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Programme of Assistance to the Palestinian People

PROJECT DOCUMENT

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Duration: 12 Months

Project site: West Bank

ACC/UNDP sector & subsector: 0400 Natural Resources
0410 Water Resources Planning & Development

Local Implementing Institution: Municipality of Jericho
Municipality of Hebron

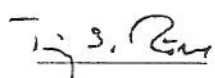
Executing Agency: United Nations Development Programme (UNDP)

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This project aims at making sufficient and good quality water available to the Palestinian inhabitants of the cities of Jericho and Hebron and at enhancing the two municipalities capacity to manage their water resources effectively. The project involves the full upgrading of the Water Supply and Distribution System of Jericho city incorporating the rehabilitation of the main water source in the city, the replacement of distribution networks and refurbishment of the storage reservoirs. Additionally, it involves the installation of a tele-control system in order to facilitate the maintenance and operation of the water supply system of Hebron city. By accomplishing the above, the project will lead to the regulation of water supply in the two areas, the reduction of leakage and water loss, and consequently conserving this scarce resource for full utilization by the local community. It also aims at enhancing the human resources capacity for efficient water supply management as well as increasing community awareness of the need and methods of water conservation and protection. Through these activities, it is expected that short-term and long-term employment will be created.

On behalf of	Signature	Date	Name/Title
United Nations Development Programme		16 Oct. 1998	Mr. Timothy S. Rothermel Special Representative

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A. CONTEXT

Water, in the semi-arid and arid Eastern Mediterranean region, is a very precious resource. There has always been competition to control the water sources. Since the 1967 Israeli occupation of the West Bank and Gaza Strip, Palestinian control over and access to water has been severely limited. Supply management, particularly in urban areas, has been handled by various Palestinian bodies. As a result of the new political arrangements, Palestinians assumed wider responsibility for the management of the water resource in the autonomous areas. The Oslo II agreement between the Palestinian Authority and the Israeli Government covered the transfer of additional authorities to the Palestinians and extended the self rule areas to other parts of the West Bank. As far as water issues are concerned the Agreement covers increasing the allocated quantity of water to the Palestinians during the Interim Period. Partly, through allowing for the development of new sources (a certain number of wells were allowed to be bored for the areas of Jenin and Hebron) as well as increasing the quantity supplied by the Israeli Water Company (Mekorot). The ultimate settlement on water issues will be dealt with at the final stages of the negotiations.

Hence, the Palestinians are presently collecting information, which has heretofore been available only to the Israeli government and water authority, about the quantity and quality of available water. Furthermore, the Palestinians are studying management options and strategies in the aim of implementing those that offer the best results for the area. Effective institutional structures and efficient water distribution infrastructure are being developed. In April 1995, the Palestinian Water Authority has been established and now is in the process of building its structure. The Authority will be the regulator and the policy formulator for water resources management in the Palestinian Territories. Further, the Palestinians are seeking international support and assistance for the realization of the terms of the Article 40 (on water) of the Oslo II Agreement. (Annex I)

The West Bank

The Jordan River basin and the mountain aquifers constitute the water resources of the West Bank. The fact that these resources are shared internationally between the Palestinian Territories, Israel, Syria and Jordan is a critical issue and the Israeli authorities have been careful to keep a firm grip on resource management. Discharged through wells and springs, the mountain aquifers, with an estimated capacity of 700 million cubic meters a year, supply most of the water consumed in the West Bank. However, Israel is the major consumer of this resource. Of an estimated 600 million cu.m/year which is pumped or discharged from the aquifer, Palestinian domestic and agricultural usage consumes approximately 130 million cu.m/year. This demand level is kept artificially low by the Israeli authorities who limit water supplies and the exploitation of new sources (An additional 28.6 million cu.m are being made available under the terms of the Article 40 of the Agreement). It is surmised that the aquifers are recharged through rain water at approximately 640 million cu.m/year.

Supply and demand management is parceled out between the Palestinian municipal water departments, water undertakings, and the Water Department of the West Bank, which is presently in the transfer process from the Israeli Civil Administration to the Palestinian Authority. These bodies are responsible for meeting consumer water demand in their respective jurisdictions, and operating, maintaining and upgrading water supply infrastructure. No regional and national water utilities responsible for service delivery have been established recently. This could possibly change in the very near future as studies regarding institutional structures for water management get finalized.

The various bodies currently responsible for meeting consumer water demand are faced with increasing difficulties. While availability of the resource has remained static and even declined with failing infrastructure, the demand has increased. Many areas can be provided with only an intermittent water supply because of restrictions imposed by the Israeli authorities on measures that would increase the availability of water to the Palestinian population. Digging new wells to tap water in the aquifer has been completely restricted and even presently, require the approval of the Palestinian-Israeli Joint Water Committee (JWC). Existing wells are ever less efficient and require deepening. The deteriorated condition of the water distribution networks cannot be extended to new residential areas because of a lack of capital and supply shortage. The Palestinian population is increasing rapidly and there is a corresponding increase in demand for resource such as water.

The results of this situation are affecting also the rural areas, where the Palestinian inhabitants, representing 70 percent of the total West Bank population, are distributed over 430 villages. Many of these villages have been totally neglected by the Israeli authorities and lack the very basic services of water supply, electricity, schools ... etc. Such a situation has very negative implications on the standards of living of the rural areas population.

UNDP and other donors have assisted the Palestinian water institutions in this field. However, it is clear that more assistance is needed to increase the Palestinian capacity to utilize existing water sources more efficiently and to facilitate access to new sources. Sufficient water resources are available in the area to meet the real demand of the population and adjustments must be made in order for this to happen.

B. PROJECT JUSTIFICATION

I. The Present Situation

Almost all urban and 70% of rural areas are served with piped drinking water. The supply in urban areas is managed primarily by municipalities who get water from their own wells or springs. In some cases, supply is complemented by bulk purchases from Mekorot, the Israeli water company. Services can be generally characterized as deficient and demand is inadequately met, particularly during the summer months. Wells require upgrading, supply networks are deteriorated, and water treatment is inadequate. More than 50% of water is unaccounted for due to extensive leakage and inaccurate metering. The intermittent nature of supply and low pressure in pipes cause back flow into the system and consequent contamination.

In the case of Hebron City, water supply is managed by the Municipality's Water Dept. which tries with understandable difficulties to satisfy the demand as well as possible by rationing water supply to the different city sections for a limited number of hours. As regards the pipelines, the Municipality is following a program of replacement of the old ones and in the recent years a number of them (primary dorsal pipelines) have been already replaced or are in course of being laid down. In this context some projects have been financed by USAID, KFW (Germany) as well as the Italian Cooperation (through UNDP), who financed also the construction of a new reservoir.

In more detail the situation could be characterized with the following:

- a. Deteriorating condition of a number of existing water distribution networks. This results in the loss of water through leakage, as well as, in serious health hazards due to the seepage of sewage into the network. Studies undertaken by UNICEF and the Palestinian health grassroots organizations have demonstrated the relationship between this and the occurrence of diseases such as, Escherichia Coli, Entamoeba, Gardia and Tricomonus, especially amongst the children.
- b. Irregular water supply i.e. a few hours every day or week. This leads the consumers to store the water in containers kept in unhealthy conditions. This has been one of the causes behind a number of health problems all over the country.
- c. Contamination of some of the springs which are used as primary or secondary water sources. At the present time, there are around 300 yielding springs in the West Bank. A number of them are utilized for domestic and/or irrigation purposes. However, quality tests have proved that the water discharged from a number of these springs are inadequate for human consumption. The reason for this being the insufficient protection of the springs and of its surrounding.
- d. Deteriorating condition of many of the boreholes and wells utilized for domestic or irrigation purposes. At the present time, there are 35 domestic wells and 200 irrigation wells serving the Palestinian consumers and farmers in the West Bank. The discharge from a number of these wells has been declining, due to the lack of maintenance and upgrading of the boreholes and the equipment.
- e. Dramatic increase in the water demand due to:

1. the influx of returnees especially after the signing of the peace accord;
 2. the lack of awareness among the consumers for the need to save water, which leads to the wastage of large quantities.
- f. Lack of experience and technical knowledge amongst the technical and managerial staff responsible for the water schemes in the municipal departments. This is leading to the improper operation and maintenance of the systems and virtually no resource management.

Institutional constraints also negatively impact the delivery of water services. Fragmented as it is between small municipalities and local councils who have very limited human and financial resources, supply management and planning and management capabilities. Incentives for efficiency and financial performance are weakened, contributing to ineffective operation and maintenance and ad hoc investment planning and execution.

In the past, regulation, licensing, policy setting and planning in the West Bank were controlled exclusively by the Israeli authorities. However, with the formation of the Palestinian Water Authority, which took over these responsibilities in the Palestinian Autonomous Areas, this situation is changing. Under the Oslo II, Article 40 Agreement, many of these issues should be referred to the Joint Water Committee, the JWC (Palestinian-Israeli). The JWC has the responsibility of issuing permits for water projects and it is a consultation forum for the two parties regarding all water supply issues in the Palestinian Territories.

In order to manage the resource and design productive regulatory systems as well as re-enforce their negotiating position, the PWA will need data on the water situation as well as development of the human resource base, scattered across the myriad of institutions working in the water sector field.

2. UNDP Sector Strategies

a. Resource Management

Palestinian water managers, scientists and researchers are at very serious disadvantage as a result of having no access to water resources information and no control. Precise and accurate scientific data is absolutely fundamental to effective water resources management. The most recent water resources assessment available to Palestinians was performed in 1964. Hydrometric network gathering water resources information has been carefully guarded as an exclusive Israeli asset and Palestinians have been unable to perform the field monitoring and establish the extensive longitudinal data records required. Correlatively, the depth of human skill base which derives from experience in practical control of water resources, is absent.

It is readily apparent that for the good of the entire region, the Palestinian community must acquire the assets, in terms of information and skills, to be able to responsibly and effectively manage water resources, establish a strategic hydrometric monitoring network, undertake comprehensive water resources assessment of the Territories and develop alternative resource management options. With water a critical and constraining resource on economic development, it is essential that these skills are rapidly developed within the Palestinian community itself, aided but not substituted by international expertise. It is also important to consider that without skills and data and resource assessment figures of their own, the Palestinian community will be unlikely to have confidence in any externally-proposed water resource allocation arrangements and in any case will lack the skills to manage those resources effectively.

Under the auspices of a UNDP project, a Palestinian taskforce of specialists to identify and resolve priority water resources issues and to build water resource managerial capacities was launched in January 1994. The project established a precedent of coordinated action and accountability to the Palestinian leadership. Through coordinated action with other donor funded activities, it is laying the foundation in terms of capacity building and data and knowledge provision for the build up of the Palestinian Water Authority (PWA), which will, as mentioned before, be responsible for regulation, policy formulation, legislation, economic and financial management, and management of central and local administrations. An important element of the project is raising public awareness on issues related to water, specifically the scarcity and value of water to the Palestinian community and the need for water conservation and protection. During 1995 and following the establishment of the PWA, the programme has been fully integrated in the structure of the Authority. Since that date, the project team has been providing advice to the Chairman of the PWA on many issues related to water resources management. The Chairman has also been assigning the team specific tasks to work on such as: preparing studies on the Palestinian Water Sector Investment Needs in the Jericho District and Gaza City. The outcomes of these

studies have not been published yet, however, the preliminary recommendations emphasize the need for upgrading the water supply and distribution system of the Jericho city as an integral part of the whole Jordan Valley water system (the Objective of this Project).

b. Institutional Development

Despite the difficulties, the Palestinian municipalities have managed to maintain at least a modicum of service to domestic water consumers. Municipal officials recognize the importance of water services and are interested in improving efficiency. The municipalities have the in-house capacity to manage and oversee the construction component of infrastructure projects with technical assistance from UNDP engineers and Palestinian consultants. However, issues such as work standards, regular operation and maintenance, records keeping, leakage monitoring, tariff setting and revenue collection, need to be addressed through the provision of expert support and training.

UNDP has a number of ongoing activities to improve municipal and utility administration development. Combined with capital investments are institutional development activities with organizational, planning, management and technical aspects. Training Programmes in these areas have been carried out on pilot basis in Seven municipalities of the West Bank and Gaza. Recently the programme has been extended to cover four additional municipalities and water departments.

Also, UNDP is supporting and guiding a project to examine various organizational options, focusing on the Jerusalem Water Undertaking as a pilot. The ultimate goal is to support the establishment of central and local utilities. In one of the activities of the project, a group of Palestinian specialists, have been developing scenarios for a number of organizational models. Observational tours in the region and in Europe, supported by UNDP, have provided fertile ground for the development of alternative models. The various scenarios will be further studied under another project supported by UNDP and funded by the Government of Finland during a master planning exercise covering water and waste water management in Ramallah district which is being currently implemented by a Finnish Consulting firm in joint venture with a local consultant.

c. Systems Upgrading

Most municipalities are planning to launch or launched projects to rehabilitate and extend water distribution systems, upgrade existing wells, and dig new ones. However, financial resources are extremely limited. Therefore, it has been essential for donors to provide assistance to improve the water infrastructure serving the population. This assistance incorporates:

- a. Rehabilitation of water supply networks;
- b. Construction of storage and pressure regulating reservoirs;
- c. Extension of supply networks to serve new residential areas;
- d. Rehabilitation of wells and booster stations;
- e. Boring of new wells and construction of booster stations.
- f. protection of springs.

The planning and design capacity in most municipalities is limited. However, Palestinian engineering consulting firms have developed this capacity and can be utilized to provide the required designing services for the municipalities and in some cases supported by International Consulting Firms.

UNDP has been providing assistance to a number of municipalities; Khan Younis, Tulkarem, Rafah, Nablus and Hebron as well as the Jerusalem Water Undertaking with funding provided by the Government of Japan, USAID and Italy . Also, improvement of rural areas water supply schemes has been the target of an ongoing

UNDP project, begun in 1987. This project has reached more than Thirty Five villages and its positive impact was highly appreciated by target communities. The project has found additional support from USAID and presently 20 additional localities as well as Hebron city are being targeted through a US\$ 8.0 million programme to upgrade water resources and supply schemes

C. THE PROJECT

The project targets two major cities in the West Bank: Hebron and Jericho. It aims at the rehabilitation and full upgrading of the water supply and distribution system in Jericho city as well as the installation of tele-control system for the city of Hebron water supply system to facilitate and improve maintenance and operation of the already upgraded network. One of the project objectives will be to assist in enhancing the maintenance and operation capacity of the Jericho and Hebron Municipalities water departments.

C.1. Jericho City

c.1.1. LOCATION, SETTING AND POPULATION

The water source for irrigation of farms lying within the municipal boundaries of Jericho City, as well as the City Domestic water supply is the Ein El-Sultan Spring, a surface spring, located in the northwest corner of the Municipality at an elevation of 215 meters below sea-level. The City itself lies about 400 meters below sea-level. This Spring has a relatively steady annual discharge of approximately 5.775 million cubic meters, corresponding to a mean average discharge of approximately 659 cubic meters per hour. Chemical analysis shows that the water is of high quality, falling well within the guideline values for health-related constituents established by WHO. About 30% of the water is used for domestic purposes and is Jericho City's only water supply. The balance is used for agricultural irrigation.

Water for domestic use is pumped through a piped system to Jericho city. The system needs extensive rehabilitation and upgrading which is the objective of this project. The irrigation system consists of open channels and simple soil embankments. Those are four main channels constructed of a concrete base and side walls running in different directions. The irrigation system also needs extensive upgrading. However, it is covered under another project funded by the American Near East Refugees Agency (ANERA).

The total population served by this water supply/irrigation network is about 20,000 persons, of whom about three-fourth are dependent on agriculture either directly or indirectly, for a living. These are rough estimates since no census has been taken in the Palestinian Territories since 1967.

Before the 1967 war, Jordan provided a lucrative export market for Jordan Valley crops. For the past 27 years that market has been entirely closed, causing great economic hardship for Jordan Valley and Jericho farmers. With the signing of the recent peace treaty between Israel and Jordan, the Jordan market may again become available to West Bank farmers.

It has not been possible to ascertain the precise number of farms and plantations within the municipal boundaries, or their distribution by size. The problem is complicated by the fact that a large farm, having been handed down from father to sons for several generations may now be farmed by 6 or 8 families or more, or by tenant farmers on a share-cropping arrangement (usually on a 50-50 basis). A reasonable estimate of the number of farm families directly dependent on agriculture for a living may be 900-1000; many others are indirectly dependent on the sector, through transport or marketing of produce, or as suppliers of agricultural inputs or other services.

c.1.2. PROBLEMS TO BE ADDRESSED

The Present Situation: An Analysis of the Community Needs

In order to acquire a full understanding of the Water situation in the Jericho area, the UNDP had contracted

a local consultant in joint venture with an International Firm to carry out an assessment study of the Jericho City Domestic Water Supply and Distribution System. Furthermore, based on the assessment findings the consultant was requested to provide recommendations on the most preferred solutions to the existing problems in the system. Following the UNDP review and approval of the recommendation, the Consultant prepared conceptual and detailed designs of the upgrading and rehabilitation works to be implemented. Those form the activities to be undertaken by this Project and are detailed in the following sections.

A description of the present situation is outlined below:

Management of the Water Supply and Irrigation System is the responsibility of the Jericho Municipality. The Municipality is the owner of the Ein El-Sultan Spring and the distribution channels and their branches, which are located on public land. Allocation of the water for the purpose of irrigation (about 70% of total flow) is governed by a system of long-established water rights owned by farmers as private property. The Water Department is a separate department within the municipality and has the responsibility of both operations and revenue collection. It is supervised by the "revenue supervisor" who is assisted by a "technical" supervisor. Other departments provide services to the Water Department including the Engineering Department.

Ein Al Sultan is the only source supplying the Municipality. Unreliable chlorination takes place on the deliveries of the three pumps situated at the spring. The galvanized steel and AC distribution network is very poor condition. This is attributed to poor workmanship and materials for the AC pipework and corrosion of the steel pipework. The standard method of repair of the steel pipes is to wrap inner tube rubber around the pipe. Not surprisingly, unaccounted for water is high and is roughly estimated at around 70%.

There are around 2,200 metered supplies and 200 unmetered supplies such as mosques, churches, schools and "social" cases. In the last twenty four months or so, the Municipality has had a very successful meter changing policy and also a programme to collect payment arrears. There are virtually no working sluice valves on the system. Any "major" repair (which can mean a two inch diameter pipe leaking badly) means a shutdown of the entire system. The supervisor is anxious about the possibility of any increase of pressure on the system at all causing excessive damage.

a. **JERICO WATER SUPPLY SYSTEM**

a.1 Sources

- a.1.1 The single source used for the Municipal water supply is Ein Al Sultan spring.
- a.1.2 The mean average discharge is around 700 cubic meters per hour with a range of 650/750 cubic meters per hour.
- a.1.3 Water from the spring is collected in a chamber at an elevation of around 215 meters below sea level.
- a.1.4 Water from the spring collecting chamber is used for the Municipal water supply. It is also used for irrigation purposes through the network of channels.
- a.1.5 The amount of water taken from the spring for potable water supply is not metered but is around 6,000 cubic meters per day .

a.2 Treatment

- a.2.1 The only treatment is simple chlorination on the pump deliveries at the spring site.
- a.2.2 There is one duty chlorine cylinder which normally lasts around three weeks. There were periods when supplies were not chlorinated as the gas cylinder was off site for replacement but a standby cylinder has recently been obtained.

a.3 Pumping Plant

- a.3.1 There are three pumps in regular use. A fourth pump was installed to pump water to the 500 cubic meters capacity service reservoir but it is not in use.
- a.3.2 There is a manually started diesel engine as a partial standby for power failures.
- a.3.3 Electricity supply is from the mains which is prone to regular failure. The frequency of failure

was suggested as varying from 3 to 10 times a day and were usually of short duration of 5 to 15 minutes.

a.4 Service Reservoirs

• 2,000 cubic meters reservoir.

a.4.1 There is a service reservoir in regular use which has a capacity of 2,000 cubic meters and was built in the late 1970's.

a.4.2 It has a TWL of the same as the spring level - 276 meters below sea level.

a.4.3 The service reservoir is in poor condition and requires rehabilitation.

• 500 cubic meters reservoir.

a.4.4 The 500 cubic meters service reservoir has never been put into operational use for fear of causing additional bursts in the mains network. It is situated at some 70 meters above the spring .

a.4.5 Although it was only built about four years ago, it is in poor condition and rehabilitation work is recommended .

a.5 Distribution Network

a.5.1 The network consists of some 30 km of mains .

a.5.2 The earlier larger mains are reported to be steel with Asbestos cement being used around 1973 for mains of 4" diameter upwards. The smaller mains were laid in galvanized steel.

a.5.3 The AC pipes are reported as being in bad condition when delivered and were badly laid .

a.5.4 There are no sluice valves on the distribution network so any maintenance work that cannot be completed with the network "operational" necessitates a complete shutdown at the spring. Consumers then have to rely on their own storage.

a.5.5 A "bottleneck" is observed in the distribution network supplied via one 6" diameter main and several 2" dia. mains. The 2" diameter mains are badly corroded.

a.5.6 The Municipality have to repair an average of some 5 leaks on the system per day. The number has been about the same for the last five years.

a.5.7 The standard repair is to wrap a rubber strip around the leaking pipe. It is usual for old bicycle inner tubes to be used for this purpose with the ends now sealed by smaller rubber strips and previously with wire.

a.5.8 There is therefore a considerable number of repairs on the distribution network that have been "temporarily" repaired using rubber.

a.6 Unaccounted for Water

a.6.1 An analysis and extrapolation of the information provided by UNDP consultant indicates an annual billed consumption equivalent to 90 liters per capita per day. This allows for the reduced consumption in November/December compared with the 10 month consumption analyzed in detail in the report.

- a.6.2 This is equivalent to a total billed consumption of 1,800 cubic meters per day.
- a.6.3 The consultants indicate a total supply of potable water, measured at the spring, of 6,000 cubic meters per day.
- a.6.4 This rough assessment would suggest a figure of unaccounted for water of 70%.
- a.6.5 This high figure does not allow for the unmetered consumption of a further 200 supplies and has to be considered in relation to the very poor condition of the distribution network and the poor method adopted for repairing leaks.

a.7. **Water Quality**

- a.7.1 Water quality is monitored by the Health Department which is based at the local hospital. It is not part of the Municipality.
- a.7.2 The Health Department is concerned about the reliability of the chlorination equipment and the lack of chlorine supplies. The potable water supply is not always chlorinated.
- a.7.3 The department advises the Municipality on the chlorine dose to be applied at the spring.
- a.7.4 No diseases that could be directly attributed to water supply had been notified although there had been cases of typhoid and other diseases which could be either food or water borne.
- a.7.5 Chemical and bacteriological samples are taken and analyzed by the central health department at Ramallah.

a.8 **Per Capita Consumption**

- a.8.1 The per capita consumption over a 10 month period is 102 l/p/d . If the consumption during the two months of November and December were included this would decrease to, say, 90 l/p/d.
- a.8.2 This figure is high compared with that in other Municipalities studied.
- a.8.3 The high consumption is attributed to:
 - climate (particularly in summer).
 - increase in population in winter months.
 - illegal use of potable water for horticulture.

b. **JERICHO INSTITUTIONAL ARRANGEMENTS:**

b.1 **Water Department Staff**

The water department employs a total of 19 staff.

The 19 staff are as follows:

- 1 Water Supply Supervisor.
- 1 Technical Supervisor.
- 6 Maintenance.

- 2 Laborers.
- 3 Spring Operators.
- 1 Service Reservoir Operator.
- 2 Meter Readers.
- 2 Revenue Collectors.
- 1 Clerk.

- b.2 No formal organization chart was available but, in practice, the Water Supply Department operates as shown in Annex I.
- b.3 The three operators work at the spring on shift.
- b.4 The 6 maintenance personnel work daily but are called out from home to cover emergencies.
- b.5 The planning function is covered by the Engineering Department.
- b.6 The Department has two vehicles including a Mitsubishi recently supplied by UNDP.
- b.7 The Municipality is due to take delivery of vehicles provided by the Spanish Government (Barcelona). It is possible that one additional vehicle will be available for the use of the Water Department and one as a mobile workshop shared between the water and irrigation departments.
- b.8 The UNDP has provided training in leak detection and mains location and the equipment was delivered to the Municipality .

b.2 Income for Water Supply.

- b.2.1 There are 2,200 metered supplies out of a total of 2,400 supplies supplying the estimated population of 20,000 .
- b.2.2 Total metered consumption has not been calculated in the past but water department revenue for the last few years is as follows:

1993	240,000 NIS
1994	276,000 NIS
1995	640,000 NIS

- b.2.3 These figures include other water department revenues (eg new connections). There has not been an increase in tariff since 1983. The increase in income in 1995 is apparently due to an increase in billed consumption as well as the payment of some arrears under a threat of the municipality taking action against debtors in the National Court.
- b.2.4 The growth between 1994 and 1995 of billed income is attributable to the fact that some 80% of consumers meters have been reported as being changed, at the consumers' cost, since January 1995.
- b.2.5 The programme of meter changing was carried out against a threat of supplies being cut off.

b.3 Water Charges

- b.3.1 The charges for a two month period are as follows:
 - Meter charge of 4 NIS.
 - Maintenance charge of 5 NIS.

- Volumetric charge of 0.5 NIS per cubic meter.

b.3.2 The minimum charge is based on 20 cubic meters per two months i.e. the charge is 4 NIS plus 5 NIS plus 10 NIS or 19 NIS per supply per two month period i.e. 9.5 per month.

b.3.3 If all 2,200 supplies paid only the minimum charge the income would amount to 250,800 NIS.

b.3.4 Meters are read at two monthly intervals.

c. **Summary of Problems identified and suggested solutions**

c.1. **Water Supply and Distribution System**

The distribution system and other works are in a very poor state as reported in detail in the December 1995 "Assessment Report" by Arabtech-Jardaneh/Babel Consulting Engineers in association with Montgomery Watson.

Renewal and/or rehabilitation works are urgently required as confirmed by the Preliminary and Final Design Reports.

Solution:-

Based on the recommendations of the Consultants and considering a design horizon for the year 2025, the immediate term option to be adopted in order to overcome the serious shortcomings in the system identified above is as follows:

- * Replace the existing pumping station and all associated plant and equipment.
- * Refurbish the existing 2000 m³ and 500 m³ storage, reservoirs, control systems and accessories.
- * Upgrade the chlorinating systems and relocating it near the 2000 m³ storage reservoir.
- * Replace the distribution System in line with a new hydraulic scheme.

c.2. **Structure of the Water Supply Department**

The existing water department is obliged to react to the daily problems and has virtually no forward planning or managerial input.

If the system is to be improved, under this project, then it is essential that the Water Department is structured and has the motivation, skills, tools, equipment and stores necessary to operate the new system in an efficient manner.

If this is not the case, then the new system will, no doubt, deteriorate rapidly and the investment will not be cost effective.

In parallel with the programme of new work, it is recommended that there should be a technical assistance programme, which would include institutional and human resource development.

The composition of the team should be considered, in detail, when the proposed works are being finalized.

C.2. Hebron City

C.2.1. LOCATION, SETTING AND POPULATION

The city of Hebron is located south of Jerusalem at a distance of about 35 km and covers an area of approx. 30 km² with an altitude ranging between 800 and 1000 m.a.s.l.

The main sources which supply water to the city of Hebron - the Herodion wells - are located in the West Bank.

at a distance of 17 km northwards, not far from the road to Bethlehem.

Even if the Palestinian Water Authority represents the true Authority which the Municipality's Water Dept. should refer to, in practice the control of the sources is still under the Israeli authorities - Mekorot / West Bank Water Authority (W.B.W.A.) - and the main contacts are presently maintained with them.

Only two of the existing five wells are kept for the city; the main reservoir (Khalled Batrah) is receiving water from the said wells through two pipelines (12" and 8" diam.).

In the same area two new wells have been recently drilled by the Hebron Municipality, but the 16" diam. pipeline to the city is still to be built (tender stage - Germany financing).

There is also a plan to drill three more wells to supply water to Hebron and Bethlehem as well as another 32" diam. pipeline to Hebron District (USA financing), but the necessary permit has not yet been released.

Two other wells (under control of the Municipality) have been drilled more than 35 years ago in the area of Al Fawar and are still supplying 7-8% of the water to the city; as a matter of fact the production of these wells is much higher (about 2,200 m³/day), but only 25% is actually supplied to the city, the remainder being intended for the adjacent villages and the neighboring refugee camp.

The 10" diam. pipeline from the wells to a Buster Station in the southern part of the city is old and needs to be replaced in a near future.

The total population served by the water network is about 270,000 inhabitants, 200,000 in the municipal area and 70,000 in surrounding villages including two refugee camps, but this is a rough estimate since the last census in the Palestinian Territories has been made in 1967.

C.2.2. PROBLEMS TO BE ADDRESSED

An Analysis of the Needs

The average water demand, limited to the city inhabitants and based on a daily consumption of 100 l per person, can be estimated at 9.7 million m³/year.

Considering that the water shares from Herodion wells are presently ranging from 12,000 m³/day during Winter to 6,000 m³/day in Summer and the supply from Al Fawar wells is about 550 m³/day, the total allocation per year is more or less 2.9 million m³, far below the demand.

To alleviate the problems connected with the scarcity of water, most of the households (approx. 85% over a total of 12,000) have developed a Rainwater Catchment System, by which they can store rain water, to be used as a supplementary resource especially during Summer. The size of such storage tanks is about 70 m³ (total storage capacity about 700,000 m³) and the quality of water has been proved of good quality and at very low cost.

For the above considerations it is appropriate to affirm that water in Hebron represent one of the main problems and any projects aiming at up-grading the present situation can be considered of high priority.

A Description of the Present Situation

Water distribution to the city is by gravity. The supply from Herodion wells is mostly directed to the main reservoir (Khalled Batrah) and through it to the other four reservoirs, but part of the water can also by-pass Khalled Batrah and reach directly Abel El Riyah reservoir. The supply from Al Fawar wells is directed to the Booster Station and from there pumped to Al Hawouz reservoir.

Part of the pipelines is rather old and produces therefore a serious leakage problem, worsened by the difference in elevation (approx. 1000 to 800 m.a.s.l.) among the various sections of the city, which gives origin to excessive pressures in the lower part of the network. Therefore the decision was taken to subdivide the city into four pressure zones and to this scope a new reservoir of a capacity of 3,875 m³ (financed by the Italian Cooperation) and some new pipelines were foreseen, which are now under construction or being laid down. Moreover during the last period a number of old dorsal pipelines have been replaced - some are still in course of being replaced - giving to the Municipality's Water Dept. a better control of the entire network.

a - HEBRON WATER SUPPLY SYSTEM

a.1. Sources

a.1.1 Main source: 5 Herodion wells controlled by the Israeli Authorities, of which only 2 utilized for the supply to Hebron City.

The average discharge is 13,000 m³/day, of which 9,000 m³/day during Winter and 6,000 m³/day during Summer is the allocation to the city of Hebron.

- a.1.2 Other source: 2 Herodion wells owned by the Hebron Municipality.
Already drilled, but not operating until the relevant pipeline is laid down.
- a.1.3 Other source: 2 Al Fawar wells owned by the Hebron Municipality.
The average discharge is around 2,200 m³/day, of which 550 m³/day reserved to the city.
- a.1.4 Other source: the Rain Water Catchment System controlled by the consumers, which accounts for a total storage capacity of about 700.000 m³.
- a.1.5 In general the water arriving to the reservoirs is of good quality.

a.2 Treatments

The main treatment is simple chlorination on the pump deliveries at the sources. Weekly control on water samples from the wells of the Municipality.
The wells under the Israeli Authorities have a daily control on chlorination.
From time to time a coli-bacterium test is also carried out.

a.3 Pumping Stations

There are 2 pumps and 2 buster at the Al Fawar wells.
Another pump is at the Buster Station in the southern part of the city.
In general there are no problems of energy failure.

a.4 Reservoirs

- a.4.1 Khaled Batrah (3,875 m³) - in good condition.
It is the main reservoir, still under control of Israeli Authorities, to be delivered to Palestinian Authorities within a few months.
The construction year is 1978.
The reservoir supplies the other reservoirs and directly the High Zone (1020 - 950 m) and the Intermediate Zone (950 - 900 m). The water outlet is at 1.020 m elevation.
- a.4.2 Al Manchar (2,000 m³) - in good condition.
The construction year is 1992.
The reservoir supplies the Intermediate Zone. The water outlet is at 975 m elevation.
- a.4.3 Abel Al Riyah (600 m³) - not in very good condition, even if up to now no leakage have been reported.
The construction year is 1962.
This reservoir supplies also the Intermediate Zone. The water outlet is at 987 m elevation.
- a.4.4 Abou Naer (600 m³) - not in very good condition, even if up to now no leakage have been reported.
The construction year is 1962.
This reservoir, as the previous ones, supplies the Intermediate Zone. The water outlet is at 967 m elevation.
- a.4.5 Al Jaladeh (3,875 m³) - under construction (financing of Italian Cooperation).
This reservoir will supply the Low Zone (900 - 850 m) and the Very Low Zone (850 - 800 m), covering about 30% of the inhabitants and also the industrial area.
The supply to the Very Low Zone will be operated by means of a break-pressure tank located at the south eastern part of the Low Zone.

a.4.6 Al Hawouz (400 m3) - no more operating.
As the reservoir will be dismantled, the water from Al Fawar will be by-passed to Abou Neir reservoir.

a.4.7 All reservoirs, but Abou Naer, can be by-passed to allow maintenance and cleaning operations.
The last cleaning at Khaled Batrah was made 3 years ago. The other reservoirs undergo these operations very seldom.

a.5 Distribution Network

a.5.1 The network consists of about 130 km of mains, ranging from 2" to 12":
- all the 2" and 3" pipes are in galvanized steel.
- 80% of the 4", 6", 10" and 12" pipes are in steel with cement lining and PVC covering, while the remaining 20% are in galvanized steel.
- 50% of the 8" pipes are in steel with cement lining and PVC covering, while the remaining 50% are in galvanized steel.

a.5.2 The main lines have been replaced during the last years. The lines from 1/2" to 3" are still old and then the majority of repairs have to be done on these lines. Sometimes there is a contamination problem due to back flow into the pipes.

a.5.3 As no pressure reducing valves have been installed yet, the high pressure drop in the lowest sections of the network create leakage problems and sometimes breakage of valves.

a.5.4 The average daily number of repairs is 15, of which 70% occurring on small diameters pipelines.

a.6 Water Meters

The estimated population of Hebron city has been estimated at 200,000 inhabitants.

The average family size is 5-6 persons.

The total number of meters installed is about 11,500, but in general more families are connected to the same meter (on an average 3).

Anyway, apart from a few illegal connections, all the water consumption is controlled through meters. Unfortunately a number of them are not operational and/or record less quantity of water than the actual consumption, negatively affecting the fees collection by the Municipality.

b - INSTITUTIONAL ARRANGEMENTS

b.1 Water Department Staff

b.1.1 The Water Dept. staff is composed of 36 persons:

- 1 Engineer;
- 6 technicians - graduated (2 years course) from the Polytechnic;
- 19 technicians - non-graduated;
- 5 unskilled labourers;
- 5 watchmen.

The planning function, as well as the control of the current works, is covered by the Engineering Dept.

b.1.2 The Accounting Dept. is a separate office of the Municipality.

b.1.3 The Water Dept. is equipped with 2 vehicles: 1 old Jeep and 1 Mitsubishi pick-up (1995), and 1 Leak detector in good condition.

b.2 Income for Water Supply

The revenues collected by the Municipality during the last year amount to 3 million NIS.

On the ground of 2.9 million m³ of water supplied per year, the revenues should exceed a lot this amount being in the order of 10 million NIS.

It is believable that about 45% of water is to be considered unaccounted for leakage and black losses (illegal connections) besides some consumers not paying their bills. As a matter of fact the Municipality is reluctant to put in practice the threat of cutting supplies off, as people is most of the time suffering for the shortage and water is absolutely necessary to everybody.

b.3 Water Charges

b.3.1 The charges are as follows:

- for the first 10 m³: 3.2 NIS/m³;
- for consumption from 10 to 20 m³: 3.5 NIS/m³;
- for consumption exceeding 20 m³: 4.0 NIS/m³.

Another charge of 3.5 NIS/month is requested to each consumer for the maintenance of the network. The repair of the meters, whenever requested, is to be paid also by the consumers.

B.3.2 Meters are read at monthly intervals.

C.3. THE PROPOSED PROJECT

C.3.1 For the city of Jericho and based on the recommendations of the Consultants and considering a design horizon for the year 2025, the immediate term option to be adopted in order to overcome the serious shortcomings in the system identified above is as follows:

- * Replace the existing pumping station and all associated plant and equipment.
- * Refurbish the existing 2000 m³ and 500 m³ storage, reservoirs, control systems and accessories.
- * Upgrade the chlorination systems and relocate it near the 2000m³ storage reservoir.
- * Replace the distribution System in line with a new hydraulic scheme.

Structure of the Water Supply Department.

The existing water department is obliged to react to the daily problems and has virtually no forward planning or managerial input.

If the system is to be improved, under this project, then it is essential that the Water Department is structured and has the motivation, skills, tools, equipment and stores necessary to operate the new system in an efficient manner.

C.3.2 For Hebron city and as already mentioned, the Municipality is making an effort to renew and give more effectiveness to the water supply system: a new reservoir has recently been built and another one is under construction, a great number of mains have been replaced and/or are in course of being replaced, in order to allow the subdivision of the city in four pressure zones and avoid problems of excessive pressure stress on pipes and valves.

The Water Dept. in the mean time has a need to improve its efficiency in the management of a scarce resource: sharing of water to the different sections of the city, instant information on the allocated quantities, water levels in the reservoirs as well as water inflow and outflow, etc., are chief components to acquire a proper running capability of the water distribution system.

The proposed project therefore aims at supplying the Water Dept. with an appropriate and modern tool.

such as a telecontrol system, in order to render it possible an efficient control of the water distribution. As it is not deemed necessary, at least in a first phase, the acquisition of data regarding water quality (pH, residual chlorine, turbidity, dissolved oxygen), being the water sources only wells and the quality fairly acceptable, the telecontrol shall be dedicated mainly to manoeuvring of valves and measuring and regulating flow as well as water levels in the reservoirs. In addition it shall be opportune to foresee in the control room the installation of a mimic panel showing the entire network, the flows, the valves status and all the other parameters kept under control.

A preliminary survey carried out in February/March 1997 identified the necessary component of the project as follows:

setting up of a SCADA (Supervisory Control And Data Acquisition) System, featured to allow command and control of valves, water flow, water levels, etc. from a control room, housed in the Municipality premises;

- setting up of a mimic panel in the said control room;
- setting up of 31 intelligent RTUs (Remote Terminal Units), connected to the control room by means of dedicated telephone lines;
- replacement of existing valves by new hydraulic valves and/or installation of the same (total number 90), to permit telecontrol operations;
- installation of 30 flow transmitters (instant and integral flow);
- installation of 9 pressure reducing valves;
- installation of 2 pressure transmitters, 1 at the Buster Station in the southern part of the city and the other on the pipeline from Khaled Batrah reservoir to the lowest areas;
- installation of 5 level transmitters in the reservoirs.

The replacement of gate valves by hydraulic valves has been considered a suitable solution, instead of motorizing existing valves, to lower the cost of the project (savings are approx. 300,000 US\$). In any case a survey should be carried out through the manufacturers of such valves, during the detailed engineering phase, in order to investigate any inconvenience which may discourage from their adoption.

The use of dedicated telephone lines has been preferred to the radio links, as it is less costly and is also a time-saving solution: getting radio frequencies is not easy in the Palestinian Territories and requires a lot of time.

Some sketches, one of the network and others of the nodes relevant to the project, have been drafted during the said preliminary survey, and are attached in Annex 2.

The contractor whom the contract will be awarded to (the main sub-contractor) shall carry out in any case a detailed survey to bring in all the needed modifications and up-dating, together with the preparation of the project detailed engineering.

C.4. EXPECTED END OF PROJECT SITUATION

Jericho City

The present project is part of an overall project aiming at making sufficient and good quality water available to the residents of the city of Jericho and at enhancing the Jericho municipality capacity to manage its water resources effectively. The expected results of the overall project are listed below:

- The water needs of the 20,000 inhabitants of the Jericho city will be better met quantity and quality wise due to the increase of the water storage capacity of the reservoirs and through the

improvement of the network distribution system. It is envisaged that the leakage percentage would be reduced to international acceptable levels.

- The financial situation of the Jericho Municipality will be improved through increased revenues from the water system due to reduced leakage, meter errors and illegal connections.
- The Municipality will manage its financial and human resources more efficiently and equitably.
- Monitoring and maintenance of the water system will be more efficiently controlled through the improved management structure of the Water Department, staff training programmes, maintenance equipment and spare parts. It is envisaged that the black losses would be reduced due to the improved monitoring, penalty system and awareness campaigns.
- Unemployment in the area will be alleviated by the use of currently unemployed labors in long-term and short-term positions.

Specifically, the project funded with the present contribution of US \$ 1.6 million from the Government of Italy will call for the upgrading of source and reservoirs structures as well the distribution system and service connections in Jericho city. Works will be phased in five independent contracts, detailing for the following works (please see attached plan for further details on specific areas covered under the different subcontracts):

- a) Demolition of Existing Pumping Station and Associated Buildings.
Construction of Pumping Station at Source Including All Interconnecting Pipework and Standby Generation.
Upgrading of Spring Protection Structure.
- b) Construction of Pumping Station at 2000 m³ Reservoir as well as Construction of new Chlorination and Standby Generator Facilities at the Pumping Station.
- c) Refurbishment of a 2000 m³ Reservoir and a 500 m³ Reservoir.
- d) Upgrading of the Distribution and Service Connections in Zones B and D ranging in size from 8" to 3" diameter pipes.

Hebron City

As mentioned the Municipality's Water Dept. is composed of 36 persons, all technical staff being the Administrative Section in another Department. The head of the Department is the only full graduated engineer: he is a very qualified technician and the only person who possesses a deep understanding of the Hebron Water Supply System. Thus he should be considered a key-man for an effective fulfillment of this project.

The other staff of the Water Dept. has good experience, but lack educational background in water network management, and moreover is insufficient to follow all the required operations and to quick repair damages when needed.

The lack of management training brings consequently that problems are dealt with in the very moment they occur, without any systematic anticipatory planning.

This project represents an effective tool to promote institutional development and to enhance management capabilities through an "ad hoc" training, which will be oriented towards a better control of water losses and black losses - consumers will be prevented from diverting water flow to their zones, first because all the valves shall be housed in locked manholes and second because any change of flow shall be observed at the control room (mimic panel, flow transmitters, etc.) - and an improvement of consumers services, including better availability and reliability of supply.

The financial performance of the Municipality could eventually also be enhanced through reduced costs and improved revenues collection. Furthermore, the Water Dept. being very poor of means of transport, the two vehicles provided under this project should be assigned to the said Department upon completion of the works.

C.5 Benefits to the Community

- The water needs of Hebron and Jericho city inhabitants will be better met and regulated due to the improvement in the infrastructure and control mechanisms on the water distribution networks. It A reduction in water leakage is also envisaged.
- The Municipalities will benefit of more efficient human resources, also from the financial point of view.
- As above said, monitoring and maintenance of the water system will be enhanced through the improvement of the management ability of the Water Dept. staff, and black losses will be reduced, even introducing, if necessary, a strong penalty system.
- Unemployment in the area will be alleviated by utilizing unemployed labourers in long-term and short-term positions.

C.6 Long Term Sustainability of the Project

The innovative features of the project coupled with the appropriate training of the technicians and the financial motivation shall guarantee that the Water Departments in the two municipalities will fully comply with the policies and engagements necessary to sustain this project.

C.7. TARGET BENEFICIARIES

a. Direct Beneficiaries:

- the 200,000 inhabitants of the city of Hebron as well as the 20,000 inhabitants of the city of Jericho
- the Municipalities of Jericho and Hebron Water Departments.
- the labourers hired for the project.

b. Indirect Beneficiaries:

- the small-scale industries dependent on water resources;
- the tourism industry;
- the Palestinian Authorities.

C.8. PROJECT STRATEGY AND IMPLEMENTATION ARRANGEMENTS

Respective Responsibilities of the UNDP and the Benefiting Institutions

The first component of the project targeting Jericho will be implemented jointly by the UNDP and the Municipality of Jericho. The system assessment, conceptual and detailed designs for the project have been undertaken by a local consulting firm in joint venture with an international one contracted by the UNDP for this purpose. The designs and tender documents are being regularly reviewed by the UNDP Engineering Division and the Jericho Municipality. The construction will be undertaken by Palestinian contractors and supervised jointly by the UNDP engineers and the Municipality of Jericho engineers assisted by a site engineer recruited under this project by UNDP. The procurement of materials and equipment, when appropriate, will be carried out by the UNDP according to standard UNDP procedures.

As for the public awareness campaign, the activities in Jericho will be implemented jointly with the Palestinian Water Authority, the Municipality and grassroots organizations. It will primarily target the female population, farmers, youth and focus on issues of water conservation and protection as well as hygiene.

The overall monitoring and supervision of the project will be carried out by UNDP staff.

As for Hebron, on the basis of the information contained in this document, UNDP will prepare the necessary

tender documents dealing with telecontrol systems.

The entire work will be organized in three independent sub-contracts:

- a. The main sub-contract will incorporate:
 - supply and installation of the entire telecontrol system (including valves and any other required apparatus);
 - detailed survey of the network;
 - preparation of the project design;
 - civil works (manholes, trenches, etc.);
 - technical assistance programme. It is worth to underline the opportunity of having the trainees involved in the project since the beginning of the installation activities, to achieve a proper "on the job training".
- b. A second sub-contract with the Telephone Company for the supplying of 30-35 dedicated telephone lines.
- c. A third sub-contract with the Electricity Company or the Electrical Dept of the Municipality for the necessary power supply to valves and apparatus.

The final design will be reviewed and approved by the UNDP Engineering Division and the Italian Cooperation technical experts. A senior supervisor engineer with previous experience in telecontrol systems will be recruited under this project by UNDP (Job Description in Annex 1).

The procurement of materials and equipment will be carried out according to standard UNDP procedures.

The overall monitoring and supervision of the project will be carried out by UNDP staff.

C.9 Reasons for Assistance from UNDP and Donors

On addressing this issue, the following aspects need to be considered:

First, the Ein El-sultan spring is the principle source of water for drinking and other domestic purposes for the entire metropolitan area of Jericho City, with approximately 30% of the water flowing from the spring being used for domestic purposes. This water supply is barely able to meet the demand at the present time, while the population is projected to increase significantly as refugees return to the West Bank when full Palestinian autonomy is achieved under the peace process. Meanwhile, the water supply/irrigation system is slowly breaking down, and water losses rising. Rehabilitation of the system will not only reverse this process, but simultaneously increase the volume of available water as current losses are reduced.

Secondly, it is true that Jericho is a rather small town. Its importance, however, is not defined by its size alone. The city has always been a primary destination for tourists, both Palestinians and foreign visitors. Because of its proximity to the Dead Sea, the ancient archeological site of the original Jericho, considered by many experts to be the oldest city in the World, and currently under excavation. The tourist industry, as peace returns to Palestine, is one of the most promising sectors for the earning of foreign exchange by the Palestinian Territories, and Jericho can play a significant role in this but not if the city's water supply continues to decline while water demand grows.

Thirdly, major investments by a number of donors including Italy for the upgrading of Hebron Water System took place in the past few years. Almost all were implemented through UNDP. Hence, it is only logical that UNDP involvement in this innovative initiative be continued to ensure the sustainability of the infrastructure already installed.

Fourthly, it should be noted that improving the economic status and quality of life for 220,000 or more people is no insignificant achievement, and fully in line with UNDP's concepts of human development. Most of the residents in the area are people with limited income and the prevailing political situation had further deteriorated their status.

C.10 Counterpart Support Capacity

This project will be implemented in partnership with Jericho and Hebron Municipalities , with UNDP acting as the facilitator, coordinator and overall supervisor of the project. All required support to the municipalities will be provided by the UNDP technical and programme staff.

D. DEVELOPMENT OBJECTIVE

To fulfill the basic needs of the Palestinian inhabitants in the Cities of Jericho and Hebron.

E. IMMEDIATE OBJECTIVES, OUTPUTS AND ACTIVITIES
(See table on following pages)

Objectives	Outputs	Activities
1. To rehabilitate the water distribution system of Jericho in the most cost-effective way, consistent with the basic goal of reducing water losses to a minimum while taking due account of the environmental and other issues that need to be balanced.	<p>1.1 A water distribution system that conforms with the conditions just described and improves the quality of the general environment in Jericho City.</p>	<p>1.1.1 Identify qualified construction firms to carry out the work.</p> <p>1.1.2 Solicit bids on competitive basis and select the contractors.</p> <p>1.1.3 Recruit a UNDP Engineer for project monitoring and supervision.</p> <p>1.1.4 Carry out the work under UNDP and Jericho Municipality supervision in order to ensure cost effectiveness and high quality of works.</p>
2. To increase the public awareness among farmers as well as domestic water consumers residing in and around Jericho, regarding	<p>2.1 People more aware and appreciative of water shortage problems and the adverse effects of unnecessary wastage and instructed in water conservation measures.</p>	<p>1.1.5 Prepare an inception, quarterly report, as well as a final report upon completion of the project to be submitted to the donor.</p> <p>2.1.1 Plan the campaign design the material and the visual aids required.</p> <p>2.1.2 Select the organizations and the institutions to carry out</p>

Objectives	Outputs	Activities
the importance of water conservation and reduction of waste.		the campaign.
3. To improve the maintenance and operation capacity of the Jericho water department including Human Resources Development	3.1 Technical staff trained on operation and maintenance requirements and the department better equipped with necessary tools and equipment.	<p>2.1.3 Implement the campaign, with practical demonstrations of ways in which wastage of water can be reduced.</p> <p>3.1.1 Recruit a consultant to identify the necessary M&O requirements as well as staff training needs.</p> <p>3.1.2 Procure necessary equipment and tools</p> <p>3.1.3 Conduct training programmes either through local or international experts.</p>
4. To improve the water distribution system, reducing water and black losses and ensuring a more effective supply of potable water to all inhabitants of Hebron City.	4.1 A telecontrol system which allows keeping under control 24 hours a day the entire network, real-time manoeuvring of valves, precise measuring of water distribution to the various sections of the city and collection of records on water allocations.	<p>4.1.1 Identify qualified firms to carry out the works.</p> <p>4.1.2 Prepare tender documents and carry out tendering procedures.</p> <p>4.1.3 Solicit bids on competitive basis and select the firm.</p> <p>4.1.4 Carry out a detailed survey of the network.</p> <p>4.1.5 Review and approve project designs.</p> <p>4.1.6 Recruit an international expert (an engineer) experienced in telecontrol for project supervision and to assist in finalizing the project designs.</p> <p>4.1.7 Carry out the works under UNDP supervision in order to ensure cost effectiveness and high quality of works.</p> <p>4.1.8 Prepare an Inception, Mid-term, as well as a Final Report upon completion of the project, to be submitted to the Donor.</p>

Objectives	Outputs	Activities
5. To enhance the water network management capability of the Water Department.	5.1 A new organization chart of the Water Dept. in line with the improved abilities of the staff who completed the training.	5.1.1 Assess the present managerial structures of the Water Dept. and their resources management plans. 5.1.2 Design new organization chart and resources management plans.
		5.1.3 Identify trainees, assess their training needs, design and implement the training programme.
	5.2 The tools for the proper management.	5.2.1 Prepare up-to-date plans of the network, and records of operational para meters, including details of valves and future programmed works.
		5.2.2 Set up a maintenance and operation system and train the staff on its implementation.
		5.2.3 Set up a program to manage and regulate the water flow in the different sections of the city, and train the staff to operate it through the SCADA System.
		5.2.4 Create the data base for storing all the records deemed necessary.

F. INPUTS

Total project cost is estimated at US \$ 3.0 million. Works planned for Hebron City are estimated at 1.4 million and works planned for Jericho city are estimated at 1.6 million. For Jericho city the first phase of the works incorporating upgrading part of the water distribution system are presently under implementation with funding provided by the Government of Norway for a total amount of 2.4 million. The overall project as designed is estimated at US\$ 8.0 million and have been packaged in three independent contracts covering specific areas in Jericho City (please see attached plan for details). The Government of Italy will contribute US\$ 2.0 million to meet part of the total costs related to the overall project. The project will be subject to a 8% flat UNDP support cost, amounting to US \$ 222,222.

The inputs for Herbon project will incorporate:

- a. Engineering:
 - Survey and Project Design;
 - International Expert (Supervisor).
- b. Equipment:
 - SCADA System (complete of hardware/software and Panel) and RTUs; Mimic
 - Valves and Pressure Reducing Valves;
 - Flow, Pressure and Level Transmitter;
 - 2 Vehicles.
- c. Works:
 - Civil works
 - Installation of the System and all the relevant equipment;
 - Telephone lines;
 - Electricity connection works.
- d. Technical Assistance Programme.

G. RISKS

Unrest in the political situation might delay the realization of the project activities.

II. PRIOR OBLIGATIONS AND PRE-REQUISITES

The Hebron and Jericho Municipalities must provide all construction permits as pre-requisites to the launching of the project activities by UNDP.

The two Municipalities should enter into formal agreement with UNDP which clearly indicates the former obligations towards the entire project.

The Hebron Municipality shall provide all the necessary information on the network including drawings, engineering designs and future rehabilitation/enlargement projects, in order to allow a correct detailed engineering drawing up.

I. PROJECT REVIEWS, REPORTING AND EVALUATION

The UNDP, the Hebron and the Jericho Municipality will meet once a month to evaluate the project's progress and appraise its activities. The monthly meetings are in addition to daily weekly meetings between supervising engineers. The daily and weekly meetings between supervising engineers will be conducted in order

to monitor the progress of construction work and decide on necessary corrective action.

UNDP will present to the Government of Italy an inception report, a quarterly report, as well as a final report upon the completion of the project.

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J. PROJECT BUDGET

Total contribution from the Government of Italy amounts to US\$ 3.0 million. The Project is subject to a flat 8% UNDP Support Cost amounting to US\$ 222,222. Project budget is divided into two major components: Jericho sub-project approximately US\$ 1.6 million and Hebron sub-project approximately US\$ 1.4 million inclusive of UNDP support cost. The tables below provide additional detail of the budget breakdown:

Description		Estimated Cost in US\$
A)	Subcontracts (Upgrading Source and Reservoirs Structures)	
A.1	Demolition of Existing Pumping Station and Associated Buildings, site works. Construction of Pumping Station at Source including All Interconnecting Pipework and Standby Generation. Upgrading of Spring Protection Structure.	350,000
A.2	Construction of Pumping Station at 2000 m3 Reservoir as well as Construction of new Chlorination and Standby Generator Facilities at the Pumping Station.	200,000
A.3	Refurbishment of a 2000 m3 Reservoir and a 500 m3 Reservoir.	120,000 <i>175,000</i>
B)	Subcontract (Upgrading of Distribution System)	
B.1	Upgrading of the Distribution and Service Connections in Zones B and D ranging in size from 8" to 3" diameter pipes.	567,500
Total Subcontracts		1,237,500
Site Engineer (12 months)		30,000
Public awareness Campaign including Social Scientist		75,000
Technical Assistance Programme (Maintenance and Operational issues)		138,982
Sub-Total Cost		1,481,482
UNDP Support Cost at 8% flat Rate		118,518
Jericho Project Grand Total		1,600,000

As mentioned above, total contribution for Hebron Sub-project is approximately US\$ 1.4 million inclusive of the 8% UNDP support cost. The table below provides additional detail of the project budget breakdown:

A.	Description	Estimated Cost in US \$
A.1	Survey	12,000
A.2	Detailed engineering	20,000

A.3	Civil works (pits, trenches, etc...)	62,000
A.4	Supply of 90 control valves - various diam. (hydraulic type).	125,000
A.5	Supply of 30 flow transmitters - various diam.	65,000
A.6	Supply of dedicated telecontrol system (computer & basic software) for A.5	10,000
A.7	Supply of 9 pressure reducing valves	32,500
A.8	Supply of 5 level transmitter	6,500
A.9	Supply of 2 pressure transmitter	2,500
A.10	Supply of various installation materials (flanges, cables, etc...)	94,000
A.11	Supply & Installation of a complete SCADA System including 31 RTUs, hardware, basic and dedicated software and mimic panel.	312,000
A.12	Installation of the above A.4 to A.10	210,000
A.13	Various transport costs.	13,000
A.14	Commissioning & Start-up and preparation of "as built drawings".	37,500
A.15	Supply of spare parts - 5% of A.4 to A.11	32,500
	Sub-Total	1,034,500
B.	Sub-contract - Telephone lines	
B.1	Installation of 30-35 new telephone lines from the Main Telephone Central to the control room in the Municipality (about 1500 m).	8,000
B.2	Installation of new cables from sub-stations to RTUs (about 2000 m)	10,000
	Sub-Total	18,000
C.	Sub-contract - Electric power	
C.1	Supply of electric power (220 V) to 41 nodes including board containing switches/circuit breakers and meters.	15,000
	Total Sub-contracts	1,067,500
	Expatriate Supervisor Engineer	100,000
	N. 2 vehicles (Type Fiat Bravo)	44,000
	Technical Assistance Programme (maintenance & operational issues).	84,796
	Total Cost	1,296,296
	UNDP Support Cost at 8% flat rate	103,704
	Project Grand Total	1,400,000

ANNEX 1

JOB DESCRIPTION

Employer Agency	:	UNDP
Title of Post	:	Supervisor Engineer
Duty Station	:	Hebron
Duration:	:	8 months

Duties to be performed:

The Supervisor Engineer will be responsible for the overall management and coordination of the project. He will work in close collaboration with the other UNDP project management personnel, as well as the personnel of the Water Dept. of Hebron Municipality.

The Supervisor Engineer will be expected to perform the following specific duties:

- Formulate a detailed work plan for all aspect of project implementation in close consultation with the Water Department of Hebron Municipality and the selected Contractors.
- Oversee the implementation of all surveys to establish the technical needs of the project.
- Taking a leading role in the establishment of the necessary selected for the project, in order to ensure the appropriateness of the same.
- Formulate in close consultation with the Water Department of Hebron Municipality a programme of technical assistance after completion of the project installations.
- Participate, if required, to the formulation of a detailed proposal for a second phase of the project.
- Prepare on regular basis all the reports required by the agreement between the Italian Ministry of Foreign Affairs and UNDP.
- Carry out any other activities which might be required to ensure the timely and successful achievement of the project objectives.

Required qualifications

- A university degree in engineering.
- A minimum of fifteen years working experience. Knowledge of SCADA System and experience in similar projects is also required.
- Effective verbal and written communication skills. Attitude in establishing relationships at all levels and management skills will be mostly preferred.
- International working experience. A high degree of flexibility, at conceptual as well as management and implementation level, and sensitivity to cultural constraints.
- Fluency in written and spoken English.
- Working experience in the region will be positively considered.

UNITED NATIONS DEVELOPMENT PROGRAMME

BUDGET DOCUMENT

UNDP - Programme of Assistance to the Palestinian People

Project No : P/L/87/J39/K/53/31

Title : Upgrading of Water Systems in Jericho & Hebron Cities

Funding : 31

Line Description	T O T A L		Prior		1997		1998		1999		2000	
	WM	Budget	AOS	WM	Budget	AOS	WM	Budget	AOS	WM	Budget	AOS
20. SUB-CONTRACT												
2101 Subcontracts		925926	0		0	0	500000	0	425226	0	0	0
2999 COMPONENT TOTAL		925926	0		0	0	500000	0	425226	0	0	0
93. AGENCY SUPPORT COST												
9301 Support Cost	0.0	69444	0	0.0	0	0	37500	0	31944	0	0.0	0
9399 COMPONENT TOTAL	0.0	69444	0	0.0	0	0	37500	0	31944	0	0.0	0
99 PROJECT TOTAL	0.0	995370	0	0.0	0	0	537500	0	457870	0	0.0	0
999 UNDP CONTRIBUTION	0.0	995370	0	0.0	0	0	537500	0	457870	0	0.0	0

Handwritten signature and date:
 PLS
 19/10/88