CHAPTER TWO:

AGRICULTURAL PRODUCTION AND AVAILABILITY OF FOOD

INTRODUCTION

Developing a diversified and sustainable agricultural production system is the main challenge facing developing countries to reduce food insecurity and improve livelihood of rural people and vulnerable areas. The oPt has a diversified agro-ecosystem that vary from Al-Aghwar to semi-highlands, highlands, semi-costal and Costal ecosystems. These agro-ecosystems gave Palestine the potential to produce up to 105 crops all around the year (especially vegetable crops), including 38 types of fruit trees, 37 types of vegetables and 30 types of field crops and grains . However, local production is limited and unstable due to its susceptibility towards climatic shocks and lack of access to land due to Israel restrictions. Despite the relative small superficy of the oPt, agriculture plays a significant role in Palestinian economy and Palestinian livelihood. Overall, the agricultural sector accounts for between 11%-20% of the Palestinian economy, employing approximately 15% of the formal workforce and up to 39% of the informal workforce, and accounting for about 20% of oPt exports[48] . Percentage of the labor force engaged in agricultural work increases during times of strict closures and crisis.

On a gender base, the sector employs 10.1% of the males' formal Palestinian formal labor forces and 27.5% of the females' formal labor forces[49]. In the informal labor force in agriculture, women are the main component with 90%[50] Daily wages in the agricultural sector are generally lower than the average daily wages in all other economic sectors by 20%.

AGRICULTURAL PRODUCTION

Agricultural production is essential to food security in two ways: first as a source of production for local consumption and second as a source of export for income generation. The total agricultural land currently used by Palestinians covers 30.5% (1834.8 km^2) of the Palestinian land area and 54.4% of the total suitable lands for cultivation[51]. Rain-fed agriculture is practiced in 85.3% of the total cultivated area, while only 14.7% is irrigated agriculture. Due to the limitation in land fertility and drought conditions, the contribution of dry-land agriculture is limited and contributes only to 8.6% of the total plant production in the oPt. The olives cultivation has great influence on the plant production sub-sector as nearly 51% of the total cultivated area is covered with olive trees[52]. The olive fruits harvest varies from 50,000 and 180,000 tons annually in a two-year production. Thus the plant production varies from year to year based on rainfall season, drought, and olives production.

The livestock sector witnesses instability in the animal numbers from year to year based on the inputs production and mainly on feeds' prices. The oPt is a habitat for 34,255 heads of cattle, 744,764 heads of small ruminants, 26,581 thousand broiler birds and 2,797 thousand laying birds, and 65,948 beehives[53]. Additionally, the blockade harmed Gaza's fishermen by hampering exports (down from 1,784 tons in 1997 to about 55 tons in 2007)[54], thus reducing drastically the fishing catch over the recent years.

Agricultural activities in the oPt are characterized mainly as family based production activities to subsist household own needs. Fifty-eight percent of both plant and livestock production are mainly for the domestic consumption, 23% to sell the surplus after meeting the domestic consumption and only 20% for direct sale [55].

FOOD AVAILABILITY

Despite the potential for producing many crops all around the year in the oPt, less than 5% of the cereals and pulses consumed in the oPt are locally produced. Supply of these commodities is to be ensured by commercial imports and assistance. Only 60% of the Palestinians main food items[56] are locally produced, still food availability per se is not the most critical issue presently in the oPt. In genera, food is supplied in sufficient quantities and acceptable variety on local markets, essentially from imports, with the exception of a few sub-sectors in which local production covers a significant proportion of domestic consumption. Current availability of food on the market could be hampered given the volatility of the peace process and the high dependency[57] on the Israeli market. Local food production would be larger, if land, water and other inputs be more accessible.

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[47] *Palestinian Central Bureau of statistic (PCBS), 2008. Agricultural statistics for the year 2006/07. Ramallah. Palestine*
[48] *WFP/FAO. Food Security and Vulnerability Analysis Report in the oPt. December 2009.*
[49] *Palestinian Central Bureau of Statistics (PCBS): Labor Force – Annual Report, 2009.*
[50] *Palestinian Central Bureau of Statistics (PCBS): Labor Force – Annual Report, 2009.*
[51] *Applied Research Institute-Jerusalem (ARIJ). Geo-informatics Department. 2008. Land use/Land cover analysis for oPt.*
[52] *Applied Research Institute-Jerusalem (ARIJ). Geo-informatics Department. 2008. Land use/Land cover analysis for oPt.*
[53] *Palestinian Central Bureau of statistic (PCBS). 2008. Agricultural statistics for the year 2006/07. Ramallah. Palestine*
[54] *FAO, 2008 - Quoted in: O'Callaghan Sorcha, Jaspars Susanne, Pavanello Sara – Losing Ground: Protection and Livelihoods in the Occupied Palestinian Territory. ODI Humanitarian Policy Group (HPG) Working Paper, July 2009.*
[55] *Palestinian Central Bureau of statistic (PCBS), 2008. Agricultural statistics for the year 2006/07. Ramallah. Palestine*
[56] *The main food commodities are 25 selected food items including: Short grain profiled rice, Haifa white flour, White bread, Fresh goat meat with bones, Fresh beef meat, Fresh chicken without feathers, Fresh red snapper, Frozen fish, Pasteurized milk 3% fat, Powdered milk, Powdered milk kikoz (No.1), Yogurt, Labaneh, Chicken eggs, Olive oil, Big size orange, Medium size banana ,red apple, Green house tomato, Local dry onion, Cauliflower, Greenhouse cucumber, Medium size potato, Lentils, Chick beans, Fine white sugar, Tea, White table salt.*
[57] *Spanish Cooperation & ARIJ. 2007. A review of the Palestinian agricultural sector. Jerusalem*

The analysis of food production/consumption balance in the oPt showed that the agricultural sector is meeting the Palestinian populations' consumption for the main vegetables such as tomato, cucumber, eggplant, squash, beans, cabbage, cauliflower. The production surpluses are usually exported to Israel. Local production of potato, onion, watermelon, and garlic does not meet the Palestinians' consumption. Shortage of these products is usually imported from Israel or from other countries through Israel. Regarding fruits production, there is a general shortage in fruit production to meet the local consumption demand. Only olive oil exceeds the oPt consumption requirements despite the irregularity of its yearly production due to seasonality and obstacle of its cultivation. Grapes, plums and citrus are meeting in its vast majority the local consumption demand. On the livestock production level, there is high shortage in the production capacity of red meat, fish, milk and dairy products and honey, while some surpluses were recorded in poultry meat and eggs production[58]. The Ministry of Agriculture estimates in the year 2008 showed significant decrease in the number of heads of small ruminants by 14.4% in comparison with the year 2006[59]. The prices of meat and milk kept increasing since 2006, mainly following international trends, restricting access to these commodities by the most vulnerable population.

AGRICULTURAL OWNERSHIP

The total number of agricultural holdings in Palestine is 101,172. Plant holdings are the most common, averaging 69.5% followed by mixed holdings with 23% and finally livestock holdings with 8%[60]. Almost a quarter and less than 5% of the West Bank families own agricultural lands and own livestock, respectively. While a higher proportion of rural households owned land (39%), a significant share of urban households also did (21%). However, only 6% of refugees in camps owned land[61]. At governorate level, the number of families that own agricultural lands is the highest in Salfit with 37%, followed by Tubas with 32%, and Tulkarm with 28.5%. While Hebron and Tubas have the highest percentage of families that own livestock reaching up to 14%[62].

The average size of agricultural land in the West Bank was larger in the central governorates (1.6 ha or 16 dunums), followed by the northern governorates (1.3 ha) and southern governorates (1.1 ha). Because of the West Bank Barrier, many Palestinians cannot easily reach land on the western side. Getting permits to cross is very difficult and only landowners and first-degree relatives are typically allowed access[63].

Due to the Palestinian family inheritance land ownership system and land confiscation policies, the agricultural holdings in the oPt are getting smaller and increasingly fragmented. The average area of agricultural holdings is 18.6 dunums per holding. In its vast majority, agricultural land owners are small-holders farmers. In addition, 51.1% of the sheep holdings in oPt are with an average of 1-19 heads and 71.1% of the existing agricultural holdings in oPt is with an average of just 1-3 heads[64].

AGRICULTURE AND CONFLICTS

In political terms, the Israeli settlements in the West Bank confiscated a total area of 67,743 dunums, which equals to 50% of irrigated agricultural lands in the West Bank (95.1% is located in the Jordan Valley). Most of these lands are irrigated and consume up to 60 Million cubic meters (MCM) annually. It is worth noting that 62.9% of agricultural and arable lands of the West Bank are located in area C under Israeli control[65] (see Chapter 5).

As highlighted in the West Bank SEFSec report, close to 10% of the households owning agricultural land considered it difficult, very difficult or almost impossible to tend their land during the second half of 2008. Almost 60% cited restrictions on movement within the main difficulty to tend their land. Other difficulties mentioned by many farmers included long transportation time (53%) and high transportation costs (27%). Due to the West Bank Barrier, herders have lost essential grazing areas for their goats/sheep, jeopardizing their livelihood and source of income. Overall in the West Bank, 38% of total land area in the West Bank is controlled by the Government of Israel for settlements, military use, checkpoints or road closures, and the West Bank Barrier[66]. Lack of access to agricultural land, both in the West Bank with the Area C, but also in the Gaza Strip with the Buffer Zone, as well as restrictions of entrance and movement of agricultural inputs and equipment further deteriorate the production of farmers.

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[58] *Spanish Cooperation & ARIJ. 2007. A review of the Palestinian agricultural sector. Jerusalem*
[59] *PCBS press release. Agricultural Statistics: report. 2009*
[60] *Palestinian Central Bureau of Statistics (PCBS), 2005. Farm structure survey 2004/05. Main findings. Ramallah. Palestine.*
[61] *FAO/WFP. Socio-Economic and Food Security Survey Report, West Bank. August 2009.*
[62] *FAO/WFP. Socio-Economic and Food Survey Report-West Bank. August 2009.*
[63] *WFP/FAO. Food Security and Vulnerability Analysis Report in the oPt. December 2009.*
[64] *Spanish Cooperation & ARIJ. 2007. A review of the Palestinian agricultural sector. Jerusalem*
[65] *The Applied Research Institute-Jerusalem (ARIJ). Urbanization Monitoring Department. Analysis of Satellite Images, "Monitoring Israeli activities in the oPt" project funded by EU. November 2009.*
[66] *- The World Bank, 2008 – The Economic Effects of Restricted Access to Land in the West Bank. Social and Economic Development Group, Finance and Private Sector Development, Middle East and North Africa Region*
- According to the Applied Research Institute – Jerusalem (ARIJ) some 61% (3456 km²) of the West Bank territory falls under complete control of the Israeli Army, and is defined as area "C". It also includes the western Segregation zone (733 km²-13% of the West Bank total area)

Additionally, limitations are imposed by the Israeli authorities on the movement of Palestinian commodities for exportation. Gates of the West Bank are often closed at important times during the agricultural season and crops needing regular tending cannot be grown. Production has been reduced as a result[67]. Many Palestinian farmers still managed to get the export certification and their products reached the international standards for export. However, due to Israeli restrictions many of these farmers found themselves imposed to market their products locally or on Israeli markets with local prices.

Due to constraints imposed on water resources access, the Palestinians are using only 84.29 MCM per year for irrigation in the West Bank (see Chapter 4). While in the Gaza Strip, in addition to the impact of the Cast Lead Operation, the water quality is deteriorated due to over pumping and the intrusion of sea water into fresh water[68].

Besides farmers, pastoralists are also affected by loss of land access and restriction of freedom of movement. Of the 1,500,000 dunums of existing grazing lands in the West Bank, 85% are closed to Palestinians as a result of Israeli settlements or military areas and the West Bank Barrier. As a result, only 225,000 dunums are available for the grazing of sheep and goats. Furthermore, more than half of the estimated 25,000 Bedouins – semi-nomadic people who traditionally rely on herding and farming as their main sources of livelihood – are concentrated in Area C of the West Bank and thus face major planning restrictions for construction (including water sources, houses and agricultural shelters). Insufficient land for pasture forces them to buy expensive fodder to feed their animals and they get heavily indebted as a result[69].

Food availability in the Gaza Strip is not stable across the type of commodities. Rice, pulses, canned vegetable, sauces, tea, coffee and fruit juice are available as pre-war. However, availability of fresh chicken, red meat and eggs is reduced due to the heavy damages incurred during the Israeli Cast Lead Operation, as well as restrictions imposed by the Israeli authorities to enter cattle in the Gaza Strip. The later are entering from Egypt through tunnels, however, at a higher price and putting at risk food safety[70]. Several agricultural losses took place as a result of the Gaza continuous closures and war, where almost 15% of Gaza's total cultivated areas (which amounted to about 170,000 dunums prior to 27 December 2008) have been completely destroyed during the war[71]. Moreover, the soil is now polluted with heavy metals and white phosphorous as a result of the Israeli offensive, which will negatively impact the agricultural sector[72] . The total value of the direct damages on the agricultural sector is estimated at over USD 180 million, while indirect damages amount to about USD 88 million.

Access to sea is possible to Palestinians living in the Gaza Strip but the Israeli authorities have reduced accessibility to fishing waters from 6 to 3 nautical miles, resulting in marked over-fishing in the remaining waters and depletion of fish stocks. Fishing distance was further reduced to 2-3 nautical miles after the Israeli offensive at the end of 2008[73] (the fishing limit outlined by the Oslo accords is 20 nautical miles). The cumulative fishing catch in April 2009 amount to 79 mt [74], which is approximately one third to what fishermen in Gaza caught during the same period in 2007. Because of the restrictions to access the sea and the damages on two fishing ports during the war (the value of damages is estimated at USD 1.5 million), it prevents fishermen from sufficient catches; affect the sardine season and causes overfishing and loss in productivity, thereby threatening more 3,500 households relying on fishing for their income. The current quantity of sardine found on the market is estimated at 20-50 kg daily, instead of the usual 100-150 mt/day during the sardine season period[75]. In addition, water pollution due to discharge of untreated sewage into the sea further limits safe fishing grounds.

Fishing boats, when available, also cannot operate at their full capacity due to shortage and high cost of fuel. Fishers' livelihoods are further at risk as a result of being subjected to import restrictions of entry of cooking gas by the Israeli authorities. Cooking gas is used for lamps to fish sardines. Shortage of cooking gas decreases sardines catch and result in lower quantities available in the market. Furthermore, fishing equipment is in short supply[76].

As for climatic conditions that will be further developed in Chapter 4, field crops and forages are the most affected cultivations by weather conditions. Also, open irrigated cultivations are affected by the prevailed warm wind and frost conditions. Al-Khamassin winds also affect the fruit trees bearing especially the olive trees. Additionally, the prevailed drought conditions during the last two years in addition to the sharp increase in the agricultural inputs costs have affected the feasibility of the agricultural activities. These conditions have imposed many of the small farmers to avoid reactivating their lands due to the loss occurred to their planted crops and many of the livestock holders have soled their folks as they did not manage to offer feed due to its high cost.

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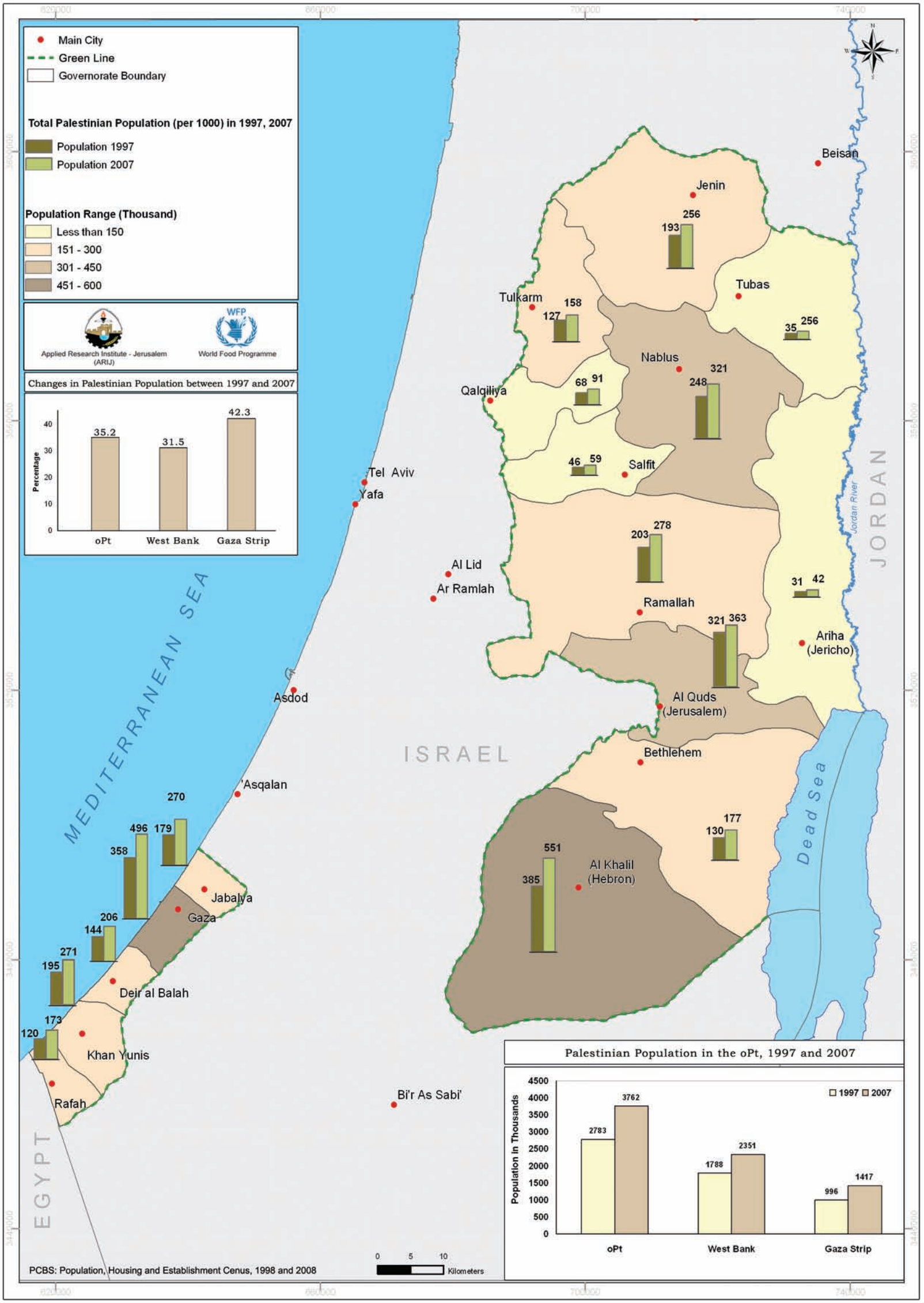
[67] *WFP/FAO. Food Security and Vulnerability Analysis Report in the oPt. December 2009.*
[68] *Spanish Cooperation & ARIJ. 2007. A review of the Palestinian agricultural sector. Jerusalem.*
[69] *WFP/FAO. Food Security and Vulnerability Analysis Report in the oPt. December 2009*
[70] *World Food Programme. Vulnerability analysis and Mapping (VAM); Food Security and Market monitoring report. Occupied Palestinian Territory, April 2009. Report 20.*
[71] *World Food Programme. Vulnerability analysis and Mapping (VAM); Food Security and Market monitoring report. Occupied Palestinian Territory, April 2009. Report 20.*
[72] *Palestinian Central Bureau of statistic (PCBS): press release. Agricultural Statistics: report. 2009*
[73] *WFP/FAO. Food Security and Vulnerability Analysis Report in the oPt. December 2009*
[74] *WFP/FAO. Update on Food Security in Gaza , May 2009.*
[75] *WFP/FAO. Update on Food Security in Gaza , May 2009*
[76] *WFP/FAO. Food Security and Vulnerability Analysis Report in the oPt. December 2009*

Although the potential for agricultural production is important in the oPt, the actual crop and animal product outputs are limited by: the small size of land available and safely and regularly accessible; the lack, and high (and increasing) cost, of agricultural inputs and equipment; the lack of irrigation (only 6% of West Bank cultivated area); adverse climatic factors in recent years (drought, irregular rainfall and frost); shrinking marketing opportunities due to Israeli closure regime; leveling of large agricultural areas in the Gaza Strip. These concerns should be tackled both in the West Bank and the Gaza Strip as to decrease the vulnerability of the agricultural sector and to help farmers to resist to the various shocks and crisis they faced over the last decade and to which they will be confronted in the coming years.

Palestinian Population of the occupied Palestinian territory, 1997 & 2007

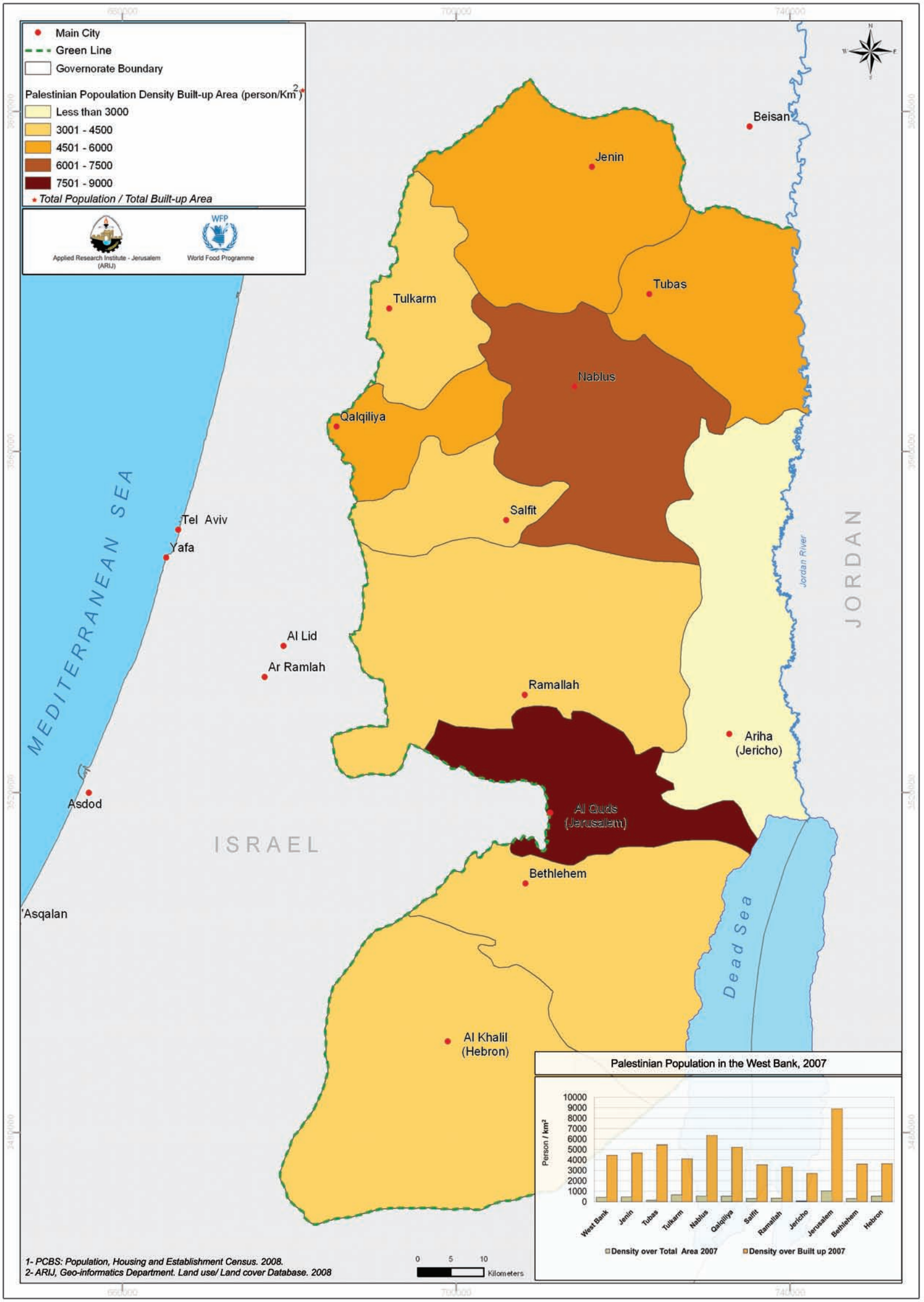


Palestinian Population Density over area A,B,C of the West Bank, 2007

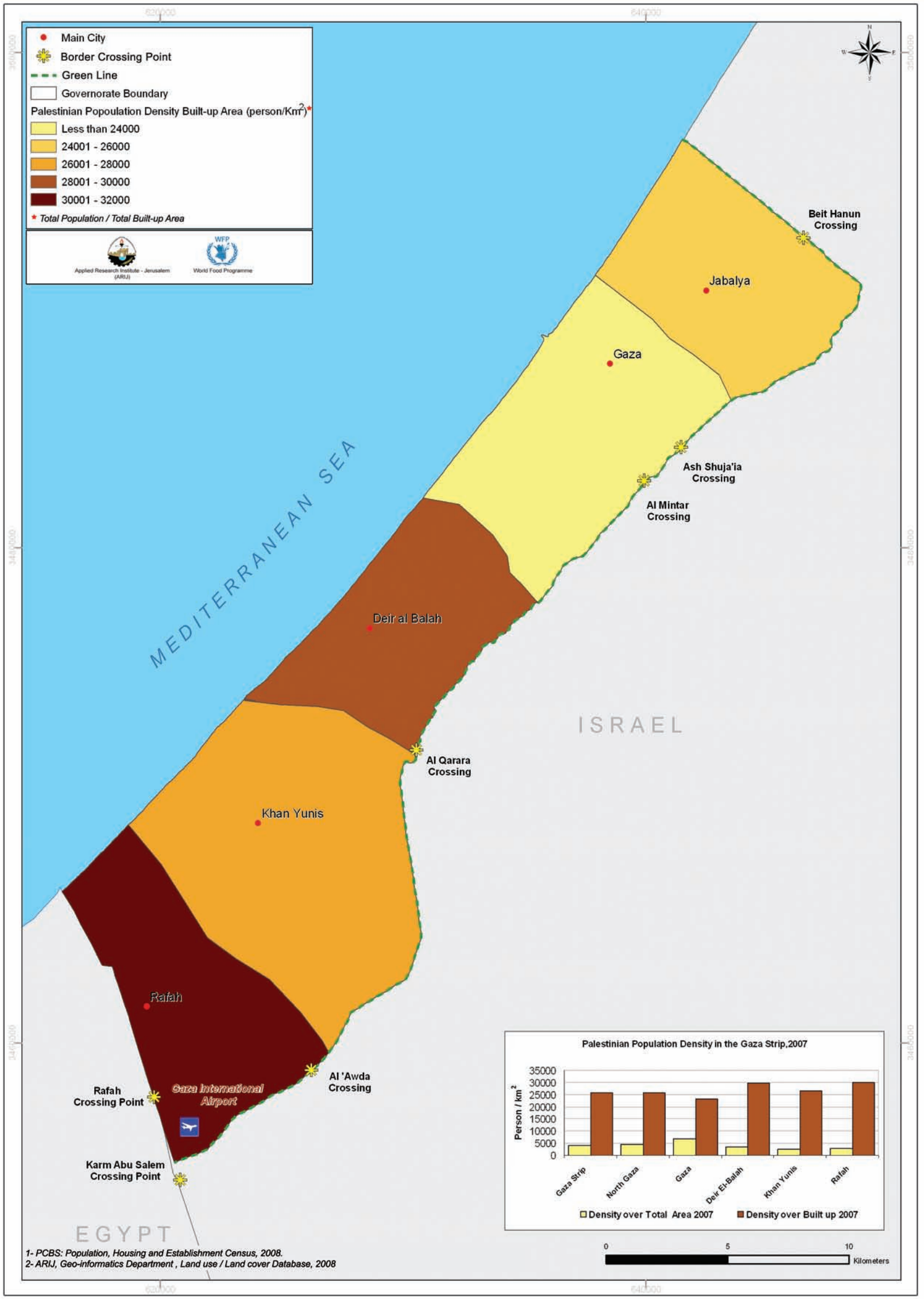
Palestinian Population Density over Total Area of the West Bank, 2007

Palestinian Population Density over Total Area of the Gaza Strip, 2007

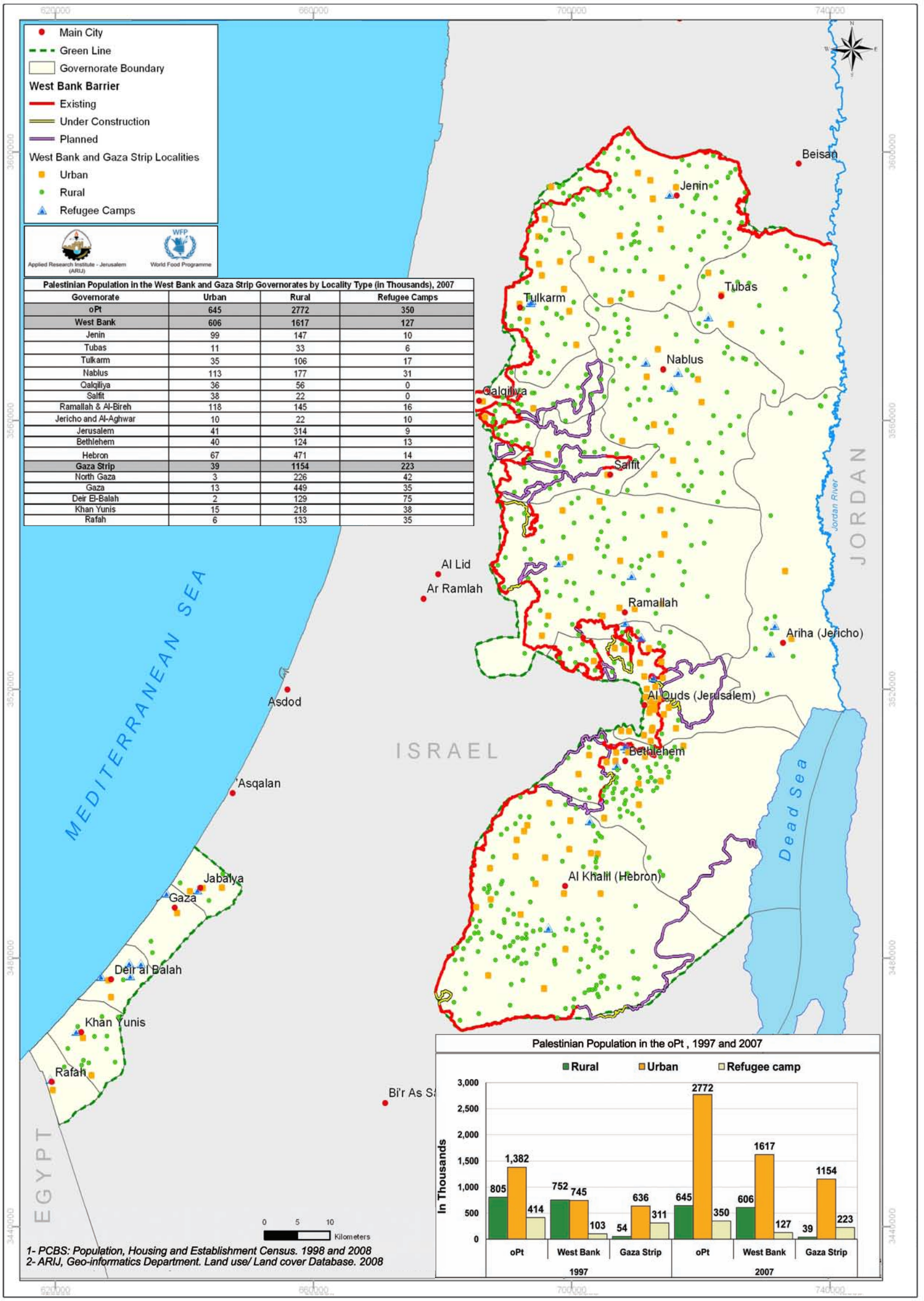
Palestinian Population Density over Built up Area of the West Bank, 2007



Palestinian Population Density over Built up Area of the Gaza Strip, 2007



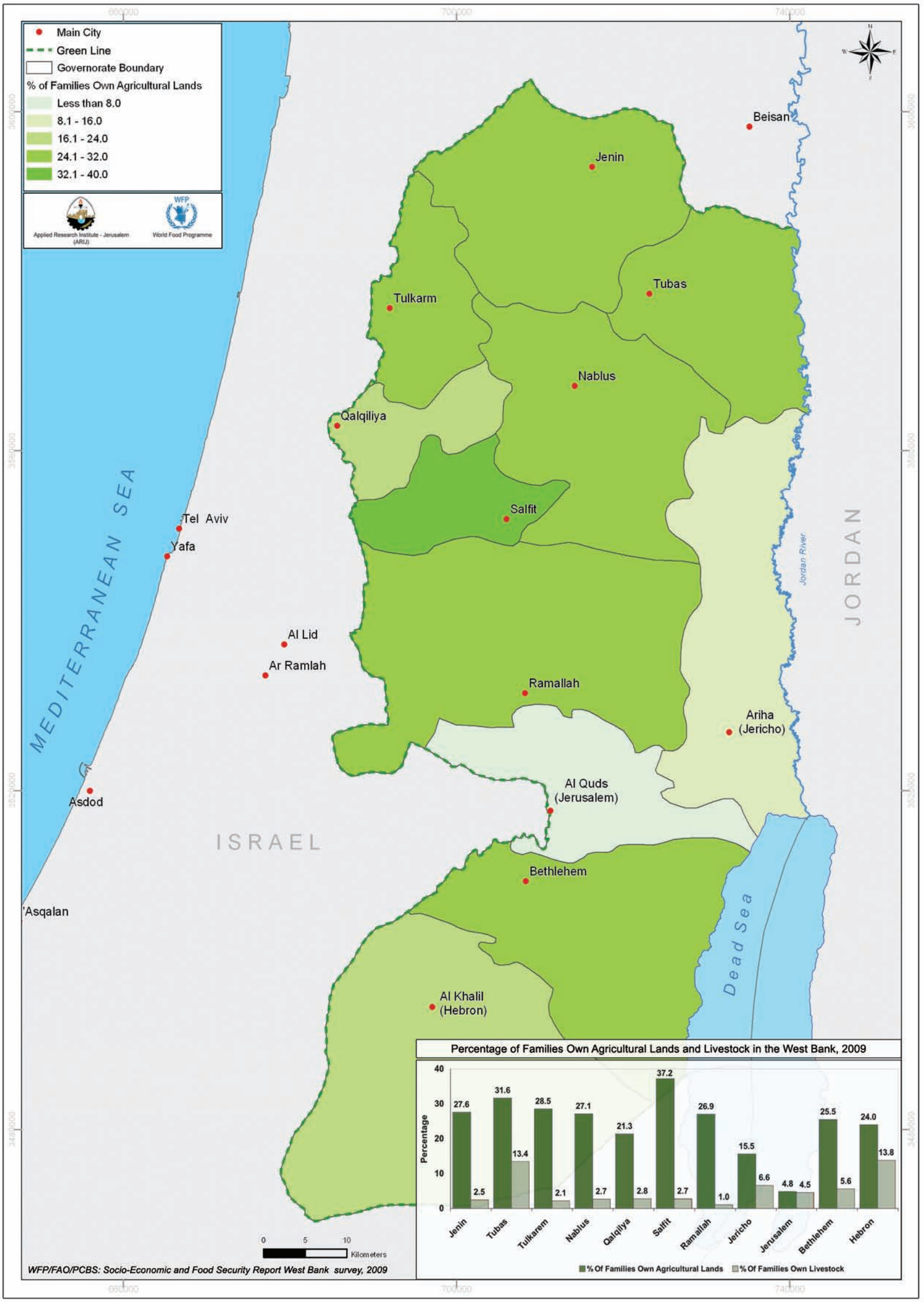
Distribution of Palestinian Localities in the occupied Palestinian territory by Locality Type, 2007



Palestinian Population in the West Bank and Gaza Strip Governorates by Locality Type (in Thousands), 2007			
Governorate	Urban	Rural	Refugee Camps
oPt	**645**	**2772**	**350**
West Bank	**606**	**1617**	**127**
Jenin	99	147	10
Tubas	11	33	6
Tulkarm	35	106	17
Nablus	113	177	31
Qalqiliya	36	56	0
Salfit	38	22	0
Ramallah & Al-Bireh	118	145	16
Jericho and Al-Aghwar	10	22	10
Jerusalem	41	314	9
Bethlehem	40	124	13
Hebron	67	471	14
Gaza Strip	**39**	**1154**	**223**
North Gaza	3	226	42
Gaza	13	449	35
Deir El-Balah	2	129	75
Khan Yunis	15	218	38
Rafah	6	133	35

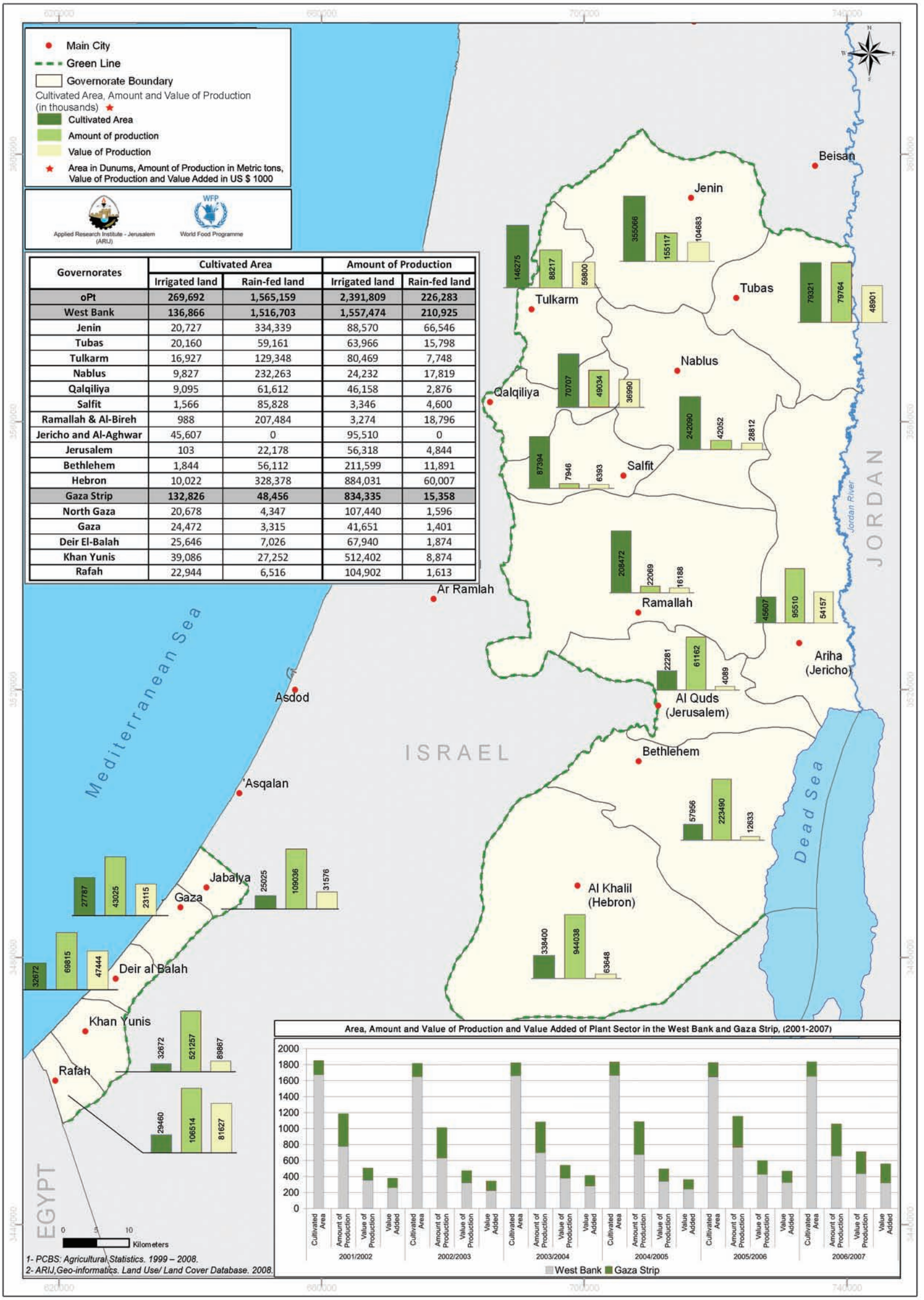
Household Size in the occupied Palestinian territory, 1997/2007

Agricultural Lands Ownership in the West Bank, 2009



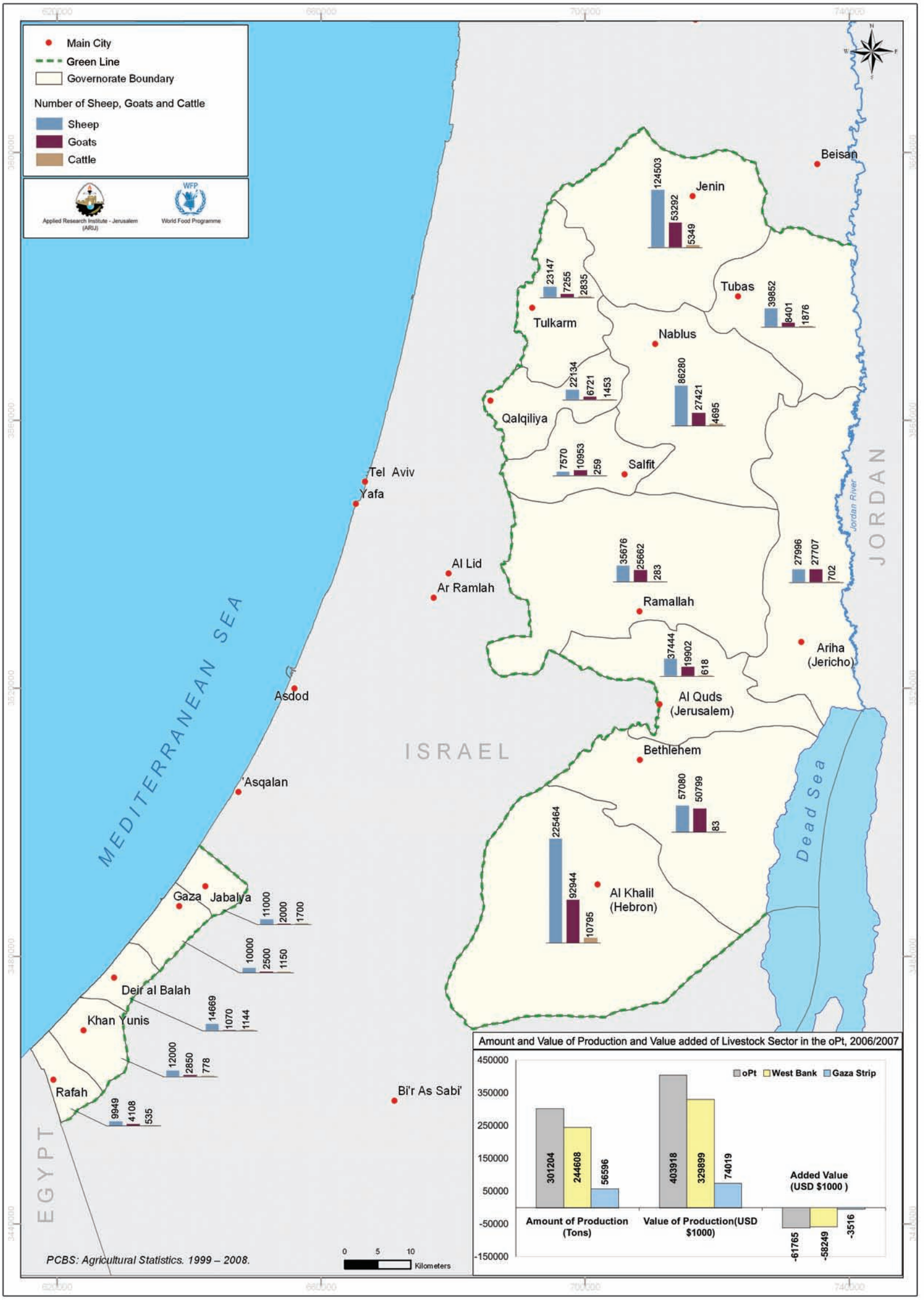
Livestock Holding in the West Bank, 2009

Cultivated Area, Production and Value Added of Plant Sector in the occupied Palestinian territory, 2006 / 2007

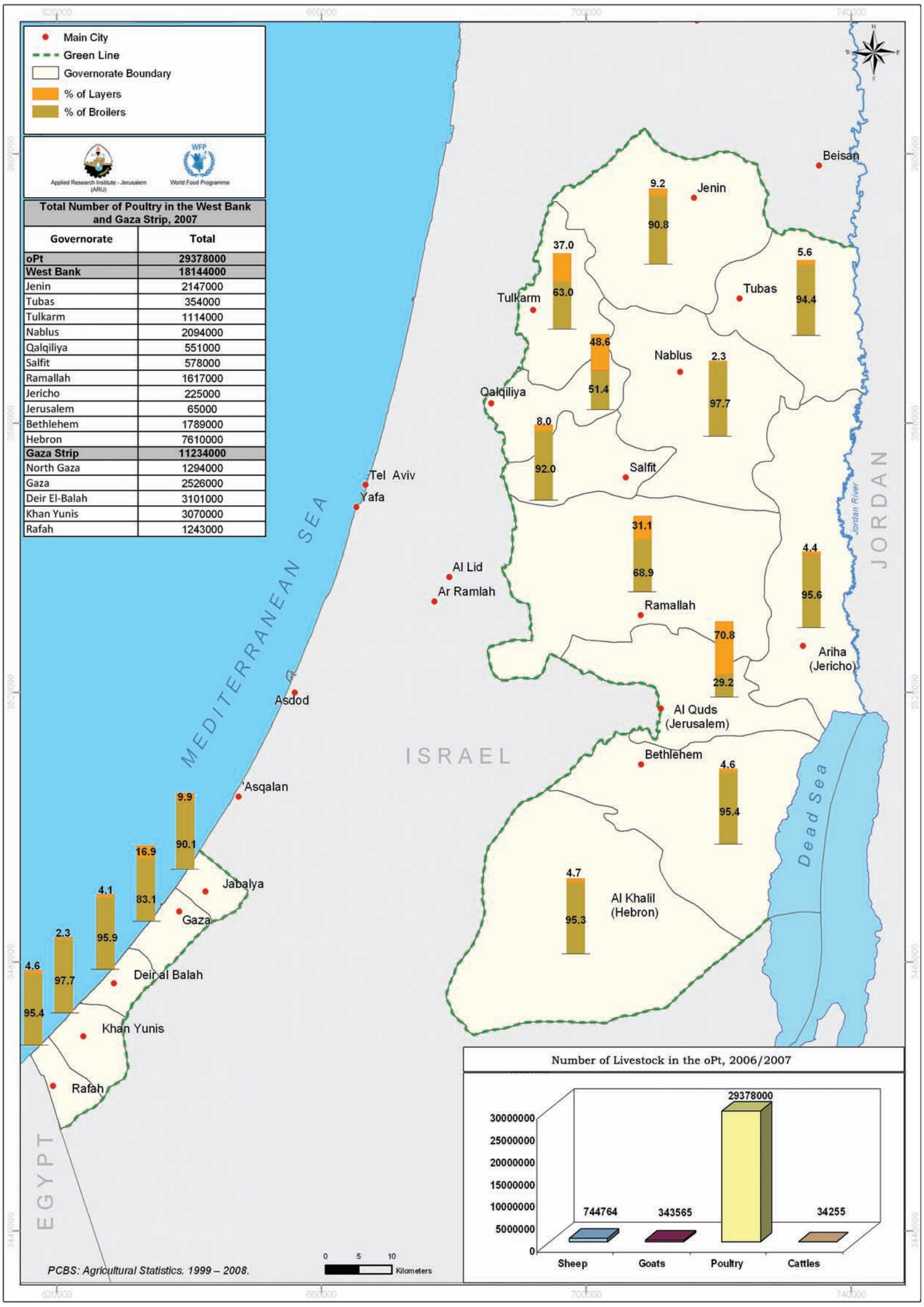


Governorates	Cultivated Area		Amount of Production	
	Irrigated land	Rain-fed land	Irrigated land	Rain-fed land
oPt	**269,692**	**1,565,159**	**2,391,809**	**226,283**
West Bank	**136,866**	**1,516,703**	**1,557,474**	**210,925**
Jenin	20,727	334,339	88,570	66,546
Tubas	20,160	59,161	63,966	15,798
Tulkarm	16,927	129,348	80,469	7,748
Nablus	9,827	232,263	24,232	17,819
Qalqiliya	9,095	61,612	46,158	2,876
Salfit	1,566	85,828	3,346	4,600
Ramallah & Al-Bireh	988	207,484	3,274	18,796
Jericho and Al-Aghwar	45,607	0	95,510	0
Jerusalem	103	22,178	56,318	4,844
Bethlehem	1,844	56,112	211,599	11,891
Hebron	10,022	328,378	884,031	60,007
Gaza Strip	**132,826**	**48,456**	**834,335**	**15,358**
North Gaza	20,678	4,347	107,440	1,596
Gaza	24,472	3,315	41,651	1,401
Deir El-Balah	25,646	7,026	67,940	1,874
Khan Yunis	39,086	27,252	512,402	8,874
Rafah	22,944	6,516	104,902	1,613

Number of Ruminants in the occupied Palestinian territory, 2006/2007



Number of Poultry in the occupied Palestinian territory, 2006 / 2007



Total Number of Poultry in the West Bank and Gaza Strip, 2007

Governorate	Total
oPt	**29378000**
West Bank	**18144000**
Jenin	2147000
Tubas	354000
Tulkarm	1114000
Nablus	2094000
Qalqiliya	551000
Salfit	578000
Ramallah	1617000
Jericho	225000
Jerusalem	65000
Bethlehem	1789000
Hebron	7610000
Gaza Strip	**11234000**
North Gaza	1294000
Gaza	2526000
Deir El-Balah	3101000
Khan Yunis	3070000
Rafah	1243000

Amount, Value of Production and Changes in Olive Trees and Land Area, (1997/1998 - 2006/2007)

Distribution of Olive Trees and Percent of Olive Trees Land Area in the West Bank, 2006/2007