

Nakheel Project Environmental Assessment Report



Prepared as a partial fulfillment of the World Bank/ MIGA Requirements for the Political Risk Insurance Application for the Nakheel Farm in Jericho.

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Preface:

One of the main goals of the Palestinian Environmental strategy is to promote sustainable environmental development and the environmental protection in Palestine, which is in line with the World Bank environmental policies, and is part of PADICO's vision.

For this, the Palestinian Environmental assessment policy was prepared aiming again at providing effective means of integrating environmental factors into planning and decision making process in a manner that promotes sustainable development.

PADICO, and believing in the above goals and vision, has adopted the strategy and the policy as well, and for this has decided to apply the policy measures and recommendations on all developmental projects including Nakheel project in the Jordan Valley area. In doing so, Nakheel aims at being part of the sustainable development process through the implementation of all possible and applicable procedures and guidelines as well as adopting policies based on a vision outlining their future status.

Nakheel is a startup company developed by PADICO Holding along with investors who have committed to injecting a total of 75% of the company's needed equity.

The total amount of capital required for this project is \$13.6m which is divided into 60% in equity (\$8.16m) and 40% in debt (\$5.44m). The equity is will be called over three payments over the first three years.

This project is expected to break even in the seventh year, and is expected to generate a good return after the tenth year. The projected IRR over the first 10 year span of the project is estimated at 29%.

Nakheel currently has one project consisting of two Medjool palm farms in Jericho, but it expects to expand in the future to include other projects and agricultural businesses and product lines.

The date's industry is a promising one, with this project capitalizing on recent developments allowing it to capture the local and a portion of the international market soon after production begins. This includes the new law issued by the Palestinian Authority (PA) that bans all Israeli settlements' products, which currently supply 90% of local market share of dates. Finally, the PA has also recently passed a law calling for the prohibition of all Palestinians living in the West Bank from working in settlements by 2011. Given that most of the farmers in the Israeli settlements are Palestinian; this will adversely affect the Israeli date's market and provide the project access to experienced date farm workers. Additionally, the new movements in the EU that will grant duty-free and quota-free access for Palestinian exports to the EU will also open up international market opportunities for the Nakheel dates farm.

To date, 5,350 new seedlings have been planted in both farms; 3500 in Farm 1 and the rest in the second farm. 2550 Medjool palms have been planted a year and a half ago on an area of 235 dunums in Farm 2. The first farm has begun the preparation of the

land and the establishment of water systems for the first phase of the project with a land size of 620 dunums. Planting should be completed by year four for both farms. To date, the project has incurred a capital expenditure of \$1.2m paid out for the above-mentioned activities, among others.



Farm as of April 2011

Introduction:

This report was completed as a partial fulfillment of the World Bank requirement for MIGA application requirements to precede with the request made by Nakheel insurance process. At the same time, the Initial Environmental assessment (IEA) is a special requirement by the Palestinian Environmental Quality Authority (EQA) and due to the fact that the project is in Area "C" such requirement is not valid, but the Israeli Civil Administration representative visited the site several times and made no comment. This by itself is considered an Israeli no objection on the project.

The report was completed based on literature being collected, field observations, and direct discussions with stakeholders including representatives of the community especially those in or within the areas where the farm is planted.

The report has indicated a number of negative as well as positive impacts associated with the farm project, but all negative impacts can be avoided if the listed mitigation measures are considered.

Policies, Applicable Laws and Regulations:

Given the fact that the farm is within an area classified as "C" Area; it has acquired the required Palestinian Authority approvals at an early stage through the authority declaration and encouragements to utilize this area. With this, no farther Palestinian approvals are required.. The company has also acquired the related Palestinian legal status through the registration with the Ministry of Trade and Economics, the Chamber of trade and commerce, the Civil Defense authorities, Trade and Ministry of Labor. In such a location, the farm is not obliged to get the EQA approval, but to follow the Ministry of Agriculture instructions. (these are regular updates and instructions made by the Ministry on all farming processes and activities covering advices/ instructions on the use of agrochemicals, safety procedures, and so on).

Given the above and as the report is a requirement of the World Bank, then the Bank instructions, procedures and laws are also applicable.

In summary the applicable laws and procedures are as follows:

- 1- The approval of the local council of Jericho through the Ministry of Local Governments for the area as for the land use application.
- 2- Ministry of Agriculture standards, regulations and procedures.
- 3- Ministries of National Economics and Ministry of Labor regulations and procedures. This is due to the fact that farm products shall be marketed locally with the possibility of exporting to other countries.
- 4- In terms of standards, the farm follows the Palestinian Standards Institute approved standards.

Products & Services

The two main products that the company will produce are Medjool dates and Medjool seedlings. As mentioned earlier, there is a potential for including a packing and labeling house that will be responsible for categorizing the dates, packing and labeling them according to the International Medjool dates Standards.

Product Description and History

Dates, in general, are considered the oldest cultivated fruit in the world. The Medjool date, specifically, is considered the king of all dates. Historically, Medjools were once reserved for Moroccan royalty and their guests, as they were a precious confection and to some extent, remain so. Medjool is more expensive than other varieties because the cultivation is more complex and labor intensive. Date palms pollinate naturally by producing a few dates and growers therefore must hand pollinate each tree to ensure adequate yield. Green dates are removed to encourage larger dates to grow and then they are covered to protect them from birds, insects and sun rays. Dates are then hand-picked one at a time as they ripen.

Product Attributes

Medjool dates are graded according to their quality as choice, fancy, large, jumbo and super jumbo. The bigger the date, the higher is the quality classification.

Medjool dates are grown mainly in the Jordan Valley of Palestine, California and Morocco due to the conducive climate conditions in these areas including:

- Hot dry climate
- Dry soil

- Could be watered with saline water
- Requires sufficient land to plant one palm per 8X9 meters apart (approximately 12-14 trees per dunum)

The popularity of the Medjool palms variety of dates has spread widely over the past decade, as has become the preferred variety in the region. Demand for Medjool dates has been increasing over time in both Europe and Asia, specifically.

The highest consumption rates of Medjool dates occur during the peak season of the month of Ramadan and holiday seasons, both in the local Palestinian and international markets. However, the fact that Medjool dates can be stored for up to a year allows the producer to sell the entire supply throughout the year.

Production of (and therefore revenue of) Medjool dates begins in the fourth year and are harvested from late August through early October. Seedlings are produced after five to six years of planting with five successful seedlings produced per palm tree, sold for an average price of \$50USD each (this is \$30 USD higher than the figure used in our financial assumptions).

Production of Medjool Dates:

Each fully matured Medjool palm produces 80-120 Kg of dates in different categories. The International Standards categorizes the dates into 4 categories as shown in Table (2).

Table 1: Dates Categories

Quality	Category
Best Quality	Super Jumbo
Excellent Quality	Jumbo
Good Quality	Large
Average Quality	Medium

Any dates produced that do not fall within the categories above are used in producing dates paste used in making sweets.

After dates are produced and harvested from the palms, they will be transferred to a packing house (outsourcing action, the packing house is not part of the project) (whether it be a part of Nakheel, or a subcontractor) and there the dates will be washed, dried, categorized, packaged and labeled. Then the boxes of packaged dates will be shipped to a refrigerated storage location until they are sold.

Production of Seedlings:

Each fully matured Medjool palm produces approximately 5 successful seedlings, and they could be separated from their mother trees after the fourth year of planting.

Production Schedule:

The project is to be implemented in four phases, whereby in each phase a certain number of palms are planted on a certain number of dunams. Table (3) illustrates the four phases.

It should be emphasized that 2550 palms were planted in the second farm will start producing dates before others since they were already planted 1.5 years ago. The phases are going to be conducted as shown in Table (3).

Table 2: Planting Schedule

TOTAL	Phase IV	Phase III	Phase II	Phase I			
				Total Phase I	Recently Planted	Already Planted	
	Year 4	Year 3	Year 2		Year 1	Year 0	
32500	32500	32500	19250	7550	5,000	2,550	No. of Palm Trees:
2,500	0	1000	900	600			No. of Dunams:
	<i>2016</i>	<i>2016</i>	<i>2015</i>		<i>2014</i>	<i>2013</i>	Production Start Date (Dates):
	<i>2018</i>	<i>2017</i>	<i>2016</i>		<i>2015</i>	<i>2014</i>	Production Start Date (Seedlings):

Production will begin in year four (2013) at approximately 30 kilograms per year per tree and the rate of production will increase gradually. Starting around year eight (the year 2017), production will reach its peak of 70-120 kilograms per tree, which translates into a steady production of 1,400 kilograms per dunam per year from year eight forward (typical lifetime of a Medjool palms is 60-80 years).

Quality Assurance and Control:

As the company is mainly targeting the international markets, the produced dates will comply with the Global Gap standards in order to sell the production in the targeted market, particularly the EU market. In addition, a portion of the produced dates will comply with the known organic production standards which will enable the company to reach new markets and expand its customer's base.

The requirements for obtaining Global Gap certificate has been discussed with an accredited company in Palestine. A work plan should be set by the end of November 2010. The company that will be hired will provide trainings and supervision on applying the standards.

Sourcing:

The main input required for the project is water. To date, Nakheel has secured two wells of water for the first farm and another two for the second one. Both are owned by the land owner and the lease agreement states that the land owner provides water for the farm from these wells and the project pays for the cost of water production. According to the project plan, four more wells will be dug around the first farm by the

land owner, in order to secure the needed quantity of water over the life of the project. Moreover, other water resources will be examined such as treated waste water which represents a good watering source.

The other required inputs are fertilizers, pesticides which shall be applied under the Ministry of Agriculture supervision and instructions, and light agricultural equipments. There are two main Palestinian suppliers and one Israeli supplier for these inputs. The required quantities of each regular kind of fertilizers and pesticides are determined and bought according the stockpile schedule.

Business Operations and Organization:

Farm

Location:



As mentioned earlier, the project is located in Jericho, Palestine in two separate farms that are six kilometers apart. A lease agreement shall be attached to this report. One of these farms is located in the Eastern part of Jericho and the other is located at the Southern entrance of Jericho. One should mention that the farm at the South is located on area C land.

The map in Figure 1 shows the locations of the two farms.

Project Area base line Conditions:

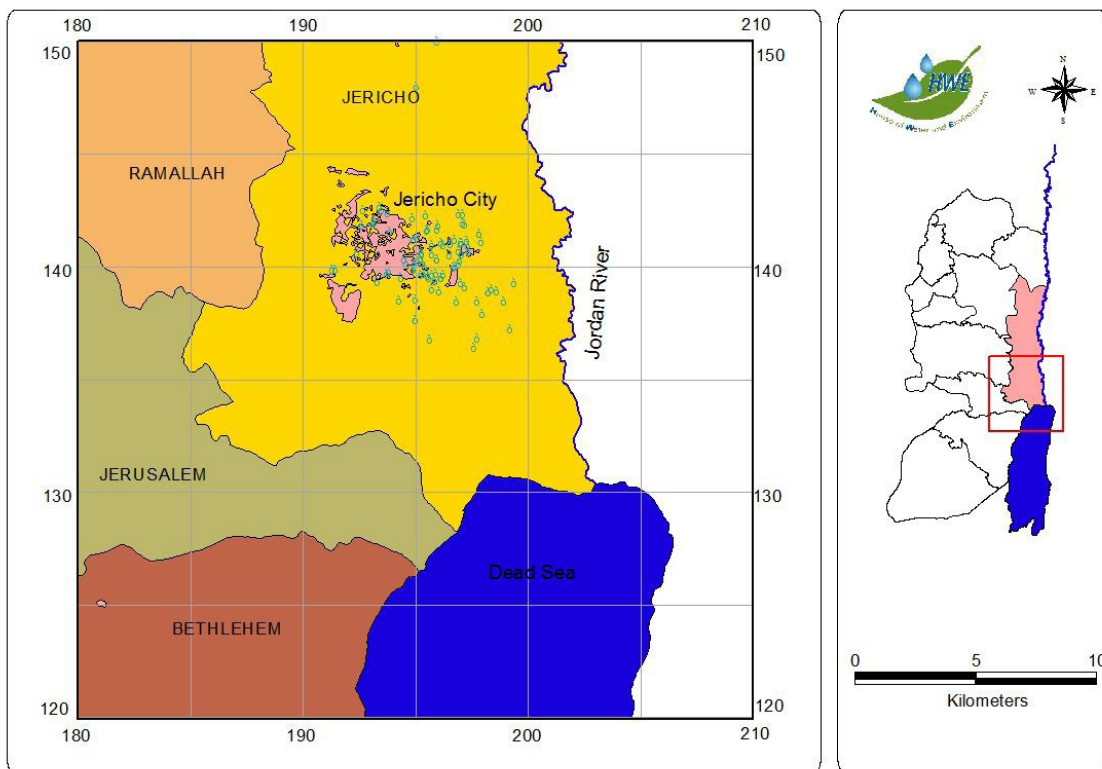
As Jericho is the main city in the farm vicinity, and as the project is within the city boundaries, base line conditions shall be drafted based on those of the city)

Area and Location:

The nearest town to the project is Jericho which is located near the Jordan River. Situated 250 meters below sea level, Jericho is not only the oldest city in the world (dating back to 7000 B.C.) and the oldest continuously occupied settlement in the world, but is also the lowest living town on earth. While it has a desert climate, Jericho is considered an oasis since it is watered by many springs. This characteristic makes it an important agricultural area, especially for fruits and vegetables.

Although the Jordan valley district area is 2400 sq. km which represents 30% of the total area of the West Bank, the city total area is only 66.9sq.km.the city is classified as area A in the Oslo agreement land areas classifications.

The city is a green oasis in the Jordan Valley which lies 7 km west of the River Jordan, 10 Km north of the Dead Sea and 30 Km east of Jerusalem.



Demography and Population:

Compared to other regions in the West Bank, the Jericho region has a relatively low

population density. This is due to the large Israeli designated closed military areas, military bases, nature reserves and the Israeli settlements located there. The present population of the Jericho district is estimated at 43,620 Palestinians, living in the city of Jericho, the four villages (Al-Auja, An-Nuwe'ma, Dyouk Al-Tahta and Dyouk Al-Fouqa) and the two refugee camps (Ein Al-Sultan and Aqbat Jaber) (PCBS, 2006). The growth rate for the West Bank, in general was 3.0% in 2006.

The population of the city of Jericho is 18,346 as shown in the 2007 PCPS records. The population of Jericho is considered young as 58% of the population are in the age group of 0-19 and 24% of the population is in the age group of 20-30.

Employment and income are indicators of the economy and standard of living in any country. For Palestine, all the available figures are general and not specific for one region or district. Approximately 18.5% of the male population in the West Bank is unemployed, while 21.6% females are unemployed. The average net daily wage of employees working in the Palestinian territories is \$17.10 for males and \$16.30 for females (PCBS, 2007).

Climate:

The climate of Jericho is classified as arid which has hot summer and warm winter with very rare frost incidents.

The average temperature in January is 8.5 degrees and the lowest average annual temperature is 17 degrees, with January is the coldest month and August is the warmest month. The average annual temperature is 23.5 degrees and the highest average annual temperature is 30.5 degrees. The average annual amount of rainfall is 150 millimeters, and the average annual humidity is 52%.

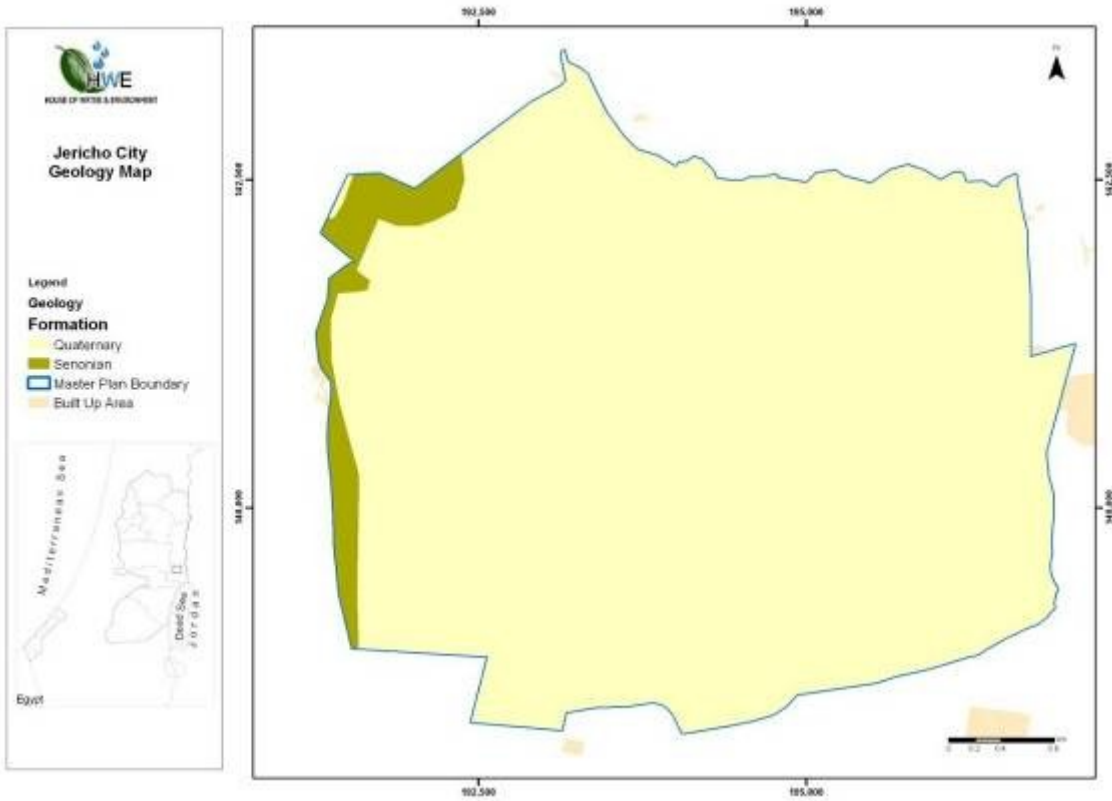
The average daily wind speed in the district is around 3.27m/sec. throughout the year, the daily wind direction changes from a northwestern at night to southern in the early morning.

The amount of rainfall in the Jericho area is less than that of the surrounding mountains and the coastal regions, thus Jericho area relies entirely for drinking and irrigation on subterranean wells and springs such as the Ein Al-Sultan spring. The source of this water is situated in the distant mountains. Ein Al-Sultan spring is considered to be the main source for agriculture. It has an output of 680 cubic meters an hour, and a salinity of 600 fractions in one million. It provides a steady output throughout the year. It is used equally for drinking water and for irrigating.

The solar radiation reaches its peak during July, with the total incoming radiation at the city is the highest in the West Bank which is favorable to agriculture and greenhouse cultivation.

Geology, soil and land use:

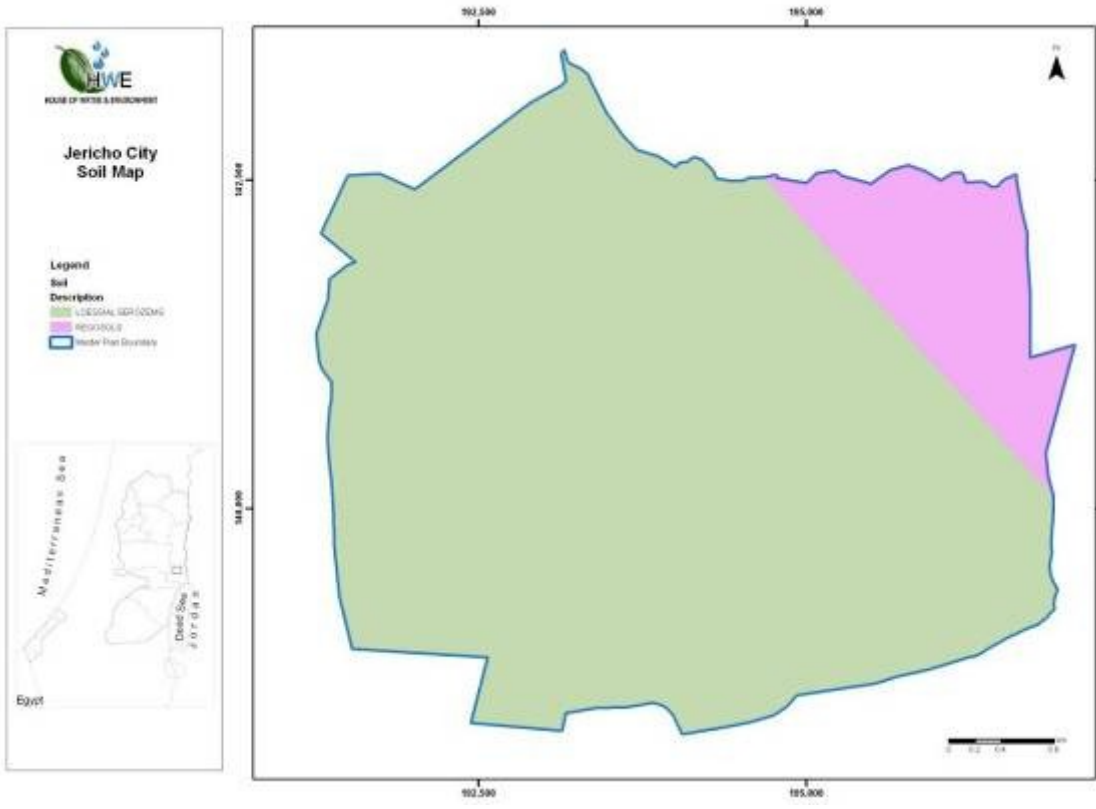
The geology of the city of Jericho is characterized by the Jordan rift valley deposits which are mainly composed of Marl and Pleistocene Alluvial formation. The geology formation of the city is shown in the map below:

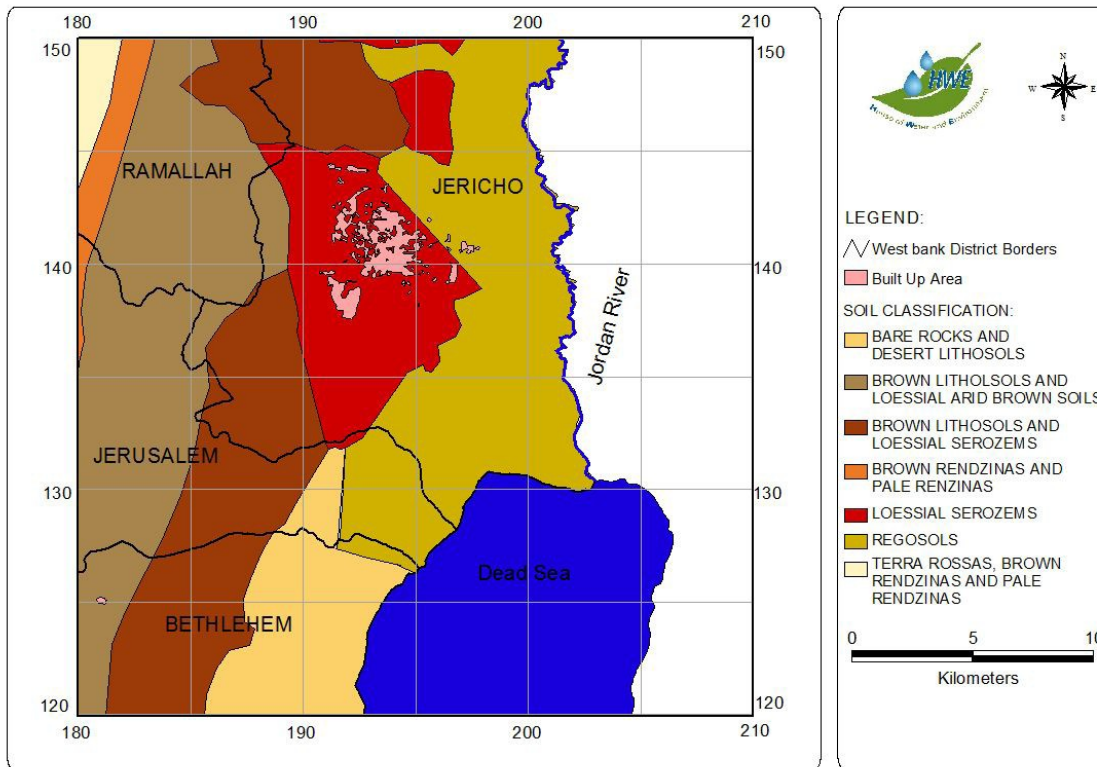


This type of formation is favorable for ground water protection, and the formation is covered structurally by minor faults.

Soil Type:

As shown in the following maps, the Jericho city falls over mainly the Loessial Serozem soil type. A description of this soil types and the others found all over the Jericho district follows.





Brown Lithosols and Loessial Arid Brown Soils

Rock outcrops in such soils range between 50-60%. They are pale brown to yellowish brown or brown, loamy and calcareous. Brown lithosols are found in the pockets among the rocks. Loessial arid brown soils are found on flat hilltops, plateaus and foot-slopes.

The parent rocks of this soil association are chalk, marl, limestone and conglomerates. The deeper layers consist of either brown clay or yellowish brown loam. Field crops are planted in areas where the top soil is deep enough and sloping is moderate. However, in shallow and steep areas, grazing is the common activity. Major vegetation types are *Ballotetlia undulatae* and *Aretemisietaea herbae-albae*.

Brown Lithosols and Loessial Serozems

Lithosols are typical of the steep hill slopes. Brown lithosols are found also on small plateaus. Inclusions of loessial Serozems are found in broad valleys, terraces, and on large plateaus. The soils are originally formed from limestone, chalk, dolomite and flint.

The structure of this horizon is subangular blocky or prismatic, with many lime nodules.

The transition to the rocks is mostly sharp. Many rock outcrops are found, usually at the surface; the soil is restricted to the pockets among these rocks. Major vegetation types found in these regions are *Anavasetea articulatae* and *Zygophyllum*. Such soils suffer from extensive erosions due to runoff, especially in steep slopes. The soil association is also suffering from salt accumulation due to limited salt leaching capabilities. The current land use is restricted to winter crops that are grown by Bedouins in some wadis.

Regosols

This soil is found as bad-lands along the terrace escarpments in the Jordan Valley. The soils are quite variable in texture and color. The soil parent materials are sand, clay and loess. The dominant vegetation types found in this region are *Anabasis articulata*, *Salsola vermiculata* and *Salsola tetrandra*. The area is used for grazing.

Loessial Arid Brown Soil

This soil is formed originally from conglomerate and/or chalk and mainly found on gently sloping plateaus as well as dissected plateaus with locally hilly topography. Major vegetation type found in this region is *Achilleetum santolinae*. The main current land use consists of various field crops and some horticultural crops planted as irrigated crops. Wheat, barely and sorghums are also grown as dry-farming crops.

Regi-soils and Coarse Desert Alluvium It is found in plains and dissected low plateaus and characterized by large valleys and alluvial fans. Its parent materials are of mainly unconsolidated mixed stone and deposits. At greater depths there are stones and weathered rocks. Gypsum crystals or petrogypsic horizons are found in the deeper soil layer. The vegetation is restricted in few areas to rivulets. In most areas, dwarf shrubs such as *anabasis articulata* and *Reaumuria* are dominant. The area is of almost no agricultural value with the native vegetation able to supply only very poor grazing for camels, goats and sheep.

Calcareous serozems

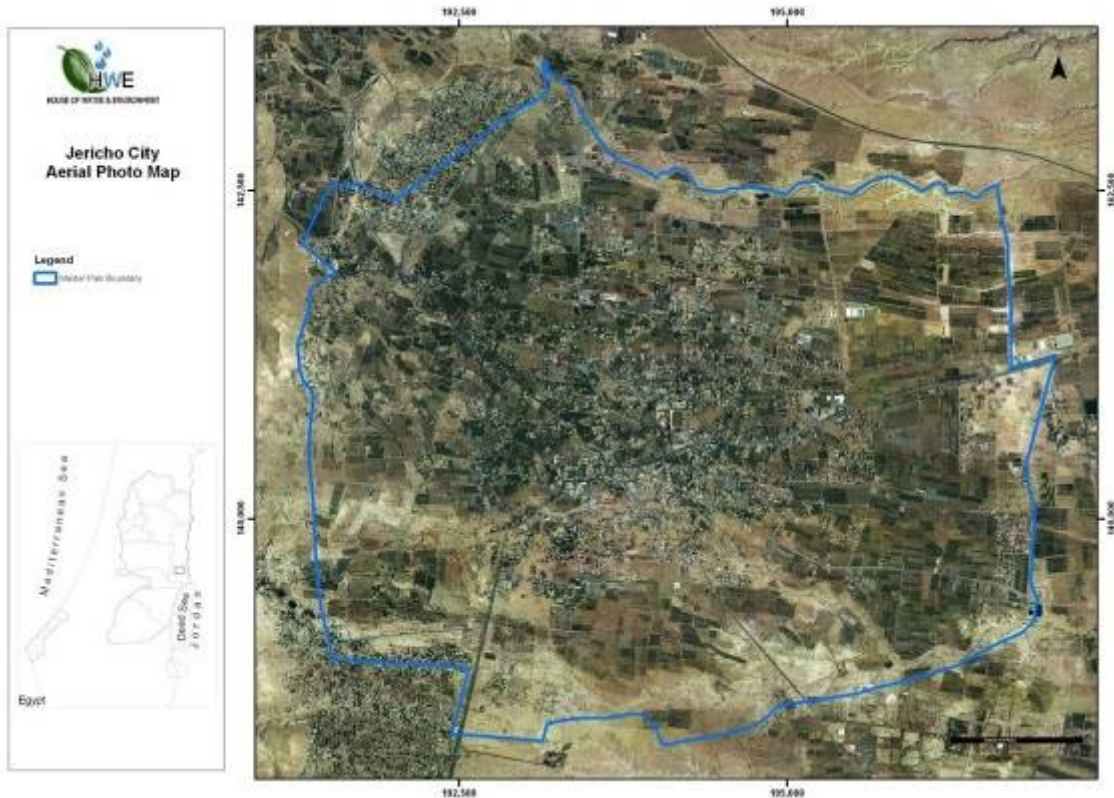
It is formed mainly as a result of flooding of the Jordan River. It is originally formed from limestone, chalk, and marl. These are deep, highly calcareous grayish brown, medium to fine textured soils. They are often gypseous or even saline at depth. The aridity restricts plant growth resulting in low soil organic matter content in the soil (0.5- 1.5%). The soil may be of almost any texture. Leaching is slight, basic cation saturation is about 100 %, and primary minerals make up most of the soils forming parent rock.

Some soils have lime cemented hardpans that restrict root penetration. Many of these soils are among the most productive soils when they are irrigated and fertilized. The soil's low humus contents make addition of nitrogen essential. In contrast, a lack of leaching allows potassium accumulation. Potassium deficiency is rare, being found only in sandy soils and few shallow soils or in soils developed from low potassium parent material. The lack of leaching does result in soil pH values of about 7-8.5. Deficiencies of zinc and iron, and to a lesser extent manganese and copper, are common. Irrigation is essential. If the soils are not already salty, irrigation water may add enough to develop salty soils. The vegetation is restricted to *Salsoletum villase*. The current land use is restricted to winter grazing.

Topography:

The topography of the area of Jericho shows continuous decrease in elevation from about -150m below sea level in the East to almost -300m below sea level in the West. And thus, most of Nakheel farm project is d is within an elevation of 100-300 meters below sea level.

Still, no deep wadies or hills are within the project area, and thus an aerial photo of the area shows almost a flat city and surrounding including the farm area as shown below:



Land use:

Although the city has prepared a city master plan in 2004 as shown below, still, the control of illegal buildings constructions and the city ability to take action is limited. With this, even if new farms were planted, demand for houses does not stop at the farms boundaries but might go deep within agricultural land.

An indicator of the expansion of houses constructions over the past few years is shown as this: (as within the municipality records)

Year	Total Area of constructions
2002	17012
2003	23837
2004	23032
2005	61720
2006	22601

As noticed, the year 2005 has witnessed a sharp increase in the constructions industry, this is the year where JICA has implemented a number of important projects in the city.

Another indicator of mis-use of the city land is the construction within agricultural areas as shown below:



Infrastructure: water and waste water systems:

Water Resources:

There are several aquifer systems in the Jericho region, mainly:

- 1- Lower Cenomanian Aquifer System
- 2- Upper Cenomanian-Turonian Aquifer System
- 3- Tertiary Aquifer System
- 4- Quaternary Aquifer System

The *Lower Cenomanian Aquifer System* is composed of the Lower Beit Kahil, Upper Beit Kahil and the Yatta geological formations. The Lower Beit Kahil Formation and Upper Beit Kahil Formation and sometimes the lower part of the Yatta Formation comprise the Lower Aquifer, which is deeply confined across most of the West Bank. It is an excellent regional source of drinking water, the high water bearing capacity and productivity reflects the thickness of dolomitic limestone and limestone. Water quality is generally good, though slightly salinity has been encountered towards the Jordan Valley. *The Upper Aquifer* consists of the Turonian (Jerusalem Formation), Upper Cenomanian (Bethlehem and Hebron formations). Turonian (Jerusalem) aquifer formation consists of massive limestone (sometimes thinly bedded limestone), and dolomitic limestone with well developed karst features. It is part of the Upper Aquifer, but it is isolated from the main part of the Upper Aquifer in the south and parts of the eastern West Bank wherever the underlying Bethlehem Formation becomes a weakly permeable aquitard. It forms a good aquifer especially where the saturation thickness is in tens of meters. Water quality is generally good but in some areas there is evidence of deterioration because of pollution by sewage and agrochemicals.

The Upper Cenomanian aquifer consists of the Bethlehem and Hebron Formations which are mainly interbedded dolomite and chalky limestone. In the southern and

eastern part of the West Bank, the Bethlehem Formation is considered an aquitard, while to the north and west it has aquiferous characteristics. The Lower Part of Yatta formation represents a fair aquifer. The Lower Yatta Formation hydraulically separates the two regional aquifers (Upper and Lower Aquifers) across most of the West Bank, although to the north, the presence of Yatta limestone gives rise to minor springs and seepage. Water levels (heads) in the Upper Aquifer are generally higher than in the Lower Aquifer.

The *Tertiary Aquifer System* is composed of the Beida Formation (Neogene Aquifer). It is composed of conglomerate lenses, limestone, marl and clay with Lower Tertiary age. The Beida Formation is easily recognized by its soft rounded features, light colors and encrusted surface. The lenses of conglomerates and the margins of the formation have good aquiferous characteristics.

The *Quaternary Aquifer System* is composed of three formations: Lisan, Alluvial and Gravel fans. The Lisan Formation (Pleistocene Aquifer), a marl, gypsum and silt unit, is an aquiclude. The Alluvial and gravel fans (Holocene) are distributed in the Jordan Valley. These Alluvial fans are still accumulating after large floods and consist of debris from neighboring lithologies. The alluvium is mainly formed of laminated marls with occasional sands. Gravel fans are widely distributed in the Jordan Valley and have the capability of transferring groundwater from the limestone aquifers. The Palestinian wells in the Jericho region tap the Upper Cenomanian-Turonian aquifer system and the Neogene and Pleistocene shallow aquifer systems.

Given the above, the company aims at having its own water sources through digging for two to three artesian wells in the farm area.

Wastewater Systems:

Similar to other districts in the West Bank, the responsibility of wastewater management in the Jericho district is either through the municipalities, villages, village councils or UNRWA in the refugee camps.

Wastewater collection networks are totally lacking in the Jericho district. Cesspits are the commonly used method of wastewater disposal. Cesspits serve either a single house or sometimes a cluster of houses. The soil in the Jericho district is sandy, high in salinity, and low in clay and organic matter. Therefore, cesspits in Jericho are usually built with all their sides (except bottom) lined with concrete to prevent them from collapsing.

As the Jericho municipality lacks vacuum tankers, wastewater from filled cesspits is evacuated by private vacuum tankers. The wastewater is then disposed of into vacant lots without consideration of its impact on soil or groundwater. Some of the common sewage disposal areas are located to the east of Jericho city and to the south of El-Auja village. Due to the lack of collection networks in the Jericho district, little work has been done to analyze the raw wastewater. In general, the wastewater in the West Bank is high in biochemical oxygen demand (BOD), ranging 600-900 mg/l owing to

the low domestic water consumption. The high per capita consumption in the Jericho district is due to the usage of water for irrigation purposes.

The value of the above is that once the farm is fenced, no disposal of cess-pits contents shall be seen in the area.

All collected green waste farm shall be taken by the Palestinian Waste Recycling Company to the compost plant. The understanding was made between both, no agreements were signed yet. Other non compostable waste shall be kept in a municipal container to be collected with other municipal waste by the local authority. No liquid waste is expected in the farm.

Screening:

Based on project details, the following screening process was made:

Activities, screening results, and recommended determinations:

Proposed activities	Screening result			Recommended Determinations		
	Very Low Risk	Moderate Risk	High Risk	No significant adverse impact	With specified mitigation, no significant adverse impact,	Significant Adverse impact
1. Planning & Design: including determination of irrigation water sources, seedlings sources and kind, and farm location and boundaries	X			X		
2. Site preparation: fencing, blowing, leveling,		X			X	
3. plantation: wholes digging, import of seedlings, irrigation,		X			X	
4. Operation: grass trimmings, application of agrochemicals, irrigation, and trees trimmings		X			X	
5. fruits picking and marketing/ processing		X			X	
6. Other related activities including digging for wells and irrigation network and piping system.		X			X	
7. access road opening and asphaltting		X			X	

Public Consultations:

As no residential area is adjacent to the farm, the only concerned people are the farmers, and since most are within palm farms, so to them adding one more farm is only a new company and new discussions and exchange of ideas. A number of farmers were consulted by the consultant who prepared this documents and felt that all were welcoming having another farm in the area.

To some, having anew farm means additional protection from settlers expansion in the area and an additional security to their own farms.

Assessment of significant, potential impacts and their mitigation measures:

Impacts boundaries:

With plantation/ farming programs, impacts may extend not only to the localized sites but can extend to other areas connected to the whole agricultural industry. This may include all process related to palm trees industry and the other related plantation process. With this all society sectors can be directly or indirectly positively affected. With the proposed mitigation measures, negative impacts (if any) can be minimized.

Expected significant Environmental Impacts:

After a detailed inspection, analysis and evaluation of the farm related activities including site preparation, plantation, grass trimmings, applications of fertilizers and other agrochemicals, and as was indicated in the screening process, a number of potential impacts were outlined, and it should be noted that these impacts can be avoided or minimized through careful attention in the initial planning and design stage. Farther impacts minimization can be achieved if a proper farming plan was put into action. (see details later on this report)

Specifications, standards and approved procedures can and should be incorporated in farm operations. Appropriate training is to be provided in mitigation during plantation/, and farm operations. Some of the most significant impacts may include:

Waste disposal: plantation causes the accumulation of large quantities of waste. Unless proper storage and then re use or authorized disposal sites are identified, this can be a significant environmental problem. Such waste can block roads, cause fire especially in hot seasons, and can be a breeding site for rodents and other animals.

Soil Erosion: looking at the farm map proposed by the company, it is clear that adverse soil erosion impacts might occur by failing to keep water within farm area or channeled smoothly away from loose soil. This is the case in farm with some slopes. Although the project area has no mountainous, or hilly areas, but there is a different in elevation between East and West. In such a situation, and given that soil shall be loose due to agricultural activities, area extending from east to West might have an erosion problem.

Impacts Evaluation:

Importance, value and level of above impacts are listed below with a classification in accordance to levels (low, medium and high) based on our experience as well as based on the evaluation of mitigation measures been suggested.

Project environmental elements	impacts	Impact level at site preparation stage	Impact level at plantation stage	Impact level at operation stage	Mitigation measures taken	Importance evaluation
Air quality	dust	medium	low	low	adequate	limited
Surface water quality	pollution	medium	low	low	adequate	limited
Ground water quality	pollution	low	low	low	adequate	limited
Public health	inconvenience	medium	medium	low	adequate	limited
infrastructure	interruption	low	medium	low	adequate	limited
transportation	interruption	medium	high	low	adequate	limited
General scenery	disruption	medium	medium	low	adequate	limited
Workers safety	injuries	medium	medium	low	adequate	limited
Public safety	injuries	low	medium	low	adequate	limited
Waste management	pollution	medium	medium	low	adequate	limited
Communicable diseases	Disease transmission	medium	low	low	adequate	limited
Noise and dust	pollution	medium	Medium/high	low	adequate	limited
Soil erosion	erosion	medium	medium	low	adequate	limited
Wild life	disturbance	medium	low	low	adequate	limited

With the above, measures being taken are adequate and no farther action shall be required other than those outlined in the mitigation and monitoring plans.

Farming Activities and Operations:

The most significant adverse environmental effects with farm activities are associated with poor farming operations. This covers poor attention to protective clothing during agrochemicals usage, usage or maintenance of related equipment, poor training on occupational health and safety measures and poor attention to visitors routing within the farm.

some soil was brought to the site from within Jericho area, soil tests including PH, EC, CO₃, HCO₃, Na, Cl, K, Ca+Mg were carried out by the Ministry of Agriculture laboratory and were results were approved by the Ministry as acceptable. proper attention is to be made to the source, and if trees are being imported, again health and safety licenses are to be shown.

Environmental Mitigation and Monitoring Plan:

The following is a comprehensive list of possible impacts associated with each activity during planning, site preparation, and plantation, applications of chemicals and fertilizers, grass trimmings and fruits collection at a later stage. Each impact is associated with a mitigation measure. As a new company may not have specialized farm operations teams, still, they are required to a sign a person who monitor the

implementation of the mitigation plan and supervise the implementation of the monitoring plan and keeps records of achievements.

Kindly note that the listed possible impacts are a general list of similar activities and instructions were made on the Mitigation column to be carried out if any of the listed impacts was applicable.

Activity	Possible Impact	Mitigation
Farm preparation stage	Damage valuable ecosystems or habitats	Use local approved standards, procedures and coordinate closely with related authorities; i.e EQA and municipality
	Cultural changes	Discuss work activities and future social and economic impacts with local people
	Soil erosion	Take into account local weather, include physical barriers if needed
	Degradation of water quality	Study water resources sensitiveness issue if required by the Water authority
plantation	As in above	
	Contribute to deforestation	Avoid unnecessary cutting of trees (no trees were found on site except one and it was kept)
Other farm works including agrochemicals applications, grass trimmings and irrigation	Soil erosion	Always contain irrigation water around the tree, Install sufficient cross-drains in areas, with clear slope,
Construction/ if other infrastructure is required; shelters, toilets, and stores	Damage local habits	Explore off-site accumulation, look for local workers, ensure close supervision of crew behavior
Use of heavy equipment if needed	Might cause erosion, Compaction of nearby land can affect future land use for other agricultural purposes, machinery repair can cause soil and water pollution, can put workers at risk, generate excessive noise,	Minimize use of heavy machinery, set protocols for machinery maintenance, make sure that used oil is dealt with in proper procedures. Prevent fuel tanks from leakage; ensure workers follow proper health and safety procedures.as outlined by the Ministry of agriculture.
Material storage (Including agrochemicals, fuel, compost)	Can deteriorate water quality, damage ecosystem, generate dust, smell, and can be a breeding site for	A storage plan is required, separate between agrochemicals and other material, store for a limited period only. Cover stored

	unwanted farm animals.	compost and other material that might cause dust gravel with plastic sheets, avoid using sensitive areas for storage of fuel and chemicals. at this stage, no storage shall be made
Farm cleaning including grass trimming or removal	Can produce areas with bare soil which cause erosion, dust, and accumulation can cause access blockage or lead to fire in summer season. Can also hinder vehicles and farm equipment movement.	Minimize disturbance to native flora if possible around the farm unless harmful, collect grass and trees trimmings in a safe place, or send to a compost plant if available. avoid use of herbicides, and, avoid working in windy conditions. (the site was completely clear no plants were found except for one tree)
Surface Compaction due to heavy machinery movement	Might deplete fresh water resources or systems including water canals	Make sure that machinery works only on assigned areas
Wild life safety, due to agrochemicals applications	Wild life crossing farm can be affected	Fence wherever is necessary. Wild life is not affected as there is no complete closure of the site
Drainage on loose soil	Cause soil erosion	Install drainage systems if necessary, make sure that no stagnant water remains within the farm.
Fruits collection	Can cause occupational health hazards including falling of workers from trees	Only skilled workers should collect fruits from high trees
Access road opening and asphaltting	Can cause dust, occupational health, wild life migration, flora and fauna deterioration	Select the rout carefully, compact only required areas, be conservative with waste generation, and re use local material as much as possible.

Environmental Management and Monitoring Plans:

This covers the company preparedness to meet safety procedures, supervision and environmental protection measures at each future stage. This covers administrative, financial and technical procedures, taking into consideration applied laws and procedures, coordination requirements among related stakeholders as well as company and World Bank procedures.

Environmental management and planning System:

As farm operations directly affects daily life of all related workers and staff, and is the key element in the farm life, the company is committed to look into a number of related areas including:

- Improving related staff capacities in the field of management, supervision and daily operations.
- Making sure that coordination system with other related stakeholders is in place, this includes EQA, MOH, MOA, and related health services providers facilities.
- Assigning a farm operation and occupational health supervision staff member

Monitoring and supervision system:

In this area, the company and in addition to the above shall be committed to:

Daily and weekly inspection of farm conditions,
Seasonal cleaning of unwanted grass, water system, drainage and water canals
A reporting system of farm conditions including waste handling, storage conditions, water quantities being used for irrigation, and other maintenance works being completed
A trained team who shall be in charge of farm operations

Emergency preparedness and response System:

As farming system in Palestine in general and in Jericho in particular being the key economic sector, and given the socio economic situation in the area, the whole sector is subject to emergencies including those related to security emergencies, closures, diseases, water shortages, and weather related emergencies, the company is committed to put in place an emergency response plan. (no arms shall be obtained, not allowed by the Isreali authority in this area)

This plan shall include scenarios of possible emergencies, tendency possibilities and expected measures and actions required with a budget line for such preparedness actions.

The emergency response plan shall also includes tasks and responsibilities with names attached to each task, with a command tree attached to a security tree. This plan shall also include all related stakeholders to each emergency. This might include, but not limited to, machinery owners and operators, MOA, MOH and services providers including water, electricity and waste collection systems, communications, health services and farming associations.

Occupational Health System:

Safety is the utmost important element in the whole company and farm operations, for this farmers, supervisors and workers health and occupational healthy safety and insurance is taken seriously by the company.

At the same time, the company is assigning a safety and occupational health officer who shall be in charge of all related issue, including actions to be taken, reporting, and if needed future planning.

Project Impacts on the Society:

Although the project might have some negative environmental impacts, still, a number of positive impacts are also expected as a direct or indirect outcome of the farm operations. Those impacts shall directly affect the residents of Jericho, and other localities including:

Positive Impacts:

The positive expected impacts covers those social, economic and environmental sectors and outlined as follows:

Positive Social Impacts:

Although Jericho has along history with Palm trees agriculture, still, recently, this business was associated with settlement; Jericho shall be known from now on and again as the city of Palm Trees.

Positive Economic Impacts:

A number of workers from Jericho and surrounding communities shall be involved in the farm operations all year long, another number shall be involved in the related industry and marketing business. Still, the opportunity for farmers to be trained and get the know how of palm trees farming is encouraging and similar smaller farms may be initiated based on this knowledge.

Environmental Positive Impacts:

- Increasing the number of trees in Jericho area has its own effect on the weather
- Land use in agriculture minimizes dust in the area,