study would be created to look at specific aspects of sectoral policy, institutions, public tasks and the process of creating an efficient public sector function. The study would be expected to create a number of technical groups, to deal with: (i) extension and research; (ii) agricultural education and vocational training; (iii) food quality and safety and animal health; (iv) forestry and the environment, including rangeland management; (v) fisheries and fish culture; (vi) animal husbandry; (vii) agricultural credit; (viii) collection and analysis of agricultural data; (ix) agricultural trade; and (x) existing agriculture institutions, like cooperatives, PARCs, etc. These working groups would develop and review alternatives for plans during the interim period and longer-term plans for the creation and operation of specific public services, with outside technical assistance. In addition, this program would include a Project Preparation Facility which would support preparation of feasibility studies for infrastructure for sector support services, like school buildings, extension and research facilities, veterinary clinics etc. (US$1.5 million)

- In close collaboration with the activities described above, a specific study would assess the implications of a new agricultural trade regime vis-a-vis Israel and Jordan as it pertains to the OT. The study would review changes in the current regulatory environment that could enhance export of agricultural products from the OT, including formal and informal restrictions. The study would also review how OT agriculture trade with Arab states could be enhanced. Finally the study would assess the likely impact of increased imports into the OT on local production and markets. (US$200,000)

- During the transition, technical assistance would be needed to support private sector exporters in developing markets in Europe, Israel and Jordan. This technical assistance would complement the proposed study on trade policy re Arab countries suggested in the macro report, and the previous study, and provide expertise to survey market requirements, establish trading and transport arrangements, develop barter or financing arrangements through third parties and establish quality and product controls. (US$300,000)

- One of the crucial issues in natural resource management is demand management. This applies both to water and (grazing) land. A study would review potential policy options

for water and grazing land use, distribution and pricing, as well as the potential impact of demand management measures on production efficiency and levels of competitiveness. To control environmental degradation, a program for reforestation and erosion control, and arrangements for management of grazing lands would also be prepared. The study would specifically look at the issue of infiltration, and technical solutions to enhance infiltration efficiency. It would also cover the issue of utilization of marginal lands, notably the use of inter cropping and selective use of water to enhance rain fed production. (US$500,000)

Investment

5.3 Private sector investment is needed in irrigation and well rehabilitation, and agro-industry facilities like slaughterhouses. In addition, private sector investment is needed to upgrade agricultural production and processing capacity and improve competitiveness. Finally, private sector investment is needed in land reclamation. Given the major uncertainties concerning the future developments in the sector, no private sector investments estimates have been made except for irrigation rehabilitation (US$ 40 million).

5.4 During the interim period, public investment needs are concentrated in three areas: sector support services like education, food safety and animal health; the environment and natural resource management; and sectoral infrastructure. Public investment in improving the rural roads system, facilities for agricultural exports in ports and airports, investment for development in deep wells, and investment in waste water facilities are covered in the investment program in the Infrastructure report.

- Rehabilitation and expansion of infrastructure for agricultural support services: includes education, extension and research, a food safety and quality control service and animal health services. Also includes wholesale markets in the OT and fish landing facilities in Gaza. Upgrading of facilities to ease agricultural trade across the Jordan River would be another priority. (US$20 million in the Interim period, and an additional US$ 10 million in the long term)

- Public sector investments in the environment: includes forestry development, rangeland management, fisheries management, and measures to control erosion and increase water infiltration. This component would continue well beyond the interim period. (US$20 million during interim period, US$ 40 million thereafter)

Annex 1: Agricultural Systems

1. *Area.* Within the total OT area [50] of about 6,160 square kilometers, or 6.16 million donums (Md) [51], the West Bank covers 5.80 Md, and Gaza .36 Md. In the West Bank slightly more than 1.50 Md in 1991 was actually cultivated by Palestinian farmers, with an additional .3 Md lying fallow. In Gaza .16 Md were under cultivation by Palestinian farmers. Since 1973 the area regularly used for agriculture has declined by about 6 percent in the West Bank, the decline being entirely in rain-fed lands. With close to a third of the land area used for marginal cultivation, grazing or fallow, and an unknown area being cultivated by Israeli settlers, the definition of cultivated area is necessarily vague. The area used for extensive grazing operations is uncertain, but traditionally may well have covered most of the eastern slopes of the West Bank, and some parts of the western slopes. The current area used for extensive grazing is smaller.

2. In the West Bank, family farms are dominant, notably in the western hilly areas, where until recently weekend farming became increasingly usual, also for livestock operations, as farmers worked in Israel during the week and family or laborers tended the farm. Land holdings are relatively large in the Jordan Valley, with absentee owners living in Jordan. Here share holding dominates, while cash land rent arrangements dominate in intensive farming in the small coastal zone and Gaza. Special tenant arrangements prevail in olive growing areas, where picking of fruit is delegated to 'tenant' farmers for a share of the crop. Current tenant arrangements are reportedly satisfactory to most farmers. From a macro-economic perspective excessive fragmentation in some areas must have negative implications on efficiency. In the West Bank, holdings smaller than 50 donums cover 90 percent of the agricultural area. Gaza has a few very large farms operated by absentee land owners; small, fragmented family farms dominate in terms of numbers, while larger holdings cover about half the area. Excessive fragmentation of small farms has become an important issue. Similarly, excessive fragmentation is also a problem in rain-fed areas, constraining efforts at mechanization. Dispersion of many small lots has reduced efficiency, and the willingness of farmers to invest.

3. *Farm Population Distribution, and Farm Structure.* Most Palestinians live in areas with modest agricultural potential: the western hilly areas, where rain-fed tree plantations, field crops and livestock operations prevail. The least populated areas, the Jordan valley and the semi-coastal region have the most promising agricultural potential. Even Palestinians returning to agriculture are concentrated in the western hills. Gaza is very densely populated; here casual labor is most abundant on account of limited current employment opportunities, and limitations imposed by Israel on employment and labor movement, while most unsatisfied demand for labor in the agricultural sector may well be in the Jordan Valley. At present wage labor is largely used for irrigated vegetable cropping, animal husbandry and for short periods for tree crop picking.

4. *Agro-ecological Zones.* From an agro-ecological point of view, the region can be divided in about seven distinct zones. The coastal region in Gaza has three zones: the north, with relatively moderate rainfall and acceptable quality of ground water; the middle, with less predictable, modest rainfall and highly saline ground water; and the south, with less than 200 mm precipitation and very poor quality ground water, except near the coast [52]. The Gaza has sandy soils in the west, loess in the east

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50/ Including the Israeli settlements in the OT.

51/ 1 donum is 1000 square meter, or 0.1 Ha.

52/ A detailed description of the important role of water and irrigation in agriculture is given in Technical Annex B.

and alluvial soils in the north-east. The West Bank has four zones: the semi-coastal region, with nearly 600 mm of rainfall and alluvial and heavy terra-rossa soils, used for a variety of crops; the central highland region, covering most of the West Bank, is mountainous (up to 1000 m) with relatively high annual rainfall, tapering off from north to south, often shallow soil depth, with olive and grape orchards with a scattering of plateaus used for a three year field crop rotation of winter grain, fallow and summer grain and vegetables; the eastern slopes between the Jordan valley and the central highlands, semi-arid with steep mountains and very little rainfall, largely used for grazing; and the Jordan valley, 200-400 m below sea level, with sandy and calcareous soils, annual precipitation of about 200 mm, hot summers and mild winters suitable for off-season cropping of vegetables and semi-tropical fruit tree plantations. The OT has about 20 different soil types. Although a number of soils are less suitable for agriculture, farmers have been remarkably adept at using the soils available to them to best advantage, notably in areas with shallow soils on the western slopes.

5. *Typical Cropping Patterns*. Agriculture is being characterized by it highly diverse and complex nature; in an area the size of Trinidad and Tobago, at least seven agro-climatic zones exist where about 60 crops are grown, while total rainfall fluctuates between 700 and 100 mm annually, depending on the location. This diversity is a strength, giving farmers potentially several cropping pattern options; but it is also a weakness, as successful cropping patterns need to be highly area specific. With rain-fed agriculture dominant in the West Bank, agricultural systems reflect the high variability of rainfall; most traditional crops are grown in a low-risk, low-input, low technology mode. Fruit tree plantations (olives, grapes, almonds) comprise 60 percent of the cultivated rain-fed area, field crops (wheat and barley) about 35 percent. Of the small irrigated area a little less than sixty percent is used for vegetables and fruits, 12 percent for melons and bananas and 25 percent for citrus (Annex D, Tables IV, V, VII and IX). In Gaza where close to 65 percent of cultivated land is irrigated, citrus accounts for 55 percent of the irrigated area, and consumes about half of all water used for agriculture. The remaining irrigated area is used for vegetables, some of it for multiple cropping, and guava. Of the non-irrigated area about half is used for fruit trees (olives (some partly irrigated), grapes, almonds), field crops cover about a third, the rest is planted with rain fed vegetables. (Annex D, Table X). Livestock shows less variability; extensive and more intensive forms of production exist, with extensive systems being most competitive in local markets.

6. *Level of Technology*. In most instances agricultural crop production in the OT is more advanced in comparison to some neighboring Arab countries, but not as advanced as modern systems in Israel, parts of Europe or the USA. This is especially true for protected agriculture crops produced in polyethylene greenhouses, high tunnels and row covers along with crops planted through polyethylene mulch in combination with drip irrigation. Rain fed production has not witnessed a similar technology improvement; although some technological packages exist to improve the water retention capacity of soils and introduce more productive cultivars to improve production, they are generally not being applied. While in general yields in the OT from some rain fed and open field irrigated production of field and horticultural crops have doubled and even tripled since 1967, yields of more traditional crops have increased much less, with the exception of grapes (Annex D, Tables IV, V) [53]. One should take into account the modest level of modern technology being applied prior to the occupation; however, the introduction since then of combination of new growing technologies, new crop cultivars, and better overall water and agronomic management has made a considerable difference.

53/ Information from the Department of Agriculture in the West Bank, and the Agricultural Atlas of Jordan, 1973.

7. Technological progress has not been able to maintain the pace of the early 1970s, and has been particularly slow since the mid 1980s. Current technology, entirely of Israeli origin, is not necessarily the most advanced in regard to cultivar selection and yield potential, while drip irrigation technology, as used in open field agriculture, is not cost competitive with systems from other countries. For farmers in the OT, not having ample opportunity to explore and test other methodologies and inputs has reduced competitiveness and efficiency. The overall husbandry in the cultivation of crops can also be improved. The vegetable crops are relatively high yielding, and fairly free of disease [54] and pests; mineral nutrition programs are generally adequate. Nevertheless, land preparation, uniformity of planting, weed control, post harvest handling and marketing practices do need attention, especially if products from the OT are to be exported. Without improvement, quantity and quality of many products is currently hardly competitive with countries having a long history in export markets, notably in the EC. This applies to irrigated, but also for rain fed crops. For example, grape vineyards in the OT are abundant, representing a major source of revenue. Unfortunately, the state of the art pruning and training of grape canes is quite different today than is currently practiced in the OT. The cultivars in use are of the seeded types and have extremely delicate grapes, which are suitable for wine, but not acceptable for the export market as a fresh commodity or raisins. Most vineyards are not using drip irrigation, technology which is needed to maximize yields and water efficiency in water scarce environments. Equally, plums and other trees are generally planted and husbanded in manner which does not enhance monetary returns; the olive tree husbandry, cultivar selection, picking and processing are extremely traditional, and substantial efficiency improvements appear potentially possible.

Individual Crops

8. *Citrus*. Citrus has played an important role in OT agriculture. While not being particularly important in Gaza and the West Bank during the British Mandate period, when citrus production was concentrated in the central coastal plains, rapid expansion took place in the 1950s and 1960s, mainly in Gaza. Since then citrus has witnessed rapid expansion and good markets in the early and mid-1970s, and a gradual but persistent decline in the 1980s. Although the area covered by citrus orchards increased from 13,000 donums in 1966 to 24,000 donums in 1990 in the West Bank, the area in Gaza has best reflected the fluctuating role of the product in foreign markets; the area increased from 56,000 donums in 1965 to a peak of 73,000 donums in the late 1970s, only to decline to 58,000 donums in 1991. Many areas under orchards are not being husbanded or harvested, and the actual area under active cultivation is much lower. While citrus only occupies 1.5 percent of the total cultivated area in the West Bank, it has since 1969-71 contributed about 6-7 percent to the value of agricultural output. In Gaza the crop is much more dominant, occupying between 36 and 45 percent of the area, while contributing about 50 percent of agricultural output value in the 1970s, but only 20 percent in the late 1980s.

54/ The OT have a serious problem related to the use of pesticides and herbicides. Considerable concern exists about the excessive use of these products in the OT, and about faulty application. Some Palestinian farmers, not being able to read are endangering their lives by not knowing the safety procedures in handling the pesticide and herbicide materials. Frequent improper application rates reportedly endanger ground water supplies with chemical residues. This is especially true in the Gaza Strip, where ground water is close to the land surfaces. A considerable health risk to the consumer exists through the pesticide applicator who is unable to read the rates of application and waiting periods between last application and harvest.

9. Citrus has since the late 1970s been affected by steadily declining profitability, caused by disappearing markets, notably following the Iraq-Iran and Gulf wars [55], devaluation of the Jordan Dinar, in combination with rising costs of inputs, notably increasing water costs. Productivity has declined on account of the high average age of orchards, most of which were planted in the mid-1960s[56]. In the Jordan Valley and Gaza rising salinity in irrigation water has become a serious problem. Citrus replanting, which requires permits, has also been discouraged by the Agriculture Department, which recommended replacement with vegetable growing [57]. Finally, farmers have been affected by considerable administrative security arrangements in marketing products, which became more constraining with declining profitability. In terms of the future, citrus faces the dilemma that, not unlike Israeli fruits, it has difficulty competing with low cost producers in the all-important EC markets, and may not have the varieties (pink grapefruit, easy peelers) most in demand in external markets. Future potential of the crop appears limited, and will depend on access to markets with lower quality requirements, like Eastern Europe, and improvement of profitability through a combination of improved technology, introduction of new varieties, and improving marketing and export efficiency. Even if current disadvantages, like higher tax levels on inputs and higher costs of land, labor and water compared to competitors, are removed, it appears production in the OT will still have a hard time competing in the EC markets against Moroccan and Spanish production.

10. *Vegetables*. Vegetables are grown in non-irrigated and irrigated systems. Rain-fed vegetables are dominated by tomatoes, okra, cucumber, squash and onions; tomatoes, cucumbers and squash are the key irrigated vegetables in terms of area (Annex D, Table V). In the West Bank, vegetables account for about 9 percent of the area, but 35 percent of plant production value. While vegetable production in rain fed areas declined on account of relatively low productivity and high labor costs, the area under irrigated vegetables expanded rapidly since the early 1970s until about 1987. Since then exports of vegetables to Jordan and beyond has become more difficult; as a consequence of the introduction of annual quotas and increased competition, the area under vegetables (including melons) has declined.

11. Vegetables hold, in more than one sense, the key to future development in agriculture: in the past modern technology has impacted most on vegetable production, and adjustment to market developments has been quickest [58]. Vegetables have been one reason why the OT have been successful

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55/ Arab markets took 54,000 tons in 1984, and only 26,000 in 1989; Eastern European markets took 62,000 tons in 1976, but only 20,000 in 1986 and much less at present. The key outlet for citrus is Israel, which regularly imports some 40,000 tons for its juice factories, and reportedly also re-exports certain quantities.

56/ An estimated 15,000 donums currently produces virtually no yield, while another 15,000 donums only produce marginally.

57/ Israel, which faces a profitability and market crisis in its own citrus industry, and is providing special subsidies to cushion the financial impact, has advised OT citrus growers, through the Agricultural Department of the Civil Administration, to withdraw from citrus. The withdrawal has been slow; notably in Gaza many large scale absentee land owners have continued operations on the basis of minimum cash-flow or sold their land. Smaller operators, having few alternative employment opportunities, have used Civil Administration grants for citrus conversion, and to new farmers to convert to vegetables.

58/ Melon production in the OT appears mostly no longer competitive in comparison with production in Jordan and Israel. The reaction to changing market demand and competition is well illustrated by the surge and decline of mellon production. Following increases in

in dealing with the constrained availability of water, and loss of some agricultural land. But the success of individual crops has sometimes been possible only on account of the use of cheap family labor (strawberries); equally important, technological improvements have not been able to sustain productivity increases as has been the case in Israel [59]. Labor efficient production techniques, to facilitate the use of expensive hired labor, has not yet received much attention. While the climate in the OT favors off-season vegetables, the sector has had considerable problems developing new markets for these products, reflecting ineffective marketing arrangements as well as security related demands hampering efficient delivery of produce to Jordan and the EC. Nevertheless, despite the constraints, vegetables have been the crop most farmers shifted to when traditional crops fail to perform; they account for about 50 percent of total value of production in Gaza, compared with 11 percent in 1978. But vegetables have also reacted in adverse ways to some constraints; with access to knowledge often limited, farmers have concentrated on fewer crops, thereby increasing seasonal excess supply on local markets, and increasing risks of price failure. If the OT is to succeed in the future, it should concentrate on updating technology and diversification in terms of product, production timing and markets.

12. *Other Irrigated Crops*. Dates and bananas are important irrigated crops; the area under bananas and dates is increasing. Bananas have benefitted from adverse weather conditions in neighboring production countries, and good demand in the OT and Jordan. Date palm is a tree crop with potential, notably in the Jordan Valley and Gaza; it uses modest amounts of (low quality) water, and demand for its products appears strong.

13. *Olives*. Olive culture is the backbone of the West Bank agriculture. Olive orchards account for 75 percent of the fruit tree area. The share of olives in the total value of agricultural output varies considerably between years on account of the highly cyclical nature of olive production, which may fluctuate between 20,000 and 100,000 tons per year. Although average production has increased considerable during the past 25 years, due to area expansion, the economic viability of the crop has become increasingly marginal; productivity is low, and input costs, notably for labor, have increased.

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demand in Jordan and the OT, by the late 1980s mellon production had expanded to about 46,000 tons (Source: Agricultural Production in Judea, Samaria and the Gaza Area, CBS, 1991). Such production levels were unsustainable in terms of market demand and availability of water; in addition strong demand in the OT attracted supplies from Israel. In the late 1980s about half of Israeli vegetable and fruit imports into the OT consisted of melons. As a result production dramatically declined in the West Bank, to 5,600 ton. That was less than the market needed, and production was taken over by Gaza, where it substantially increased from 1,000 tons in 1988 to 10,400 tons in 1991. It appears that while productivity is generally higher in Israel, Jordanian production costs have a competitive edge. But in this case competitiveness is not the only factor; trade restrictions have also been important. Melon exports to Jordan dropped from an average of 33,000 tons during 1981/85 to zero since 1990 on account of a combination of trade restrictions and lack of competitiveness. As a result the area under watermelon in the West Bank has declined substantially since 1986 from 22,000 donums to about 1,000 donums in 1991. The area under melon expanded in Gaza, but mainly for its local market.

59/ For example, recent research in Israel and the USA concerning the use of brackish water for tomato production, and selection of species with high tolerance levels for salt is being tested in Gaza, but is not being applied widely. Production levels for tomatoes grown under plastic in the OT are about half of those in Israel, and less than 30 percent of top production levels in Europe and the USA.

Olives have often been planted to demonstrate that land is under active cultivation, and hence has less of a chance of being taken over by the authorities [60]. Despite minimal profitability, farmers are strongly motivated to plant and grow more. Palestinians treasure their own quality of oil, which they consider superior to other oils; farmers keep oil for themselves and their family and friends. Oil which enters trading channels is considered inferior on account of potential adulteration. Marketing of oil is dominated by traditional market channels, using traditional packaging, with very little control over quality. Local production exceeds consumption by a considerable margin, and some oil and pickled olives are exported to Jordan and Israel. Nevertheless, Palestinian farmers face the dilemma of dwindling profitability; the sub-sector is highly traditional and has only modestly benefitted from new technology in production or processing. Using family labor at low opportunity costs, through special 'tenant' arrangements has been one solution to reduce cash costs and maintain production. Nevertheless, although improvements in production, processing and marketing appear feasible, the crop is unlikely to be able to compete in the foreseeable future in world markets against highly efficient and technologically advanced producers in Italy and Spain; instead future development should aim at improving profitability and efficiency rather than area expansion, and marketing should focus on the local and neighboring markets.

14. *Field crops*. Wheat, barley and other rain fed crops account for about a third of the rain fed area in the West Bank, or 500,000 donums. In addition to being traditional crops, wheat and barley have been an essential part of the traditional way of life, providing feed for human and animal consumption. They represent more than 66 percent of the total area of field crops; peas, vetch (and other animal feeds) and corn being other important crops. Although rain fed field crops cover a considerable area, their dependence on variable precipitation poses risks; particularly farmers with small holdings cannot rely on them as the main crop and source of income. Field crops have benefitted the least from technology developments. However, there is a future for some field crops; research has demonstrated the comparative advantages of extensive rearing of selected sheep varieties in combination with field crops. Given the demand for fresh meat, field crops could play a viable supporting role for animal husbandry.

15. *Other Rain-fed Crops*. Grapes have also defined the character of OT agriculture; vineyards flourished on West Bank mountains for many centuries. Prior to 1967 it was already well established as major crop, covering some 130,000 donums. Since then there has been a gradual decline to about 89,000 donums in 1990 (of which 7,000 donums in Gaza). Production initially increased until 1985, then started to decline; in 1990 about 50,000 tons were produced. Improvement of its profitability is possible, but will require new varieties, husbandry and access to supplemental irrigation.

16. Almonds, plums, apricots, apples, figs and others are all traditionally grown in the OT, but in general profitability is low. Lack of up-to-date technology and knowledge has affected local apple production, as has competition from the highly efficient Israeli production. Almond production suffers from high labor requirements, lack of pest control, and limited local markets and products; its profitability is reportedly very low. Figs have insect problems; productivity is low as importation of the most marketable varieties is reportedly prohibited. Each of these crops could benefit from the application of modern technology.

60/ According to Palestinian sources, olive trees and newly planted seedlings are uprooted by the authorities for security considerations; 90 percent of the 90,000 trees reportedly uprooted by the authorities since 1988 were olive trees. Israeli sources contend that such uprooting has not taken place during the past several years.

Animal Husbandry

17. Animal production accounts for well over a third of agricultural output. Most operations are either extensive, or small [61]. Animal husbandry is particularly important in the West bank, where recently the value of animal production has almost equalled the value of agricultural production; in Gaza the share is less than 30 percent. In order of importance, sheep and goats contribute about 60 percent to the value of output of animal husbandry in the West bank, poultry 32 percent and cattle the rest. In Gaza poultry production dominates with 60 percent to total output value, followed by sheep and cattle. Poultry, sheep and goats and beehives are most important livestock operations in Gaza on account of land constraints; animals are grown on farms or use agricultural land for grazing crop residues.

18. Sheep and goats traditionally have been husbanded by nomadic bedouins on the eastern slopes and in the Gaza. Animal husbandry witnessed a considerable decline following the start of the occupation; restrictions imposed in areas declared military land , which cover large tracts of traditional grazing lands in the eastern slopes by the authorities has not only caused a reduction in the number of animals, but also a deterioration of the remaining accessible rangelands due to overgrazing. In the OT a marked preference exists for goat meat and dairy products from goat and sheep. Traditional (Baladi) cows have been held in the OT, but never prospered on account of low productivity, low demand for its products and lack of feed. Improved (Frisian) cattle herds have traditionally had not much more success.

19. The livestock sector does not face an external market problem, until recently local demand exceeded supply for most meat and dairy products. Production of milk declined sharply following occupation, in large measure because of competition from subsidized dairy products imported from Israel. Although Israeli milk production is still subsidized, subsidies have decreased considerably over time. The livestock sector also has quality and productivity problems with its cattle; it has had difficulty financing high quality certified cattle breeding stock, as many of its cows are relatively low quality animals bought cheaply from the Israeli industry, which needs to cull lower quality stock to maintain the overall quality of the herd. Dairy production has also been hampered by quality control problems, in addition it suffers from the small size and highly dispersed production operations and small size of processing plants. In general, development of the sector has not only been affected by direct Israeli product imports, but also by its strong dependence on key Israeli inputs. After initial efforts to reduce such dependence failed, it has declined recently as licensing policies have been considerably liberalized, and local production of equipment and inputs have become more important.

20. Despite the competition and other constraints, including a declining level of public services, the industry has developed. Since 1970 red meat production has about doubled, white meat production has increased six-fold, milk production has doubled, and egg production has increased five-fold [62]. Growth has been particularly strong since 1988. Better access to Israeli and foreign technology, and the climate of more relaxed issuing of permits for construction of poultry operations has substantially assisted egg and poultry meat production growth. While the number of traditional cattle virtually disappeared,

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61/ Animal husbandry is dominated by sheep (345 thousand) and goats (210 thousand), followed by poultry 430 thousand), draught animals (19 thousand) and cattle (10 thousand). Of the dairy cattle, 58 percent of all operations have one cow, 36 percent 2-5 cows, and 6 percent more than 6 cows (1990). Source: Agricultural Data Base, 1992, and Agricultural department, West Bank, 1991.

62/ Mahmoud El-Jafari, Livestock in the West Bank-Economic Analysis, Rural Research Center, Al-Najah University, Technical Publication 24, 1991.

the number of frisian dairy animals increased by 75 percent since 1986, the number of layer chickens increased by 700 percent, and broiler chickens by about 50 percent. As a result, the West Bank is now virtually self sufficient in all areas of production, except red meat and possibly milk. This development pattern may be explained in part by the particular efforts of the Palestinians since the start of the Intifada to become self-sufficient in animal products. More specific, Palestinians started in 1987 to boycott Israeli dairy products, thereby substantially enhancing opportunities for local production. The increased availability of labor since 1987, and the relative ease with which livestock operations can be started has also helped. Equally important, local demand for livestock products has been strong, and imports from Israel have increased in price on account of declining subsidies. Finally, technological factors have encouraged production expansion: the introduction of a new hybrid sheep, Assaf, with high productivity under indoor methods of husbandry attracted attention in the early 1980s, although initial production experienced problems as farmers ignored the more exacting levels of husbandry and often imported lower quality animals from Israel.

21. The animal husbandry sector does have further potential, mainly for the local market, but some restructuring is needed. Dairy operations need investment in processing, enforcement of quality control and arrangements to deal with the widely dispersed production pattern. Poultry production equally needs quality control, and further expansion should not only reflect local demand, but should also focus on increasing value added, selected use of locally produced inputs, and reducing the costs of imported inputs. Extensive sheep and goat production has a captive local market, and can be expanded provided current restrictions on grazing can be lifted, and ecologically sound arrangements for grazing can be introduced. Bee keeping has considerable potential, with strong demand in local and neighboring markets.

Fisheries

22. Traditionally, the Gaza has had a modest but important fishing sector. Resources of small pelagic fish, notably sardines and mackerel frequent the shores, while up to 60 bottom dwelling species are common in many areas. Fish resources are usually not highly abundant in the Mediterranean, but nutrients emanating from the Nile used to support considerable fish populations off the Sinai peninsula. The reduced flows of the Nile following closure of the Aswan High Dam substantially reduced local fish resources, but high nutrient levels in current discharges have revived sardine stocks. While prior to 1979 Gazan fishermen exploited the entire Sinai coast, catching up to 4,000 tons annually, of which up to 70 percent sardines, fishing activities were restricted to the Gaza coast in 1984, which reduced fish production to less than half of previous levels. Changes in abundance of sardines also negatively influenced catches. Further restrictions imposed by the Israeli authorities on the area in which Gazan fishermen are allowed to fish [63], and on the timing of their activities [64] caused production to drop to

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63/ Until 1979 (the peace agreement with Egypt) the fishing area was restricted to: (i) on the north to two miles south of the former 'green line', (ii) to the west 12 miles from the beach, and (iii) to the south to a line to the west of Raous El-Abed. Since then the southern border of the area was changed to two miles north of the international boundary with Egypt, while recently the northern boundary was extended to 1 mile south of the former 'green line' and the western boundary was extended to 20 miles from the beach.

64/ Fishermen cannot leave or return when they want; initially Israeli regulations limited fishing to the period of 7 am and 4 pm during the day. After strong protests of the fishermen, including strikes, Israeli authorities agreed that access gates to the beach (and the boats) will be open between 5am and 5pm. Fishermen are allowed to stay overnight at sea, but are not allowed to come closer than 700 meter to the beach until daybreak All

one tenth of pre-1967 levels in 1989. Highly favorable climatic conditions have increased fish abundance near the coast, and the past two fishing seasons have witnessed a spectacular increase in catches.

23. Fisheries is carried out from the beach, which limits the size of the vessels, and involves cumbersome and damaging beaching of vessels. New technologies for beaching vessels and new hull forms to improve beaching and reduce damage have been introduced for smaller boats. Gaza fishermen have not been able to replace their older and larger vessels, which utilize inefficient equipment and old designs, and suffer most from the lack of a proper fishing port in Gaza, although some jetties, traditionally used for loading and unloading of general cargo, still exist and are being used in fair weather. Support facilities for the sector are basic; infrastructure is limited to some ice production, fish auction hall and boat building and engine repair facilities.

24. All fishing operations are restricted to three small sections of the beach in Gaza, where all fish is landed and which have some infrastructure for storage and marketing. Marketing is local, but Israeli merchants buy considerable quantities of high value fish for their own market. Prices fluctuate but appear generally high, reflecting the considerable demand for prime quality fish in Israel. At current production levels, fishermen -- who usually own their boats in groups -- may earn similar or higher incomes than agricultural workers. Fishermen are organized in a single cooperative, which has been quite effective in arranging less restrictive security limitations for its members. About 1000-1200 fishermen are full-time involved in fishing, with 400-600 additional, part-time, fishermen mainly operating in the sardine season. Support and services involves an estimated equal amount of people.

25. Past attempts to manage fishing effort by reducing the size of the fleet (through buy-outs funded by external donors) to reflect the area currently accessible for fishing have been rejected by the fishermen, arguing that natural fluctuations in fish populations and restrictions imposed by Israel, and not over-fishing were at the root of the modest catches during the 1980s. Recent catch increases support that view. Fishermen have also argued that a fishing port is needed. While current technology of larger vessels requires relatively protected landing facilities, alternative vessel designs for larger vessels exist, and may be cheaper than constructing a new fishing port, given current fish landing levels. However, if access to international waters is being restored and the fleet expands, relatively cheap measures could be taken to improve protection and expand capacity of the current jetties in an economically feasible way.

26. There is virtually no fish culture in the OT. Nevertheless, demand for fish is strong, and the area has potential to raise fish in controlled conditions, as demonstrated in Israel. The potential of technologies which utilize brackish water resources, or raise fish on the basis of nutrients from human waste water appear substantial, and offer considerable prospects for the future, both in Gaza and the Jordan Valley. More in general, with very considerable quantities of human waste water and waste from animal production not being effectively used, waste water treatment technologies based on macrophytes, which produce products that can be effectively used for animal feeds appear to have considerable potential, at a fraction of the costs of traditional waste-water treatment systems.

Forestry/Land Reclamation

27. Prior to 1968, the West Bank supported a program of reforestation, aimed primarily at reducing erosion and water run-off, to which many areas in the OT are prone. After the occupation the program has been handed over to Israeli institutions involved in the settlement program and its scope has

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fish is carried of the beach to the auction (about 500 m distance) by donkey cart or by the fishermen themselves, to facilitate security inspections, no trucks are allowed on the beach.

declined. Land reclamation is often viewed within the larger context of land policies, and efforts to lay claims to land. Land reclamation has been practiced in many areas for a long time, and is continuing; in Nablus and Hebron alone almost 15,000 donums were added to the land area during the past 10 years. In general reclamation is taking place in increasingly marginal areas. Reclamation is not supported by additional infrastructure; many reclaimed areas are in dire need of road access. Another problem is the selection of crops in newly reclaimed areas; traditional rain-fed crops, without the benefit of new technology, are marginal at best in terms of profitability. However, the financial aspects of land reclamation and rain fed production may not fully reflect its positive impact on reducing environmental degradation as it minimizes run-off erosion. Specifically, the economics of olive and grape production should not be viewed in terms of financial benefits alone; the impact on the environments appears beneficial, and hence may warrant some public support. Forestry appears to have even more ecological potential, not only in terms of wood production, but particularly in the way it enhances the environment, and improves the ability of the soil to absorb moisture for infiltration into aquifers. Tree planting should receive strong public support in the future.

Agro-Industry

28. Agro-industries have not been able to copy the performance of the agricultural sector in terms of production; agro-industries account for less than 20 percent of the total number of industrial operations in the OT. Olive processing is by far the most important. It has witnessed substantial modernization during the past 20 years, but location of the press capacity may not fully match production. Currently installed capacity possibly exceeds peak production capacity, but the bi-annual production pattern causes very low capacity utilization, and hence low productivity. The eight existing and one defunct citrus packing facilities have a daily capacity of 1200 tons. There are seven major food processing firms in the OT dealing with such products as tomato paste, hommus and meat. Many industries are currently based on Israeli raw material. While the OT have large quantities of surplus citrus and grapes, and supply Israeli industries, no local juice industry is operating, although one is being established. Similarly, no local wine industry exists. Olive pickling, a small but important industry, of which about two-thirds of production of about 600 tons is exported, is still very traditional. A modern pickling industry, linked to upgraded olive production, may have potential. Two cigarette factories in the OT largely work with imported raw material. The dairy industry, small prior to 1988, has expanded rapidly since then; the expansion is largely based on cow milk processing; sheep and goat milk processing, which is far more important in terms of volume, remains traditional. The 16 dairy plants currently process about 17 tons a day, although installed capacity is about 4 times this amount. Plants still rely heavily (by some accounts 80 percent) on imported milk powder from Israel.

29. All agro-industries have suffered from the prevailing overall business investment, trading and licensing climate, as discussed in detail in the private sector report. Although the overall business, climate has improved over the last two years on account of the peace process and new policies and regulations of the Civil Administration, in the past would-be entrepreneurs had to wait for years before obtaining the necessary licenses. Few have access to suitable credit facilities, and most investment is private equity, severely hampering the potential investor to design his investment in the economically most optimal way. As with agro-industries in general, production and processing capacity and timing need to match; in the OT few industries are able to organize such matching, and instead rely on imported inputs. This is particularly valid for the dairy industry, which is unable to efficiently organize the widely dispersed small producers of milk. Whether agro-industries will have potential in the future will largely depend on local circumstances affecting production of raw material and markets. Improvements in the business climate, from credit to licenses and tax regime will help this segment of the sector, but given the nature of the OT's climatological advantages, fresh rather than processed product appears most desirable, suggesting packing and marketing as areas of focus. Production of specialty products based on local products, like

olive and cucumber pickles appears promising, while locally produced wine may also have limited potential for the local tourist industry.

30. Some inputs into OT agriculture are produced locally (animal feed, seedlings, green houses, poultry cages) but most are imported from Israel or through Israeli agents; this includes equipment like tractors, spreaders, fertilizers and pesticides. Current arrangements for direct import from other countries are cumbersome and time consuming. As a result costs of inputs are high, when compared with world market and even Israeli costs, on account of import taxes, VAT, margins of Israeli importers and over use. Second hand agricultural machinery often originates in Israel, and is sold to OT farmers; some equipment is more appropriate for Israeli large scale and capital intensive production conditions, but its low second hand costs balances the technical drawbacks. The OT do not produce improved seed, and are entirely dependent on seeds imported from Israel, or through Israel from Holland and the USA. However, the OT has demonstrated considerable ingenuity in dealing with this situation, it has developed a thriving nursery sector. About 2 million fruit tree seedlings and 60 million vegetable seedlings were produced in the West Bank alone in 1992. This has become an important export industry, with over 50 percent of all seedlings exported to Jordan and other Arab countries, and future expansion appears highly promising. Green houses used to be imported from Israel; however, local production of steel structures started in 1985, and currently satisfies most demand. The OT have about 9,000 greenhouses. Plastic covers for green houses and plastic mulches are still imported, although plastic sheets used in open cultivation are now produced in factories in the OT.

The Public Sector

31. At present the agricultural sector is served by the Civil Administration [65], cooperatives and similar institutions with a long background in both areas, and a large number of institutions of a semi or non-governmental nature. The Civil Administration's functions have substantially declined over time During the early period of occupation, the Civil Administration, supported nearly 2000 extension and other personnel in the OT. Increasingly limited financial resources of the Civil Administration have substantially reduced official extension, research and education in the sector, and have limited other services (veterinary services, forestry, environmental protection). This has not only affected agricultural growth, and the sector's ability to technologically adjust, but also the ability of the administration to maintain quality control, sanitary and health related standards, and particularly animal health standards. Funding for some service functions, like agricultural education traditionally has come from abroad, notably, prior to the Gulf War, monies were available from Jordan and various Gulf states. Since the war, these financial ties have been interrupted or cut; for example, the agricultural building at An Najah University was never finished due to funding cuts from the United Arab Emirates. The cooperatives and semi- and non-governmental organizations also play a role in the sector. They determine their own policy objectives and priorities, with or without reference to their target groups, and provide various services, from extension to training and credit.

65/ The Civil Administration's role in agriculture is currently limited to the provision of various services through four departments: instruction, research, veterinary services and forestry.

Agricultural Extension

32. Where do farmers currently get their knowledge from? A large number of institutions and groups [66] is involved in agricultural extension and related activities of research, information dissemination, field support and credit. One reason has been the declining role played by the 'official' research activities and extension service of the Civil Administration. However, in an area without a representative Government, political parties and groups have increasingly used rural organizations as a conduit for their political aspirations; agricultural extension and related activities giving ready access to farmers are providing a channel to influence farmers about other matters. The divergent and essentially competitive interests of some of the sponsors of these activities virtually rule out any serious efforts at coordinating operations. In addition, many of these operations receive support from a host of sources, Palestinian and foreign, including bilateral and multilateral sponsors. As a result, despite the many, often overlapping activities taking place in extension, the OT farmer in many instances may not be able to get effective and quick help for his specific problems, whether they concern his current crops or the potential of alternative crops. In addition, although no aggregate data are available, the current system, with its forty odd institutions involved, in terms of expenditure per farmer, must be one of the most expensive in the world.

33. Extension type activities are conducted by:

(a) Civil Administration. Immediately following the occupation, the Departments of Agriculture of the Military Administration pursued an active expansionary policy to modernize agriculture. Agricultural staff was expanded, demonstration plots to show new crops and production techniques were set up all over the OT, credit facilities and food aid were advanced to pioneering farmers, exports to Jordan were heavily promoted and also received subsidies, and exports to Israel, although not permitted, was not strongly resisted. The result was rapid modernization and expansion of OT agriculture. These policies were gradually withdrawn or toned down starting in the mid-1970s. Lack of financial resources has caused a substantial reduction of the applied research program and major staff cuts have substantially reduced the effectiveness of the extension service of the civil administration [67] . There are at present in the OT 55 extension workers and 33 veterinary specialists (of which 21 assistants) [68]; in the West Bank the total number of employees of the Agricultural Department has dropped since 1978 by 68 percent to 141. An estimated 50 percent of the farmers has currently no contacts with the official extension service; some 90 percent of the time of the few remaining specialists is spend on pesticide application and disease related matters. With no domestic applied research as basis, the remaining extension efforts are based on information from Israeli sources and the experience of the remaining staff.

66/ The total exceeds 45 according to the Directory of Agricultural Development Institutes in the West Bank and Gaza Strip, Data Base of the Agricultural Relief Committees and Arab Thought Forum, Vol 1, No 4, 1992.

67/ The Department of Agriculture of the Civil Administration allocated 75 percent of its total budget of NIS 3.6 M for Jan-Sept, 1991 to salaries of Israeli and Palestinian staff, 5 percent to reduce Brucellosis in animals, 3 percent to forest maintenance and 2 percent to extension and research activities combined. The rest was used for cars, building maintenance etc.

68/ Development Perspectives for Agriculture in the Occupied Palestinian Territories, Society for Austro-Arab Relations, 1992, page 244.

(b) Radio and TV. Israel and Jordan conduct regular programs on TV and radio aimed at farmers; the Israeli programs reportedly receive considerable attention of OT farmers, as they handle issues which affect them most. They do not, however, specifically address issues of particular relevance to the OT.

(c) Private Sector. Israeli seed and chemicals companies provide information about their products as part of their efforts to promote their use, and provide support to users.

(d) Semi-Governmental Institutions. Specialized agricultural cooperative unions provide some information to farmers; they run workshops and seminars, and have some direct farmer contacts, but in general their role in disseminating information, and addressing farmer questions is modest.

(e) Non-Governmental Organizations (NGOs). Local and foreign NGOs are most active in the field of extension; foreign NGOs appear to make a limited contribution. The most active are non-formal local organizations, of which Palestinian Agricultural Relief Committees (PARC) and the Union of Agricultural Work Committees (UAWC) have the most elaborate organizations, and are the most experienced, while several others have a more minor role. PARCs have specific agricultural extension units, guided by regional farmer committee's. Such units are established in various regions of the OT, and cover plant production and animal husbandry, while female staff work on agronomy and home economics. Extension takes all the traditional forms, and is supported by a modest joint credit program with UAWC. UAWC conduct their activities through small local committee's. Both have initiated modest research activities. Formal NGOs focus more on obtaining and disseminating information; most are small and dependent on outside financial support. Without clear links with extension operations, their importance has been limited. The two agricultural faculties currently operating in the OT in Hebron and Nablus also have modest extension activities, although they are unable to carry out any supporting applied research at present; they do use Israeli sources for information. In addition, a number of other small institutions collect and disseminate information, some of which with external financing from bilateral and multilateral sources.

(f) Experience from Israeli Farms. Many Palestinians work on Israeli farms, and during the past 25 years the experience obtained by these workers has been an important source of technical know-how transfer. With Israeli farming becoming more capital intensive and labor extensive, the appropriateness of Israeli technology may have declined for the average small-scale OT farm. However, practical farming experience obtained by Palestinian workers in Israel remains an important way for many OT farmers to obtain knowledge about new technologies and products.

34. While farmers in the OT can get information from a variety of sources, there is considerable evidence that these sources are too fragmented, limited and un-coordinated to effectively cover all OT farmers, and that they themselves are lacking crucial access to up-to-date and relevant information and research. Although the average farmer has learned sufficiently over the past 25 years to triple yields of some crops, he has done so from a relatively low level. More important, the current situation requires that farmers be highly effective and efficient in order to compete in local and foreign markets, and the level of production is still low by world standards, and major improvements are technically possible. In the OT, to be really efficient, a farmer needs considerable additional understanding and training in key areas of his operations. Equally important, the need for knowledge and extension/research varies between producers; modern capital intensive large-scale producers have very different needs, and opportunities to obtain information compared to small irrigated farms or small rain-fed farmers. The latter two groups are most in need of knowledge and information, and from a future strategy point of view the issue is how much of that should come from 'public' sources, and how much from the private sector and from NGO's.

In general, private and NGO sources may be more effective, provided their objectives and tasks are well defined, and do not overlap.

Research

35. Although agricultural research has been performed in the OT since the British mandate period, to a considerable extent OT agriculture traditionally relied on research results from abroad. Extension and research staff of the Civil Administration in the OT established close relations with Israeli institutions in the early 1970s, and improved extension and research efforts were a major factor in the growth of the sector during the 1970s. Budget and staff cuts of the Civil Administration have substantially reduced the limited local agricultural research capability since then, and other institutions have been unable to initiate and sustain major research programs. Although relations with Israeli institutions have been maintained by individual scientists, in general the system of research knowledge generation and dissemination in the OT has broken down; knowledge about new technologies and developments from Israeli or other sources is not systematically collected and tested, while little applied and no fundamental research is taking place. Local laboratory facilities for soil and plant analysis are virtually not available [69], facilities in Israel are hardly being used by OT farmers; some reportedly object to paying for analyses. A few private and NGO agricultural research institutions have been set up in the OT; although well intentioned, these institutions have very limited financial means, extremely modest facilities, and only limited access to cutting edge research being performed abroad. Agricultural technologies, whether they be plant breeding, biotechnology, plant protection, irrigation, mineral nutrition, engineering, post harvest physiology, etc. are all changing rapidly in the world. If the agricultural sector is to succeed in satisfying the demands of the twenty-first century, it is absolutely mandatory that agricultural researchers and farmers have easy access to such knowledge; the key issue is whether research results should be created and tested in the OT, or obtained from external sources. As with extension, the answer depends on the group of farmers one considers. While modern, large-scale farmers can and should obtain information through commercial means and channels, small-scale irrigated or rain-fed operations also need information from abroad, but will need to have research results tested under local circumstances before applying results in the field. Hence, some form of applied research should be maintained in the future in the OT. In view of the small size of the area, and the relatively high costs of research, investment in research should remain modest. A key feature of a future research policy should be to concentrate on getting regular access to research results from a variety of foreign sources.

Agricultural Education

36. The sector's training and education requirements appear considerably different from what is currently available. While in general farmers have considerable experience, farmer and farm worker education levels are low, or, particularly for younger workers, inappropriate for the job at hand [70].

69/ Except for a small soil institute in Nablus.

70/ In 1986, 38 percent of all agricultural farmers and workers in the West Bank and 26 percent in the Gaza had no formal schooling, 32 percent and 34 percent respectively had 1-6 years of formal schooling, while 30 and 40 percent had over 6 years of schooling (Source: Judea, Samaria and Gaza Area Statistics, CBS, 1987). According to the Preliminary Survey Report of Rain fed Farming in the West Bank, prepared by the Applied Research Institute in Jerusalem (December 1992), 24 percent of the sampled farm population had no formal education, and 42 percent only 1-6 years. Only 20 percent had an higher education. Surprisingly, 13 percent had over 12 years education, suggesting that a

Many women, who constitute a large portion of farm labor, also have very limited education, or no access to specific and appropriate training, although no discrimination of women in education or extension is being accepted. Only during the past 5 years considerable improvements in the general schooling levels have occurred on account of the influx of labor into the sector. This general picture does not yet take into account the knowledge and education needs of specific groups of farms; as in extension and research, different groups of farms have different education requirements, and need different types of formal and informal education. In the OT special education for farmers is limited; three agricultural schools have lost over time some of their field orientation, and are severely under-funded. Agricultural programs in the public school system are virtually non-existent. PARC has started an emergency retraining program for returnees from the Gulf, has specific programs for women, and is planning several other modest programs aimed at training farmers and technicians, which are not yet operational. Training farmers also means training trainers: well trained field oriented technicians are needed well in excess of the numbers available at present. In short, the education needs of the sector at technical levels far exceed and are much more diversified than what is currently available.

37. The OT do not suffer from a shortage of agricultural graduates, although some academically trained specialists with specific experience in the OT environment are needed in some specializations over and above who are currently available. Most have good theoretical, but limited practical experience, while many returning graduates are interested in obtaining employment in public or private service sectors rather than farming. To satisfy future demands for academically trained agriculturalists, An-Najah National University and Hebron University established agriculture faculties in 1992 and 1989 respectively, after having been prohibited from establishing a college of agriculture for some time. Financial resources for salaries and facilities at these private universities are currently extremely modest. Each university is trying to obtain land for farm facilities, laboratory class work, and research. The rationale for establishing two under-funded faculties rather than one full fledged college of agriculture is uncertain; the OT do not appear to need two faculties, nor can they afford them at this moment.

Agricultural Credit

38. The history of agriculture credit in the OT reflects the difficulties of creating new financial institutions serving rural areas in general, and particularly in the current conditions of the OT. Prior to 1967 the West Bank was served by the Jordanian Agricultural Credit Corporation (ACC), which as a public sector institution provided about 57 percent of estimated total short- and long-term credit in 1967. In addition, private banks and cooperatives (about 11 percent) and usurers and middlemen/traders (29 percent) supplied credit. With the occupation the ACC closed down its operations, while the cooperatives largely closed their credit functions. Private banks have in the past and at present played a very small role in financing the agricultural sector. During the late 1960s the military administration initiated a rural credit program, which gradually declined in importance; during this period of rapid expansion of production acute shortages of agricultural credit occurred, although private parties continued to supply short-term credit. The Palestinian-Jordanian Joint Committee, funded from Arab sources, started as a general credit institution in 1979, followed by five more institutions between 1986 and 1990. The Joint Committee's activities have been criticized on account of the relatively small percentage of its activities being channeled to the agricultural sector (8 percent of the portfolio, or US$ 31 million over the 6 years of the Committee's existence). More importantly, the credit program had clear political objectives, was highly selective in its client base, and, being based in Amman, served few small farmers. Having no independent local sources of funds, the Committee closed its operations because of lack of funds in 1985.

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considerable number of academically trained people have entered active farming recently.

39. The five non-profit corporations established between 1986 and 1990 have some similar problems. Their size does not allow them to address the sector's credit needs; together they disbursed about $ 3 million annually of which a fraction to agriculture. They rely on outside (mainly EC and bilateral) donor funds, and have no other independent sources of funds. The non-profit corporations operate more professionally, but do not view themselves as full fledged credit institutions able to meet the capital requirements of entrepreneurs and farmers in the OT. Like the Joint Committee, they have specific employment creation objectives, and at present levels of funding have a demonstrational rather than developmental role. From 1986 until 1990 they have funded some 500 projects involving about 1000 applications. Branches of private banks in the OT total 18, of which six from Israeli banks, and are currently limited to commercial (trade) activities only. In addition various non-governmental and private voluntary organizations have been established since 1979, and operate small credit/grant programs; they disburse some $3 million annually to the agricultural sector, or about 10 percent of their total outlays. These operations are characterized by a marked degree of heterogeneity concerning objectives, sources of funds, professional abilities and political affiliation. Considerable funding by these organizations has been in the form of grants, and the ultimate impact of these funds has been mixed at best.

Annex 2: Water and Irrigation

1. *Climatic Conditions*. The West Bank and Gaza are situated in the semiarid mediterranean region where winter rains dominate the climate. The rainy season extends over a six month period, but some seventy percent of the annual rain is falling between November and February. Summers are hot and dry with high rates of evaporation.

2. The weather pattern during the past decade made it very clear that the rainfall in the region can be substantially higher or lower than the long term average data indicate. While the rains during the past two winters were exceptionally good, the drought in the second part of the 1980s is still well remembered. It made people aware of their dependence on water, it led water managers in Israel and Jordan to over-exploit their groundwater reserves, to "mine" groundwater extensively, and it led people to speculate about a drastic change of precipitation patterns [71].

3. The amount of rain the West Bank and Gaza receive is closely related to the topography. The highest precipitation of close to 700 mm per year is measured in the northern mountainous region. From there it decreases to the south and east reaching only 150 mm in the Jordan Valley and the southern part of the Gaza Strip. The average total amount of rainwater falling on the West Bank has been estimated between 2000 and 3000 million cubic meters, while the amount of rainwater in Gaza is estimated at about 125 million cubic meters.

4. Roughly 75% of the rainfall evaporates, the remaining water infiltrates into the soil, recharging the groundwater reservoirs or appearing as runoff in rivers and streams, most of them ephemeral. For the West Bank, the annually renewable water that is available as groundwater and spring water (some authors distinguish between annually renewable and annually renewable water that is easily exploitable, but the criteria used for this distinction are usually not given) has been estimated at 600 to 800 million cubic meters per year (Annex IV, Table XIII). For Gaza, most authors indicate an annual volume of 50 to 70 million cubic meters.

5. Rain falling in the highlands recharges the groundwater aquifers draining to the east and west. As the western slopes of the mountain range are gentler than the eastern slopes and receive considerably more rain, the western aquifers have a much higher recharge rate than the eastern aquifers draining towards the Jordan River Valley.

6. *Surface Water*. The only perennial river in the West Bank is the Jordan River. There have been many attempts to reach agreements on how the flow of the Jordan could be shared by the riparians, but no international agreement has been signed. In the past, the Jordan river was a water source for the Palestinians, who currently have no access to the Jordan river water.[72]

71/ Any data quoted in this paper have to be seen in view of the climatic variations in general and the variability of rainfall in particular. Unfortunately, most data presented in the reports available for this paper do not indicate the reference period for which they are representative. It is thus necessary to indicate rather broad ranges of data as given in these reports. Considering the recent rainfall variations, it appears to be well justified to adopt this approach for this review, instead of trying to establish the "correct" long term average data.

72/ A more detailed discussionof this point is given in the Infrastructure Report, para 4.19.

7. Surface water run-off produced by heavy rains appears in ephemeral form in the valleys and wadis. Proposals have been made to store this water, but the irregular flows and their high sediment load make such projects look rather doubtful, unless their main purpose would be to improve groundwater recharge.

8. There are about 300 springs from which groundwater drains at the foot of the mountain ranges. Only about 120 spring flow perennially, while the remaining ones carry water only during the rainy season in the winter months. The total annual discharge of all springs is estimated to reach about 100 million cubic meters, but only half of this amount is fresh water while the other half has a higher salt content and originates mainly from the springs along the northern and western shore of the Dead Sea.

9. *Groundwater*. The structure of the aquifers in the region is very complex. The two aquifer regimes in the West Bank and Gaza differ considerably. The aquifers shared between the West Bank and Israel are not only much richer but also of better quality than the aquifers shared between Gaza and Israel. They extend from the mountainous area into Israel and are therefore considered a common resource, claimed by both Palestinians and Israelis. Usually a distinction is made between three main aquifers underneath the West Bank and Israel and the coastal aquifer of the Gaza Strip. The richest aquifer is the western aquifer, which extends to the mediterranean coast. Its annually renewable recharge is generally estimated at 335 million cubic meters, while the eastern aquifer yield is estimated at only 105 to 125 million cubic meters per year. Together with the annual recharge of the northern aquifer estimated at about 140 million cubic meters, the total annual recharge of the aquifers amounts thus to about 580 to 600 million cubic meters [73]. The data presented in Annex IV, Table 13 show the range of data given (580 to 830 million cubic meters) by various authors. Since most of the water is infiltrating into the soil and therefore available as groundwater, some publications refer only to the annually available groundwater. Gaza's annually renewable recharge is generally estimated at about 60 million cubic meters.

10. *Current Water Use*. The arid to semiarid climate of the OT restricts rain-fed cropping to the winter months, the only time with sufficient precipitation. Irrigation is needed to grow crops during the summer. In Gaza and in the Jordan Valley, the rainfall is often so sparse that rain-fed agriculture is hardly economic. In the West Bank about 95 percent of the agricultural area is rain-fed, in Gaza about half. Rainfall fluctuates quite widely, from 25 percent of annual long term averages in dry years to 160 percent in wet years [74]. The variability of rainfall makes dependence on rainwater collected and stored for irrigation a risky operation. The drought in the 1980s and the high rainfall during the past two winters have demonstrated the extent of the variability. Therefore the farmers in the West Bank and Gaza depend almost exclusively on the use of groundwater for irrigation. Traditionally, wells have been the main source of water for all purposes. They produce about two thirds of all the water used. Springs supply about 27% of the water, and surface water run-off, wadi flows, water collected in cistern and purchased from Mekoroth, the Israeli Water Utility, provide the remaining 7%. Only about 200,000 donums, or 10 percent of the total cultivated area in the OT is irrigated, with over half the irrigated area located in the Gaza Strip. The OT currently irrigate about 17 percent more land than before the start of the occupation. With irrigated production increasing substantially over this period, OT farmers have succeeded in using water much more efficiently. Total water use for irrigated agriculture in 1990 was

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73/ As mentioned earlier, the estimates given in the many publications on this subject vary considerably, but they usually fail to indicate reference periods and to specify if they refer to the annual recharge or to the easily exploitable annual recharge.

74/ Development Perspectives for Agriculture in the Occupied Palestinian Territories. Society for Austro-Arab Relations, 1992.

estimated at about 157 MCM, of which 90 MCM for the West Bank and 67 MCM for Gaza (Annex IV, Table XI). Since the occupation, water use per donum has declined; Civil Administration policies limit Palestinian access to their 1970-1973 average use less 10 percent[75]. In Gaza, water demand of the ailing citrus sub-sector declined considerably, reducing overall water demand. It also has some areas with groundwater very close to the surface, where farmers grow crops which directly use groundwater.

11. The quality of the groundwater in the West Bank is generally very good, although there are some areas where sewage infiltration causes considerable pollution. In Gaza the groundwater quality is rather poor because of the over exploitation over several decades, which led to seawater intrusion and because of the infiltration of sewage and agricultural chemicals. Only the northern and southern sections of the Gaza aquifers are reported to be of good quality.

12. Recent estimates indicate that the Palestinian population in the OT uses about 200 to 228 million cubic meters annually (Annex IV, Table XI). Israeli settlers use about 45 million cubic meters. For the West Bank, various authors have prepared estimates of the volume of water used by the Palestinians, varying between 110 and 133 million cubic meters or about 15 to 20% of the annually available water originating in the area. The rest is used by Israeli settlers and in Israel. As the western and eastern aquifers extend from the West Bank to Israel, groundwater from these aquifers have been exploited in the Israeli coastal plains for a long period of time. Since 1967, the groundwater use by Israel increased gradually, until it reached the limit of all the water available, while the use by the Palestinians remained by only a small amount above the level available to them in 1967.

13. In Gaza, the situation is very precarious because the annually renewable recharge of the groundwater is only about 60 million cubic meters, while a considerable larger amount, about 85 - 90 million cubic meters is currently withdrawn every year. In this case, the Palestinians use the bulk of the water, while the share of water used by Israeli settlers is relatively small, amounting to about 3 to 6 million cubic meters which is now fully compensated by water supplied from Mekoroth. The over exploitation of the aquifer has produced falling groundwater levels and a deterioration of the groundwater quality. Measures to restore the aquifer have been initiated. They have reduced the water use (See Water Supply and Sanitation Section, Fig. 4.3), but even more drastic measures need to be taken to reestablish the aquifer to its original state.

14. Most of the water is used in the agricultural sector. In the West Bank 80 to 95 million cubic meters or about 70% of the total water available are used for irrigation, the rest for domestic/industrial purposes. In Gaza the water used currently for irrigation amounts to about 55 MCM, or about 60% of the total, and the remainder is used for domestic/industrial purposes.

15. *Irrigated Area.* The farmers in the region have practiced irrigation for a long time. In the West Bank, they have used water from springs, wells and the Jordan river, channelling it often over considerable distances to their fields. They developed cooperative arrangements to share water, to maintain and operate the systems. The area irrigated in the OT is about 200,000 donum. The irrigated

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75/ According to the Civil Administration it had meters installed on individual wells in 1972. On the basis of 1972 water consumption data, individual well quotas were set in 1973 slightly above 1972 water use. Between 1973 and 1975 well owners were informed of the quotas, and were apprised of their right to appeal. In 1987, due to drought conditions water quotas in the OT and Israel were cut across the board by 10 percent, and have not been changed since then.

area in the West Bank dropped from 100,000 donum in 1966 to 57,000 in 1968 [76] and recovered only slowly until it reached 101,000 donum in 1984 and a peak of 104,000 in 1985 (Annex IV, Table XII). Subsequently, the area became smaller again with 95,000 donum in 1990. In Gaza the irrigated area did not suffer a setback following the events of 1967, it increased from 75,000 donum in 1966 to 90,000 in 1969. It continued to grow until it reached 117,000 donum in 1989, after which it dropped to 110,500 in 1990. Taken together, the irrigated area in the OT increased from 1959 to 1990 by about 17%. By comparison, Israel increased its irrigated area by about 73% in the same time period.

16. *Irrigation Techniques*. Traditionally the farmers applied irrigation water on their farms on flat surfaces or in furrows. With the increasing water shortages in Israel and the OT, more efficient on-farm irrigation systems found rapid and wide acceptance starting in the late 1960s. Initially sprinkler, then drip irrigation systems were adopted by OT farmers who faced the restrictions on water use imposed by the Civil Administration. Adoption was made easier by the extension service, which provided grants and instructions for new equipment. The specific water use per donum shows how the irrigation sector achieved substantial water savings. In Gaza the water use in 1966 amounted to 1333 m3/donum. For 1990, the overall statistic indicate a surprisingly low water use of 570 m3/donum. Water costs have affected water use. Water costs as a percentage of gross value of production is highest for citrus (43 percent, using 1600 m3 per donum), followed by bananas (22 percent, 1900 m3/donum) and vegetables grown in the open (19 percent, 700 m3/donum). For vegetables grown under plastic, water costs range between 4.5 and 20 percent [77]. Average water costs for OT farmers are relatively high because of restraints imposed by the authorities on the repair and renewal of wells, the low efficiency of existing wells, and the fact that all costs of irrigation are born by the farmers; contrary to Israeli farmers, Palestinian farmers reportedly do not receive public support for irrigation in terms of water subsidies and readily available arrangements for financing replacement of equipment. Nevertheless, some Palestinian farmers obtain cheap water, like those farming directly on land with a very high groundwater table, or water exploited through private wells in Gaza, or using springs in the West Bank.

17. The typical modern irrigation system consists nowadays of a water source, usually a spring or a well, a canal leading from the source to the irrigation scheme and distribution channels or pipes bringing the water to groups of farms or, more often, to individual farms. As the water is usually allocated to individual farmers on the basis of time, i.e. several hours, of a part or the total flow of the distribution channel, and the systems usually operate continuously, the farmers store their water allocation in reservoirs from which they distribute the water to their fields. This allows to fill reservoirs even during the night and to carry out all the necessary operation and maintenance work in the irrigation scheme during the day.

18. *Institutional Arrangements*. The Israeli Civil Administration is dealing with irrigation by granting or refusing permits for well drilling according to rules established by the Israeli Water Commission. The Civil Administration is also promoting a more efficient use of water, according to policies of the Water Commission. It imposed quotas on all irrigation wells and levels heavy fines on those well owners who exceed their quota. Reportedly, the enforcement of the restrictions is more strictly applied in the West Bank than in the Gaza Strip.

76/ Possibly reflecting the impact of the occupation, including difficulties with data collection.

77/ Water use in the West Bank reportedly far exceeds water use in Gaza: consumption in Gaza runs from 100 m3/donum for totally neglected orchards to 1000 m3 for fields completely irrigated with traditional methods. In the West Bank water use reaches 1,600 m3/donum in traditional systems. Source: see footnote 71.

19. Public, private and non-governmental organizations assist farmers in improving water use efficiency. Some research on irrigation is being carried out on farms which receive outside support. But, as it is typical for extension in the OT, no systematic coordination exists to make best use of the scarce resources and concentrate on the most important issues.

20. The long tradition of irrigation has produced organizational forms for the multitude of small to medium size irrigation districts in the OT. There are two basically different systems depending on the water rights situation since the right to use water is either a part of the title of the land or separately held. Where the right to use water is part of the land title, usually where a permanently flowing spring is being exploited jointly by a group of farmers, the landowners have the right to use the whole flow of a canal or a part of the flow for a certain number of hours. Usually the landowners elect a board to manage the business of the irrigation district, addressing and resolving disputes, working towards the improvement of the physical infrastructure, employing water guards and administrative staff. While there is usually no general election of the board members, villages or farmer groups along a branch of a canal may have the right to elect a board member who may serve for an extended period without a term limit.

21. Where water rights are separate from land rights, a water association may be organized and operated in the same form as for a district with combined land and water rights. But where water rights are separate from land rights, the owners of the water, very often the owners of wells, may be more interested in maximizing the profit from the sale of water than in using irrigation water on their own land. On the other hand, the farmers who have to buy irrigation water are interested in receiving it at the lowest possible price. This supply and demand situation has monopoly aspects, which may require some public intervention as part of water use policies. The situation in the OT reflects the existence of a market mechanism with some competition and the existence of informal consensus arrangements; the mark-up of the water price in the West Bank appears to be reasonable. Reportedly, the average sale price of irrigation water from wells was US$ 0.172 per cubic meters in 1990, while the average cost was estimated at US$ 0.16. In Gaza however the sale price was US$ 0.14 while the cost was estimated at US$0.10, reflecting the lower pumping costs and the greater demand for water in the Gaza Strip.

22. Although there are numerous water associations, an umbrella organization representing the interests of the associations does not exist. Its formation could be a first step to create a forum to discuss and pursue the particular interests of the irrigation sector.

23. *Waste-Water*. The use of treated waste water will require technical adjustments in farming operations unless the waste water would be made available only after tertiary treatments. Most likely waste water treatment would produce water of varying quality depending on the process and price. Farmers should therefore select field crops taking into account the danger of contamination and refrain from growing crops which are consumed raw. As treated waste water represents the only easily accessible new source of water and is already being used increasingly in the region, efforts should be made to expand the use of treated waste water in a safe and economic way. These efforts should include the continuous monitoring of the water quality and the training of extension workers and farmers.

Annex 3: Agriculture in Israel

1. Agriculture in Israel has been successful; although the sector currently contributes about 4 percent to GDP, directly employing about 5 percent of the labor force, its historic role in the country's development has been substantial. The sector is one of the most technologically advanced and capital intensive in the world, backed up by impressive and very considerable research and export promotion capabilities.

2. In developing the sector, Israel has tried to achieve a viable sector capable of solving its key dilemma: its meager natural resources in terms of land and water, its desire to create an egalitarian society well distributed in rural areas, and its need for foreign exchange. The solution has been the application of a highly refined planned production model aimed at optimal allocation of scarce resources, guaranteeing competitive levels of income to farmers and farm workers, and satisfying demand in local markets while aggressively seeking markets abroad. Providing largely guaranteed incomes to most agriculturists and workers served developmental and strategic considerations, settlement policies necessitated the need to maintain incomes in rural areas and shield agricultural workers and consumers from extensive fluctuations in production and prices. Price policies also allowed Israeli planners to achieve export and macroeconomic objectives. In Israel most of the land and all of the water resources are state-owned. Planning allowed these resources to be distributed according to specific objectives, without the use of the price mechanism. Unlike efforts at planning the agricultural sector in other countries, this system worked surprisingly well, while its implementation was executed with sufficient flexibility to avoid the usual pitfalls of centrally planned systems. The system was able to achieve its goals for extended periods of time, but at a cost. High income levels in the agricultural sector and competitive prices in export markets could be maintained only through a relatively highly protected local market--and Israeli consumers willing to pay relatively high prices--and the ability and willingness of the public at large to subsidize the sector through direct and indirect subsidies and generous financing. This included access to relatively restricted but cheap natural resources and the ability of the Israeli research complex to substantially and continuously improve production technology. To plan and implement its sector policies, Israel developed an elaborate institutional system, which controlled production and marketing, and provided indirect support when necessary. A key characteristic of the sector over the years has been its evolution from an initially labor-intensive to a highly capital-intensive production system, supported and guided by strong research and extension efforts.

3. The key factor that has underpinned the success of the sector has been the ability of the Israeli research complex to considerably offset limited water resources and the need of the sector to maintain agricultural incomes and to keep prices in external markets competitive. According to one source [78], improvements in intangible "factors of experience and research benefit" (like agro-technology and mechanization), well disseminated by a highly effective extension system, executed by highly trained farmers and supported by generous access to capital, contributed up to 95 percent of the productivity increase; tangible factors like water and land explained the rest.

4. Agriculture in Israel has developed in a unique, cooperative-institutional framework, reflecting particular ideals of equity and development. Planning supported the creation and functioning of large farmer organizations, i.e., the cooperative kibbutzim representing large-scale farming, while moshavim consisted of small-scale farmers operating cooperatively. Both developed over time from largely agriculture oriented into mixed operations, combining agriculture with services and industry; in the case of kibbutzim, the nonagricultural activities have become increasingly dominant. Nonagricultural activities of kibbutzim include agro-industry operations and service functions, like transport and maintenance. Several institutions reflect the close symbiosis between these cooperative institutions and the Government

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78/ Prof. Samuel Pohoryles: Agrarian Structure and Rural Development, 1978.

to design and implement the agricultural plans. Production and marketing are being directed by a Rural Planning and Development Authority, which is the interface between the cooperative movement and central planning, and by production and marketing boards [79], which are directed jointly by farmers and government representatives. Boards either engage directly in marketing and export, or have an advisory nature, and only direct and regulate local markets. Their chief aim is to coordinate the planning process, guide producers, assure regular supplies to the markets, direct surplus production for export and guide production for industrial processing, while guaranteeing the profitability of various operations, establishing funds to promote exports and providing quality control [80]. The agricultural support function in Israel consists of a well-integrated set of organizations, some entrusted by channeling inputs (some of which are subsidized) to farmers, like Mekoroth for water, and other inputs through Hamashbeer. The main objective of the marketing boards is to stabilize prices, or in the case of Agrexco, coordinate and handle exports to the EC.

5. Economic realities have forced Israel to adjust this sector development model. Particularly during the past six years major efforts have been made to reduce the level of direct subsidies to the sector. However, some of the indirect subsidies and other support systems remain, including the relatively high price levels in local markets, the result of controlled market access. In recent years both kibbutzim and moshavim have suffered heavy losses, notably on their agriculture operations, on account of competition from Spain and other suppliers of fresh fruit, vegetables and fresh flowers. To bring operations back to profitability, fundamental changes have taken place in the past four years in the way agriculture is being conducted. This includes introduction of a more flexible system of allocation of water and land, reorganization of marketing institutions and agricultural service organizations, write offs of farm debt, a virtual doubling of Government support to agricultural research to 3 percent of total production value, development of a more reliable farm credit network, and an increasing focus on marketing in planning agriculture. These adjustments are meant to ease the constraints imposed by water and capital shortages. Key public and semi-private institutional structures have been maintained however. While the market plays a more important role in production and marketing decisions, the planned character of the sector has not been abolished either; the sector is still planned and managed in some detail at macro- and micro level, although the process is less formal, and increasing emphasis has been placed on indirect management and market based solutions. However, water is still completely State owned and managed; while its use in agriculture is still based on allocation and crop water needs, water prices have been increased and increasingly affect demand. Nevertheless, water prices are still well below

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79/ Boards involved in direct marketing include: citrus, ground nuts, poultry and eggs, cotton and flowers; advisory boards encompass vegetables, milk, meat, cattle, and sheep, wine grapes, fruit, tobacco, olives and honey.

80/ Although the level of direct agricultural subsidies was high in the 1970s and early 1980s, it has been very substantially reduced. Some subsidies directly reach farmers. Other support is provided to marketing boards to support and regulate production and marketing operations. In 1987 it was estimated that as percentage of prices, subsidy levels for milk (5 percent), eggs (30 percent), poultry (25 percent) and irrigation water (50 percent) were most important; these have reportedly declined further. The nature of subsidies has changed over the past 10 years, with indirect and ad-hoc subsidies gaining in importance. For example, support for distressed citrus growers for 1993 reportedly amounts to US$25 M. In addition the agricultural sector still benefits from public support for the Insurance Funds for Natural Disasters, and promotional activities for exports, including market and product research.

actual costs [81]. Because of the increasing water shortage and the rapidly increasing water demand in the urban-industrial sector, Israel is using a substantial amount of treated waste-water. This amount is expected to reach 80 percent of the irrigation water needs within the next 25 years. Much land remains State owned and is being provided at rather nominal rents.

6. Three aspects have particular relevancy for agriculture in the OT and its future relationship with Israel:

(a) Planned and highly regulated market access of Israeli products to local Israeli markets rather than production control [82] currently ensures stable prices and local markets. Market access is regulated by Marketing Boards for specific products, which issue licenses for marketing of specific quantities at specific periods;

(b) Given the unpredictable nature of agriculture production, Israeli agriculture has benefitted from its ability to sell lower quality products and excess production on the OT market, even if at relatively low prices. This has prevented the Israeli market from being flooded with low quality and low priced products. In addition, the institutional structure of Israeli agriculture has made it relatively easy to determine which products should be sold in the OT markets, and ensure that they would not disrupt the local market.

(c) Some groups in the sector are clearly more vulnerable to income declines as a result of the ongoing efforts in Israel to reduce subsidies, and to enhance the role of the market mechanism. Opening-up the market to imports, notably those from the OT, will expose these groups to even more pressure on their incomes. Vegetable farmers organized in moshavim, and selected activities in animal husbandry appear particularly vulnerable, involving a relatively large number of farmers.

81/ The agricultural production and planning system was set up to shield agriculture to some extent from the most destabilizing aspects of the market. The system proved its vulnerability in the case of citrus, which at one time absorbed 50 percent of all water in Israel, and which failed to anticipate consumer preference changes in the European markets. While the idea of some demand management of water through the price mechanism has increasingly gained ground, the premise that the sector should not be responsible for the full costs of water development is still being maintained. Technology improvement in combination with demand management through prices are seen as the key to using water resources more efficiently.

82/ There are still four products of which production officially is controlled and requires licenses in Israel and in the OT: Potatoes, Onions, Carrots and Tomatoes. These controls officially also apply to the OT, but in practice only Potato production is formally regulated in the OT by means of limited OT access to seed potatoes (which has led to undesirable practices of using second generation potatoes saved by the farmer as seed potatoes). In addition poultry and milk production are still fully controlled.

Annex 4: Statistical Supplement

List of Tables

TABLE I: NATIONAL DISPOSABLE INCOME (NDI), GROSS DOMESTIC PRODUCT (GDP) AND THE AGRICULTURAL PRODUCTION OF THE OCCUPIED TERRITORIES, AT 1986 PRICES (NIS MILLION AT FACTOR COST)

YEAR	WEST BANK			GAZA STRIP		
	NDI	GDP	AGRIC. GDP	NDI	GDP	AGRIC. GDP
1968	636.1	436.9	163.1	237.3	217.2	67.3
1969	716.1	501.7	205.7	291.1	232.3	76.7
1970	799.5	533.3	185.4	369.1	280.6	88.5
1971	936.9	612.6	211.7	415.4	315.7	100.6
1972	1157.2	757.5	298.7	491.2	329.7	110.3
1973	1015.2	693.7	214.7	485.4	350.5	113.4
1974	1253.7	910.5	364.9	493.9	365.8	126.1
1975	1292.9	896.8	220.5	553.0	393.6	131.8
1976	1557.9	1061.7	293.7	675.4	426.5	141.8
1977	1509.0	1024.1	258.3	692.6	448.3	135.1
1978	1778.2	1195.7	353.3	760.4	466.7	136.1
1979	1718.3	1117.6	241.9	831.1	517.3	129.1
1980	1960.7	1386.1	442.4	793.7	489.8	117.4
1981	1832.1	1267.4	359.2	786.6	494.9	122.2
1982	2058.4	1439.9	415.6	920.7	476.1	114.0
1983	1976.3	1388.5	371.5	936.2	454.1	103.2
1984	1969.7	1467.1	373.6	922.8	469.6	98.6
1985	1924.0	1441.6	330.3	856.9	481.9	108.3
1986	2363.7	1784.1	575.0	999.2	513.4	102.5
1987	2424.3	1658.7	379.5	1133.1	578.7	123.4
1988	2373-2427	1699-1748	758	950-958	504-512	122
1989	2340-2400	1644-1699	534	988-998	573-583	141
1990	2794-2863	2068-2131	865	1083-1104	597-617	152
1991	2614-2689	1917-1988	630	1083-1111	631-652	170
1992	3396-3493	2437-2526	1087	1249-1274	751-777	198

Source: Israel, Central Bureau of Statistics

Table II: WEST BANK PRODUCTION (1986-90)												
	VALUE OF PRODUCTION (NIS MILLION)						OUTPUT QUANTITY (THOUSANDS TONS)					
	86/87	87/88	88/89	89/90	90/91	91/92	86/87	87/88	88/89	89/90	90/91	91/92
FIELD CROPS	21.0	31.4	29.1	36.7	20.3	35.2	43.0	51.0	36.1	58.1	19.7	33.6
VEGETABLES AND POTATOES	115.8	136.6	141.7	154.2	157.0	197.5	182.3	199.4	199.4	215.5	186.5	205.9
MELONS AND WATER MELONS	30.1	17.4	5.6	5.4	3.0	7.5	72.5	44.3	15.8	9.0	5.6	13.6
OLIVES	19.9	209.5	16.2	204.1	10.9	291.7	8.4	164.3	9.0	143.6	5.4	170.6
CITRUS	39.4	45.8	29.9	38.5	35.3	43.4	90.8	79.8	62.1	73.2	72.3	65.1
OTHER FRUITS THEREOF	74.0	100.0	91.8	103.5	107.8	111.1	71.9	98.4	97.9	99.0	102.8	258.5
GRAPES	26.1	21.2	25.2	32.0	33.6	38.2	34.8	37.2	47.5	47.8	42.0	47.8
PLUMS	6.4	14.6	13.2	14.1	19.3	15.2	4.6	20.9	14.7	13.7	21.2	11.0
FIGS	15.6	18.7	14.2	19.7	25.4	33.5	10.8	10.8	10.1	10.4	11.5	12.7
BANANA	18.0	28.0	12.4	21.0	18.0	9.6	16.0	19.3	9.4	14.1	12.6	5.9
ALMONDS	1.5	8.4	15.2	3.7	3.2	4.6	0.5	3.4	7.3	3.0	2.7	3.2

Source: Development Perspectives for Agriculture in the Occupied Palestinian Territories,
Society for Austro-Arab Relations, Jerusalem/Vienna, 1992, which quotes "published Israeli statistics." Adjusted with additional data of CBS.
1) at average prices of each year

Table III: PRODUCTION OF KEY IRRIGATED VEGETABLES, GAZA
(1970/71 - 1991/92)

	AREA		AVERAGE YIELD		TOTAL PRODUCTION		
	70/71	91/92	70/71	91/92	70/71	91/92	90/91
POTATO	1.10	15.2	1.8	3.2	1.5	48.5	24.5
TOMATO	1.10	7.7	2.5	65	7.5	50.0	45.6
CUCUMBER	1.00	4.2	2.0	4.5	6.0	18.9	19.9
MLUKHIA	2.24	3.8	1.9	3.0	1.8	11.3	11.3
SQUASH	0.75	4.0	2.0	2.7	1.5	10.8	9.3
EGGPLANT	0.40	1.6	3	6.0	3.9	9.6	9.9
CAULIFLOWER	0.30	2.5	2	2.5	1.8	6.3	6.4
PEPPER	0.30	1.2	1.5	2.5	1.2	3.0	3.3
CABBAGE	0.30	2.0	1.5	3.0	0.9	6.0	5.8
STRAWBERRY	0.02	0.37	2.4	2.8	0.04	1.0	0.7
OTHERS	0.80	15.5	--	2.3	--	36.3	36.2
TOTAL	8.31	58.0	--	--	36.8	201.6	173.1
AVERAGE	--	--	2.06	--	--	--	

Includes: spinach, radish, carrots, sweet corn and some others.

Source: Development Perspective for Agriculture in the Occupied Palestinian Territories, Society for Austro-Arab Relations, Jerusalem/Vienna, 1992, which quotes "Department of Agriculture Statistics; interviews"

TABLE IV. CROP PRODUCTION
(area in 1000 donums and output in 1000 tons)

	WEST BANK					GAZA STRIP				
	1966	1978	1985	1989	1992	1966	1978	1985	1989	1992
Total Field Crops Area 1)	770	529.5	495.7	552.4	587.8	53	16.7	22.7	35.4	30.9
Output 2)	51.2	41.1	27.2	36.1	33.6		3.7	0.8	13.2	12.8
Wheat Area	415	227	190	212	156.7		4.0	7.5	10.7	18.9
Output	29.7	34.6	21.0	19.1	24.4		0.7	0.3	3.5	6.6
Barley Area 3)	174	165	154	165	142		9.2	13.8	21.8	8.3
Output	12.6	27.5	18.5	19.2	16.3		2.3	0.4	6.7	2.9
Others Area	181	125	151	170	289.1		3.5	1.4	2.9	3.7
Output	8.9	13.6	9.7	10.0	9.2		0.7	0.1	3.0	3.3
Total Vegetables Area	235.7	111.7	167.7	154.6	149.5		29.8	39.1	62.6	61.5
Output	170.1	167.6	258.0	213.5	219.5		53.4	100.4	162.8	211.5
% share of value **		14.8	20.7	20.8	17.1		9.7	27.2	45.0	43.0
Tomato Area	55.6	25.8	23.2	33.4	34.5		2.6	6.3	8.3	7.7
Output	50.3	46.9	60.2	63.3	47.9		12.6	25.2	41.6	50.0
% share of value **		3.0	3.9	5.8	3.1		1.9	4.8	10.6	9.2
Potato Area	17.4	4.7	8.2	8.7	6.7		3.0	7.3	9.1	15.2
Output	21.1	8.3	18.6	17.2	12.8		4.1	15.8	22.8	48.5
% share of value **		0.8	1.9	1.9	0.9		0.8	4.5	6.3	8.5
Cucumber Area	23.4	9.7	8.2	6.9	11.4		6.0	6.7	8.4	4.2
Output	11.4	23.2	23.6	34.3	48.6		14.9	20.0	25.3	18.9
% share of value **		2.5	2.6	3.4	3.8		2.7	6.2	8.2	3.9
Watermelon Area	71.6	7.8	38.4	7.8	3.7		1.5	0.7	1.6	2.1
Output	31.4	8.2	74.6	13.6	6.4		2.0	0.3	1.1	6.2
% share of value **		0.3	4.2	0.6	0.3		0.2	0.0	0.3	0.4

* Cropping area, which involves a marked margin of double cropping.
** Value of agricultural output.
Sources: 1.Agricultural Atlas of Jordan, 1973, pp.134-141.
2.Agricultural Statistics Quarterly, 1990 (1), p.60.
3.Departments of Agriculture in the West Bank and Gaza Strip.
1) Incl. intermediate
2) Excl. intermediate
3) Intermediate, excl. in production.

TABLE V: Water Costs as Percentage of Total Production Costs for Selected Crops in Jordan, Israel and Egypt

	Highlands yield (dunum)	Production Value (dunum)	Water use (m^3/dunum)	Water costs % of total value
Jordan				
Tomato	5,602	JD 476	500	25%
Potato	3,500	JD 490	560	28%
Watermelon	4,071	JD 203	300	15%
Eggplant	3,000	JD 330	780	39%
Grapes	4,000	JD 600	800	40%
Jordan (Jordan Valley)[1]				
Tomato	2,450	JD 208	625	4%
Potatoes	2,180	JD 340	425	3%
Oranges	1,550	LE 684	642	3%
Israel				
Veg. in greenhouses			650	
Bananas (Jordan Valley)			2000	
Citrus (Jordan Valley)			1200	

1) Farmers in The Jordan Valley receive subsidised water for irrigation.

Sources: Crop Budgets of Jordan Ministry of Agriculture (Economic Department); World Bank: An Agriculture Strategy for the 1990s, (1993)

Table VI: ESTIMATED WATER COST PERCENTAGE OUT OF TOTAL PRODUCTION AND MARKETING COSTS FOR SELECTED CROPS (1990)			
CROP	TOTAL PRODUCTION AND MARKETING COST PER DUNUM NIS	WATER COST NIS	PERCENTAGE OF IRRIGATION WATER COST OUT OF TOTAL COSTS
Potatoes	1'332	175	13.1%
Tomatoes/Jordan Valley	1'970	325	16.5%
Eggplants/Jordan Valley	2'033	400	19.7%
Cucumber/Plastic House	10'700	900	8.4%
Tomatoes/Plastic House	15'557	720	4.6%
Peppers/Plastic House	10'088	600	5.9%

Source: Development Perspectives for Agriculture in the Occupied Palestinian Territories, Society for Austro-Arab Relations, Jerusalem/Vienna, 1992, which quotes "published Israeli sources.

Table VII: TRENDS IN FRUIT TREE AREA, OUTPUT AND SHARE IN TOTAL AGRICULTURAL PRODUCTION VALUE 1966-1989 (AREA IN 1000 DONUMS AND OUTPUT IN 1000 TONS)

	West Bank			Gaza Strip		
	Area	Output	% of TAPV*	Area	Output	% of TAPV*
1966	808			93		
1969	685	131	39.8	114	126	57.5
1970	711	96	31.5	115	160	60.8
1975	928	152	30.0	124	227	61.2
1976 **	956	201	43.4	126	263	64.6
1978	974	261	45.2	129	206	61.2
1984	1031	230	27.9	115	177	54.1
1985	1036	181	27.1	114	193	47.4
1988	1053	342	41.0	108	140	28.5
1989	1046	169	18.7	107	148	22.3
1990	1048	316	36.9	103	216	30.2
1991	1059	175	19.5		155	17.6
1992	1056	324	49.1		134	18.6

*TAPB = Total agricultural production value.
** Data do not fully correspond to data in Table Vlll
Source: 1. Agricultural Atlas of Jordan, 1973, pp.134-141.
2. Agricultural Statistics Quarterlies.
3. Department of Agriculture.

Table VIII: Trends in olives' area, output, and share in agricultural output value (West Bank)				
	1968-70	1978-80	1987-89	1990-92
Area of olives (1000 ton.)	600	666	801	798
Area of fruit trees (1000 ton)	692	976	1050	1055
Output of olives (1000 ton)	32	75	61	107
Total fruits output (1000 ton)	111	244	227	272
Share in agr. output value (%)	14.5	16.6	10	16

Sources: 1. Departments of Agriculture
2. Statistical Abstracts of Israel

Table IX: DISTRIBUTION OF CULTIVATED LANDS IN THE WEST BANK
(SELECTED YEARS: 1973-1991/THOUSAND DUNUMS)

YEAR/CROP	1973	1976	1980	1982	1984	1986	1988	1989	1990	1991	1992	10 YEAR AVERAGE	%
TOTAL IRRIGATED LAND	82	89	92	88	102	95	101	97	95	90	95	89.3	100
FIELD CROPS	--	9	14	2	2	0	2	--	3	3	3	7	1
EGETABLESA ND POTATOES	54	52	46	52	52	49	54	63	58	56	63	52.3	59
WATERMELON AND MELONS	--	--	2	3	14	16	12	5	3	2	1	6.0	7
CITRUS FRUITS	25	25	25	25	28	24	24	23	23	22	22	24.5	27
BANANAS	3	3	4	6	6	6	8	6	7	6	6	5.5	6
TOTAL RAINFED LAND	1941	1513	1524	1567	1538	1608	1650	1656	1698	1704	1602	1901	100
FIELD CROPS	827	530	521	501	435	514	535	553	584	430	463	554.4	29
VEGETABLES AND POTATOES	16	50	34	61	59	64	21	84	86	86	102	60.8	3
WATER MELONS AND MELONS	10	5	12	24	46	19	12	3	3	3	8	14.0	1
FRUIT TREES	738	928	957	980	998	1011	1020	1017	1025	1028	1028	942.2	50
FALLOW LANDS	350	380	335	353	350	315	330	270	260	295	--	323.8	
TOTAL EXCLUDING FALLOW LAND	1591	1551	1524	1566	1538	1571	1590	1604	1631	1548	1697	1571.4	17
GRAND TOTAL	2023	1602	1616	1653	1640	1703	1751	1755	1793	1794	--	--	--

Source: Development Perspectives for Agriculture in the Occupied Palestinian Territories, Society for Austro-Arab Relations, Jerusalem/Vienna, 1992, which quotes" published Israeli sources."

Table X: BREAKDOWN OF CULTIVATED AREAS IN GAZA ACCORDING TO THE TYPE OF CROPS, 1992		
	IRRIGATED AREA (X 1000 DU.)	UNIRRIGATED AREA (X 1000 DU.)
Vegetables	49.35	9.15
Watermelon and Cantaloupe	--	1.50
Citrus	58.20	--
Other fruit trees	7	33.90
Field crops	--	25.20
TOTAL	114.55	69.75

Source: Department of Agricultural, Gaza; Interviews.
Figures given include areas cultivated with more than one crop each year.
Includes guava and about 3,000 dunams of partly irrigated olives.

From: Development Perspectives for Agriculture in the Occupied Palestinian Territories, Society for Austro-Arab Relations, Jerusalem/Vienna, 1992.

Table XI: WEST BANK AND GAZA

Current Water Use by Sector
[Million m3/y]

Reference Year	Naff 1985	Awartani 1990	UN mid 1980s	ESCWA 1990	CIVAD 1991	TAHAL 1991	RANGES Min Max.
West Bank							
Water for domestic, industr. use	30	34	30	38	32	35	30 38
Water for irrigated agriculture	80	84	95	95	100	80	80 100
Total	110	118	125	133	132 Settlers:43 From Isr:10	115	110 133
Gaza							
Water for domestic, industr. use	20	29	23	27	35	24	20 35
Water for irrigated agriculture	70	68	80	65	55	65	55 80
Total	90	97	103	92	90 Settlers:2.5 From Isr:2.5	89	89 103

Source:
- Naff: The Middle East Imperative, 1987
- Awartani: A Projection of the Demand for Water in the West Bank and Gaza Strip 1992-2005, Zurich, 1992
- UN: Israeli Land and Water Practices in the Occupied Palestinian and Other Arab Territories, United Nations, 1991
- USCWA: Land and Water Resources in the Occupied Territory, The Center for Engineering and Planning, Report for ESCWA, 1992
- CIVAD: Data obtained from the Civil Administration, 1993
- TAHAL: Israel Water Study, Draft Working Paper, TAHAL Consulting Engineers, 1993

Table XII: IRRIGATED AREAS IN WEST BANK, GAZA AND ISRAEL

Years	59	66	68	73	57	79	81	82	84	85	86	87	88	89	90	91	92
WEST BANK Irrigated Area (1000 dunams)	100	100	57	82	83	85	98	88	102	104	95	94	101	97	95	90	95
GAZA Irrigated Area (1000 dunams)	75	75	90	95	95	95	108.5							117	110.5	--	--
ISRAEL Irrigated Area	1240	1542	1616	1760	1800	2069	2033	2238	2268	2327	2193	2072	2135	2181	2057	1815	--

Sources:
(1) Judea, Samaria and Gaza Area Statistics, Agricultural Branch Accounts, 1986.
(2) For 1986/90: Abdullah Arar: Water Issues in the Palestine Occupied Territories, Cairo, 1993
(3) Awartani (See Table XI)

Table XIII: WEST BANK AND GAZA

Annually Renewable Water

[Million m3/Year]

	WBDP	UN	Haddad	ESCWA	Society for Austro-Arab Relations	Jad Isaac
West Bank Northern Aquifer Western Aquifer Eastern Aquifer	 140 335 105	 140 335 125				 140 335 125
Total	580	600	720	700 (easily exploitable from a total of 835)	830	600
Gaza Aquifer	50-60	50-80 (Various sources quoted)	52-72	60	50-60	70
Jordan River		120 (currently used by Israel)		320 (estimated Palest. Share)		

Source: West Bank data Base Project, Agriculture and Water Resources in the West Bank, The Jerusalem Post/Westview Press, 1987.
UN: Water Resources of the Occupied Palestinian Territory, United Nations, 1992.
ESCWA: Land and Water Resources in the Occupied Palestinian Territory, the Center for Engineering and Planning, Report for ESCWA, 1992.
Society for Austro-Arab Relations: Development Perspectives for Agriculture in the Occupied Palestinian Territories, Jerusalem, Vienna, 1992.
Jad Isaac: Impact of the Prolonged Israeli Occupation on Water and Environment in the Palestinian Occupied Territories, the Hague, 1992.

Table XIV: Share of Livestock Production Value of the Value of Agricultural Output (%)		
TOTAL VALUE	WEST BANK 1990	GAZA STRIP 1990
-NIS 1000	456947	82273
-Percent	100.0	100.0
Sheep, goats	61.1	15.4
Cattle	7.7	19.1
Poultry[1]	30.9	59.3
Fish	-	2.4
Others	0.3	3.8

Sources: 1. Statistical Abstracts of Israel
2. Agricultural Statistics Quarterly, 1990 (1), P. 60-61

1/ Including eggs.

Table XV: LIVESTOCK INVENTORY FOR THE WEST BANK DURING 1980-1991
(THOUSAND UNLESS OTHERWISE STATED)

YEAR	CATTLE		SHEEP	GOATS	LAYER HENS ('000)	BROILER CHICKENS (MILLION)	DRAUGHT ANIMALS
	LOCAL BREED	DAIRY BREED					
1980	9.8	4.2	227.0	153.8	113	4.0	20.9
1982	9.6	5.2	254.6	165.3	89	5.6	20.6
1984	9.3	4.8	272.9	171.7	86	5.0	20.7
1986	4.8	3.2	263.2	157.4	93	7.5	21.6
1987	4.9	3.9	284.5	174.3	100	11.5	19.1
1988	5.7	5.0	314.0	186.2	251	6.9	19.4
1989	5.0	5.1	339.5	195.3	500	18.0	19.0
1990	5.3	5.9	345.3	210.8	603	35.0	18.9
1991	4.8	5.9	340.5	219.4	841	22.9	17.3
1992	4.6	6.9	336.7	210.0	1170	22.8	18.8

Source: Shqueir, A. 1987; Agricultural Data Base, 1992;
Agriculture Department, West Bank

From: Development Perspectives for Agriculture in the Occupied Palestinian Territories, Society for Austro-Arab Relations, Jerusalem/Vienna, 1992. Adjusted with additional data from CBS.

Table XVI: DEVELOPMENT OF ANIMAL PRODUCTION IN THE GAZA STRIP IN SELECTED YEARS

	1979/80	1981/82	1983/84	1988/89	1990/91	1992
Poultry (tons)	2.0	3.3	3.3	7.4	14.0	15.8
Cattle (head)	12000	3525	4700	3500	4300	4300
Sheep (head)	15000	15000	16000	11000	12000	10000
Goats (head)	25000	21000	21000	21000	18000	15000
Camels (head)	2500	500	800	540	400	600
Milk (million liters)	14.7	12.4	11.2	8.4	9.2	9.6
Eggs (million units)	42.8	45.8	44.5	90.0	112	145.0
Fish (tons) Thereof: Sardines	1200 800	1300 800	1000 700	229 124	1841 1382	962 568
Beehives (units)	N.A	N.A	10000	14000	17000	15500
Honey (tons)	100	100	150	140	102	124

Source: 1. Department of Agriculture, Gaza Strip
2. Central bureau of Statistics, "Judea, Samaria, and Gaza"

From: Development Perspectives for Agriculture in the occupied Palestinian Territories, Society for Austro-Arab Relations, Jerusalem/Vienna, 1992

TABLE XVII: ANIMAL AND FISH PRODUCTION IN GAZA 1967/68-1990/91				
YEAR	MEAT (1000 TONS)	MILK (1000 TONS)	EGGS (million units)	FISH (1000 TONS)
1967/68	1.7	6.8	10.0	3.7
1968/69	1.9	6.9	15.00	3.8
1969/70	2.4	7.4	15.00	3.4
1970/71	2.6	7.2	20.0	3.2
1971/72	3.0	9.7	24.0	4.2
1972/73	3.5	10.2	30.0	4.6
1973/74	3.4	11.7	30.0	3.5
1974/75	3.7	12.9	32.0	4.8
1975/76	4.3	12.8	32.4	4.7
1976/77	4.3	12.0	35.0	5.1
1977/78[1]	4.8	14.8	40.0	4.5
1978/79	5.2	17.0	47.5	4.0
1979/80	5.6	14.7	42.8	1.2
1980/81	6.2	13.9	45.6	1.4
1981/82	6.3	12.4	45.8	1.3
1982/83	6.0	11.4	46.0	1.0
1983/84	5.9	11.2	44.5	1.0
1984/85	6.1	10.0	49.5	0.6
1985/86	7.3	8.4	61.0	0.3
1986/87	8.4	8.0	73.5	0.3
1987/88	8.3	7.8	90.0	0.3
1988/89	9.9	8.6	90.0	0.3
1989/90	10.1	8.4	90.0	0.4
1990/91	12.1	9.5	112.0	1.8
1991/92	14.2	9.3	145.0	1.0

Sources: C.B.S., Jerusalem: From: Development Perspectives for Agriculture in the Occupied Palestinian Territories, Society for Austro-Arab Relations, Jerusalem/Vienna, 1992

Table XVIII: Relative significance of agricultural exports
(US $ million)

	West Bank			Gaza Strip		
Year	Total Exports	Agric. Exports	% Agric. To total	Total Exports	Agric. Exports	%Agric To total
1973	53.9	7.9	14.6	40.3	6.6	16.4
1974	77.9	10.4	13.4	51.7	5.1	9.9
1981	205.2	82.0	40.0	197.8	55.3	28.0
1982	200.6	72.7	36.2	190.0	50.1	26.4
1983	201.0	62.5	31.1	180.6	46.7	25.8
1984	184.5	77.4	42.0	104.5	27.5	26.3
1985	166.4	48.1	28.9	106.0	30.9	29.2
1986	240.1	65.1	27.1	139.7	34.8	24.9
1987	228.2	n.r		157.1	n.r	

Sources: 1. Administered Territories Statistics Quarterlies.
2. Statistical Abstracts of Israel.

TABLE XIX: AGRICULTURAL PRODUCTS EXPORTED FROM THE WEST BANK TO JORDAN FOR THE YEARS 1989, 1990, 1991 IN TONS

NO.	PRODUCTS	AVERAGE 1981-1985	1989	1990	1991
1	TOMATO	15,003	-	-	353
2	EGGPLANT	3,828	-	-	-
3	POTATOES	3,467	10	500	-
4	CUCUMBER	1,203	-	-	-
5	WATERMELON	27,765	433	-	-
6	MELONS	5,783	10	-	-
7	ONIONS	3,098	12	808	2,210
8	CARROTS		168	457	330
9	BANANAS	5,442	2,498	2,500	5,392
10	GUAVAS	523	50	-	632
11	ORANGES (SHAMOUTI)		3,000	14,000	14,730
12	ORANGES (VALENCIA)	22,424	-	14,000	15,160
13	GRAPEFRUIT/POMELOS	67	-	90	7
14	LEMONS	33	6,600	739	558
15	CLEMENTINE/MANDARIN	7,740	170	-	-
16	GREEN ALMONDS	941	366	45	325
17	DRIED ALMONDS	4,561	300	-	13
18	PLUMS	4,452	1,206	1,900	1,233
19	GRAPES	6,286	2,816	2,500	2,952
20	PRICKLY PEAR	453	-	-	516
21	DATES	-	-	-	85
22	AVOCADOS	-	5	-	7
23	APRICOTS	63	46	-	-
24	OLIVE OIL	3,221	9,226	-	3,643
24	PICKLED OLIVES	1,252	1,249	-	189
26	WHITE CHEESE	832	207	286	59
27	HONEY	37	52	-	46
28	GRAPE MOLASSES	17	-	-	7
29	VEGETABLE OIL	-	-	-	9,229
30	FRUIT TREE SEEDLINGS	-	840,040	45,480	192,050
31	SHEEP INTESTINES	-	5	-	-
32	SHEEP	-	-	-	60
33	OTHERS	-	404	-	-
TOTAL		118,491	28,833	37,834	48,506

Source: Agriculture Department Statistics, 1992
From : Development Perspectives for Agriculture in the Occupied Palestinian Territories, Society for Austro-Arab Relations, Jerusalem/Vienna, 1992

Table XX: Fruits and Vegetables Imported from Israel (1000 tons)

Year	West Bank	Gaza Strip	Total
1970/71	47.4	23.1	70.5
1974/75	45.3	35.1	80.4
1977/78	60.4	41.0	101.4
1982/83	55.0	39.3	94.3
1985/86	50.3	42.0	92.3
1986/87	47.9	43.9	91.8

Commodity Breakdown of Farm Produce Imported from Israel (1987)

	Quantity 1000 tons	Percent of total (%)
Tomatoes	8.2	8.9
Melons	26.7	29.1
Other vegetables	18.9	20.6
Grapes	1.1	1.2
Citrus	1.1	1.2
Other fruits	35.8	39.0
Total	91.8	100.0

Source: Statistical Abstracts of Israel, tables 31, 32 and Statistical Abstract of Israel, 1987, p.732.

Table XXI: AGRICULTURAL IMPORTS ENTERED FROM WEST BANK & GAZA INTO JORDAN (TON)
(FROM WEST BANK)

	(1) 83-85	(2) 86-88	(3) 89-91	(1),(2) %CHANGE	(1),(3) %CHANGE	(2),(3) %CHANG
VEGETABLE	71397	35094	1516	-51	-98	-96
TOMATO	17225	7261	40	-58	-100	-99
EGGPLANT	2432	634	0	-74	-100	-100
POTATO	4404	4484	136	2	-97	-97
ONIONS	3319	4172	852	26	-74	-80
W. MELON	36689	15908	151	-57	-100	-99
S. MELON	7328	2635	2	-64	-100	-100
CITRUS	31769	14950	5626	-53	-82	-62
ORANGE	19177	11180	4540	-42	-76	-59
LEMON	4521	2387	1047	-47	-77	-56
CLAMANTIN	6099	805	26	-87	-100	-97
MANDARIN	1878	442	5	-76	-100	-99
POUR	54	74	3	37	-94	-96
GRAPEFRUIT	40	62	7	55	-83	-89
FRUITS	18957	16646	6400	-12	-66	-62
BANANA	6509	6583	3274	1	-50	-50
GRAPES	6583	6685	1760	2	-73	-74
GUAVA	31	12	20	-61	-37	64
ALMOND	105	153	233	46	122	52
APRICOT	768	645	42	-16	-95	-94
PRUNES	39	21	888	-46	2177	4129
CUT	3594	1926	68	-46	-98	-96
GRAND TOTAL	122123	66690	13542	-116	-246	-220

FROM GAZA

ORANGE	75609	49834	30573	-34	-60	-39
LEMONS	5155	5797	3267	12	-37	-44
GRAPEFRUIT	1109	1153	100	4	-91	-91
CITRUS	81873	56784	33940	-31	-59	-40
GUAVA	2410	3101	1090	29	-55	-65
DATES	325	205	45	-37	-86	-78
TOTAL	84608	60090	35075	-29	-59	-42

Source: Ministry of Agriculture, Amman, 1992

Table XXII: Agricultural Workers by Years of Schooling (1986)

	WEST BANK		GAZA STRIP	
	Agr.	Total	Agr.	Total
Total Workers (%)	100	100	100	100
Years of schooling Zero	38.3	14.6	26.4	12.6
1-6	32.4	16.9	33.7	29.6
7-8	11.1	16.9	9.0	11.3
9-12	15.0	27.4	27.5	35.9
13+	3.1	11.8	3.4	10.6

Source: Judea, Samaria and Gaza Area Statistics (1987) p. 169

	West Bank		Gaza Strip	
Year	1969	1985	1969	1985
No. of workers (1000)*	48.5	28.3	16.6	8.8
Owner operators (%)	75.5	90.5	36.7	78.5

	West Bank			Gaza Strip		
Year	1969	1987	1990	1969	1987	1990
Total work force (1000)	109.9	177.6	192.6	52.9	100.1	103.9
Workers in agr.*(1000)	48.5	29.8	37.8	16.6	8.6	12.4

*This includes only those employed in OPT agriculture.

Source: Statistical Abstract of Israel, 1971, p.637 and 1991, p.231

Table XXIII: EMPLOYEES OF THE AGRICULTURAL DEPARTMENT IN THE WEST BANK

DEPARTMENT	1977	1983	1989
EXTENSION AND PLANNING	92	68	42
EXPERIMENTAL STATIONS AND RESEARCHES	50	37	11
FORESTRY	44	42	27
ADMINISTRATION	26	40	27
DAILY PAID WORKERS	275	--	--
VETERINARY	63	53	34
TOTAL	550	241	141

Source: Development Perspectives for Agriculture in the Occupied Palestinian Territories, Society for Austro-Arab Relations, Jerusalem/Vienna, 1992

Table XXIV: AVERAGE AGRICULTURAL GDP/EMPLOYED PERSON IN AGRICULTURE, 1981 - 1991

YEAR	WEST BANK			GAZA STRIP		
	No. of Workers (1000)	Agr. GDP (NIS Million)	GDP/Ag.Worker (NIS 1000)	No.of Workers (1000)	Agri. GDP (NIS Million)	GDP/worker (NIS 1000)
1981	28.5	359	12.6	8.4	122	14.5
1982	31.3	416	13.2	8.2	114	13.9
1983	29.2	371	12.7	8.7	103	11.8
1984	29.9	374	12.6	7.7	99	12.9
1985	28.3	330	11.7	8.8	108	12.3
1986	33.0	575	17.4	8.5	102	12.0
1987	29.8	379	12.7	8.6	123	14.3
1988	37.1	757	20.4	9.9	122	12.3
1989	30.5	534	17.5	10.9	141	12.9
1990	37.8	865	22.9	12.4	152	12.3
1991	34.8	630	18.1	14.2	170	12.0

Source: Statistical Abstract of Israel 1992, Table 27.22, and Central Bureau of Statistics data

Table XXV: WEST BANK: Distribution of Employed Persons Working in the West Bank and Gaza in the Agriculture Sector, 1969-1988

Year	West Bank		Gaza	
	Total Employed (Thousands)	Percentage of Total Employed in Agriculture	Total Employed (Thousands)	Percentage of Total Employed in Agriculture
1969	101.5		51.8	
1970	99.9	42.4	52.8	31.8
1971	91.2	40.1	51.5	31.1
1972	90.3	37.9	46.1	25.0
1973	87.8	34.2	45.4	25.6
1974	95.2	37.8	46.7	24.8
1975	91.9	34.7	46.5	27.1
1976	92.6	33.8	48.3	26.4
1977	91.8	33.7	49.7	25.3
1978	94.7	34.3	49.0	20.8
1979	93.0	31.5	45.3	21.0
1980	94.2	33.2	46.4	18.9
1981	93.5	30.5	46.6	18.2
1982	97.9	32.1	45.9	18.1
1983	99.1	29.5	45.6	19.2
1984	104.0	28.5	47.0	16.4
1985	103.7	27.2	49.2	17.9
1986	114.6	29.0	50.3	17.0
1987	114.7	26.0	54.2	15.9
1988	119.0	31.2	53.5	18.3

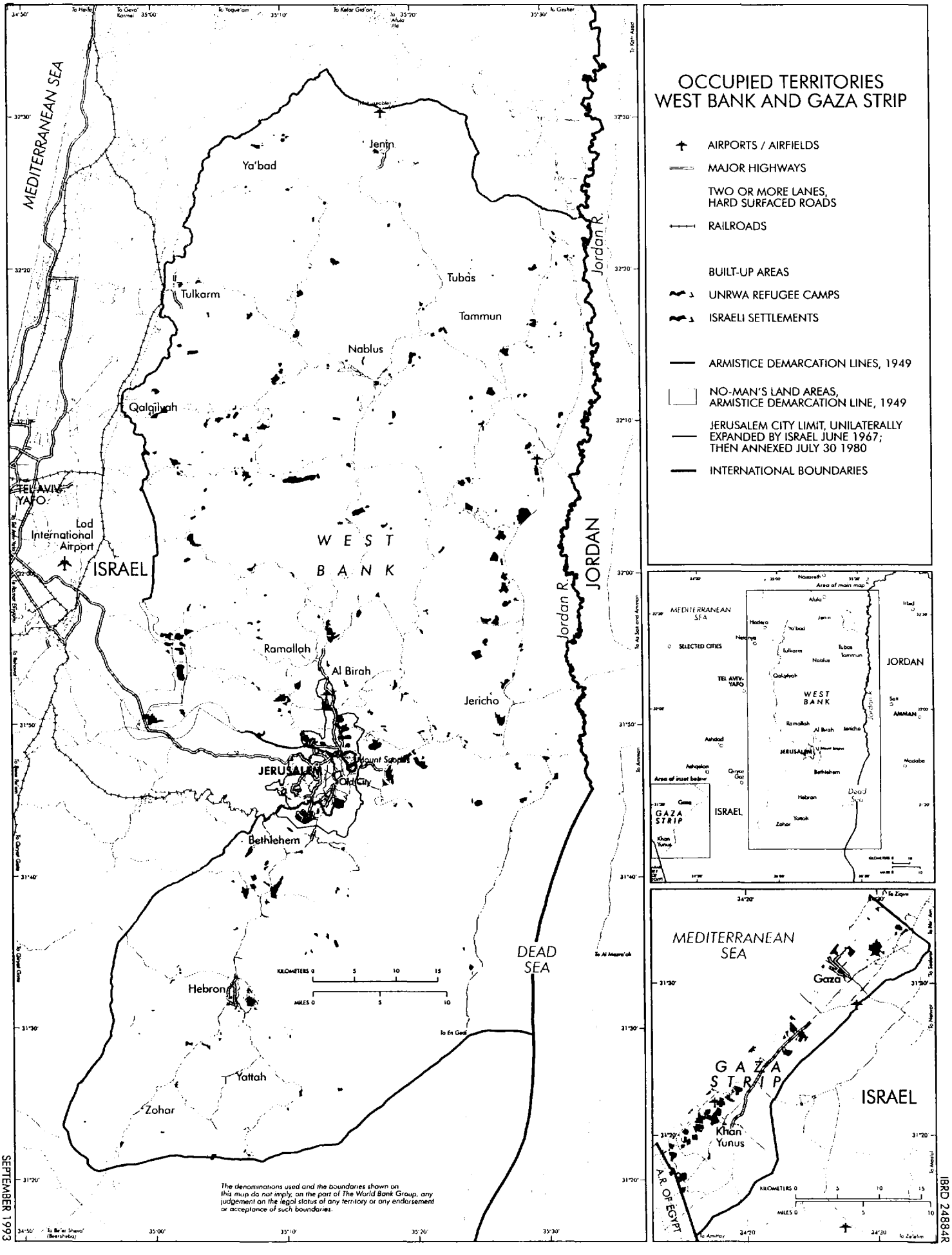
(a) Include persons working in other parts of the occupied territory.

Source: Israel, CBS, Statistical Abstract of Israel, 1971, 1972, 1975, 1977, 1981, 1983, 1985, 1989, Nos. 22, 23, 26, 28, 32, 34, 36, 40, respectively.
Israel, CBS, Judea Samaria & Gaza Area Statistics, 1980, Vol. X, No. 4.

From: Prosperity for Sustained Development of the Palestinian Economy in the West Bank and Gaza Ship (1990-2010) a quantitative framework, UNCTAD Secretariat, Technical Supplement (Nov. 1992).

Table XXVI: ORGANIZATIONS WORKING IN AGRICULTURE			
ORGANIZATIONS	WEST BANK	GAZA STRIP	TOTAL
Agricultural Departments	8	1	9
Municipalities	8	4	12
Chamber of Commerce	8	1	9
Registered Cooperatives	69	6	75
Non-Registered Cooperatives	4	4	4
Charitable Societies	3	1	4
Credit Organizations	5	5	5
Technical Services	6	1	7
Universities	4	1	5
Foreign Organizations	6	6	6
Total	151	34	170

Sources: Abdul Rahman Abu Arafeh, 1992, p.17



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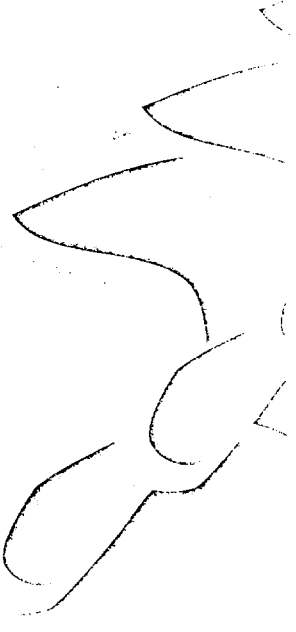

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