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WEST BANK AND GAZA

ASSESSMENT OF RESTRICTIONS ON PALESTINIAN WATER SECTOR DEVELOPMENT

Sector Note
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Middle East and North Africa Region
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Cover photos

Clockwise from top left:

- Partially treated sewage discharge in Gaza's Beit Lahia disposal ponds (source: Z. Abu-Hassanein)
- Girl drinking water from a community water pipe (Source: D. Sansoni / World Bank)
- Reflection of the Separation Barrier in a Bethlehem stormwater puddle (source: S. Ruckstuhl)
- Farmer walking past a drip-irrigated cabbage field in Gaza (source: World Bank).

West Bank and Gaza

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Acronyms

AHLC	Ad Hoc Liaison Committee
CA	Civil Administration
CAP	Consolidated Appeal for Palestine
CMWU	Coastal Municipalities Water Utility
COGAT	Coordinator of Government Activities in the Territories
DCA	Department of Civil Administration
DCL	District coordination liaison
ECHO	European Community Humanitarian Aid Department
EWASH	Emergency Water and Sanitation Group
GDP	Gross Domestic Product
GNI	Gross National Income
IDF	Israeli Defense Force
IWA	Israeli Water Authority
JSC	Joint Service Council
JSET	Joint Supervision and Enforcement Team
JWC	Joint Water Committee
JWU	Jerusalem Water Undertaking
Lpcd	Liters per capita per day
M&A	Movement and Access
M&I	Municipal and industrial
MAS	Palestinian Economic Policy Research Institute
MCM	Millions of cubic meters
MO	Military Order
MoA	Ministry of Agriculture
MoP	Ministry of Planning
NGO	Non-governmental organization
NIS	New Israeli shekel
NSU	Negotiations Support Unit
NWC	National Water Council
OCHA	Office for the Coordination of Humanitarian Affairs
PA	Palestinian Authority
PCBS	Palestinian Central Bureau of Statistics
PHG	Palestine Hydrology Group
PMU	Project Management Unit
PRDP	Palestinian Reform and Development Plan
PSIA	Poverty and Social Impact Analysis
PWA	Palestinian Water Authority
SWAp	Sector Wide Approach
UFW	Unaccounted-for water
UNDP	United Nations Development Program
UNRWA	United Nations Relief and Works Agency
USAID	United States Agency for International Development
WaSH MP	Water, Sanitation and Hygiene Monitoring Program
WBG	West Bank and Gaza
WBWD	West Bank Water Department
WHO	World Health Organization
WSWG	Water Sector Working Group

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Disclaimer

This study is based on data gathered and analyzed by team members, and through consultation, workshops, field surveys and interviews. In view of the difficulties in obtaining relevant and reliable data for West Bank and Gaza, the study should be viewed as a preliminary analysis, with the idea of raising issues for policy debate and questions for future additional research. Israeli and Palestinian authorities have been given an opportunity to review and comment on the report prior to publication. Comments received have been noted in the text or reflected in appropriate changes to the Report. Statements submitted by either party will be posted on the World Bank website (www.worldbank.org) along with this report. The World Bank welcomes further constructive discussion on the issues raised in the report.

Executive Summary

Introduction

Background to the Study

Requested by the Palestinian Authority (PA), this assessment is the fourth in the World Bank's Movement and Access study series[1]. The goal of the assessment is to develop a balanced analysis and create awareness of the factors restricting Palestinian water sector development as well as of the economic, social, and environmental impacts of these restrictions. The assessment addresses factors such as sector governance, and movement and access (M&A) restrictions beyond the control of the Palestinian Authority, as well as internal contributing factors, notably governance and capacity weaknesses of Palestinian institutions.

The Bank has been providing technical assistance to PWA since 2006 aimed at building capacity to improve its management of water resources. This largely took the form of workshops and learning events for Palestinian stakeholders to share experiences and learn about good integrated water resources management (IWRM) practices. In 2008, with the new leadership in PWA, a more specific request was received to build capacity in this organization.

A preliminary institutional analysis indicated that, while PWA had internal challenges of improving its performance in its role of resource manager and regulator of service provision, an undocumented aspect was the "exogenous" constraints it faced because of the unique nature of Palestinian access to shared water resources with Israel. Constraints to improved performance were therefore at three levels as shown below:

Level I	Palestinian Authority	Access to shared water resources
Level II	PWA	Functions of resource management and regulation
Level III	Palestinian water users	Access to reliable, safe and affordable water services

While the "exogenous" constraints appeared to directly impact Level I, and indirectly impact Levels II and III, there had been no systematic documentation of the consequences on the Palestinian economy and population. The Bank agreed to conduct an objective awareness-raising assessment that would document impacts on project delays; decision-making over access to and control over water sources, wastewater management and infrastructure; livelihoods and coping mechanisms of service providers and consumers; environmental issues; donor activities; and sector dialogue between Palestinian and Israeli authorities and donor community.

The study methodology employs both standard economic and sector work data gathering and analysis, and tools of poverty and social impact analysis designed to contextualize and deepen the analysis, particularly of the socio-political, governance [2]and environmental aspects. The study is complementary to other studies and technical assistance that the Bank as well as other donors are engaged in with the objective of building capacity in Palestinian water institutions to serve their constituents with reliable and safe water services.

[1] The first three reports in the series were: World Bank, 2007, *Movement and Access Restrictions in the West Bank: Uncertainty and Inefficiency in the Palestinian Economy;* World Bank, 2007 *Potential Alternatives for Palestinian Trade: Developing the Rafah Trade Corridor; and* World Bank, 2008 *Economic Effects of Restricted Access to Land in the West Bank.*

[2] The term "governance" throughout this report refers to decision making structures and processes, unless otherwise qualified in the text.

The history of water in the West Bank and Gaza

Prior to 1967, Israel had developed the water resources to which it had access and established a national water carrier, Mekorot, that conveyed water from existing sources of supply to the various centres of demand from agricultural, municipal and industrial customers. Following the 1967 War, Israel took control of water resources, and developed wells, throughout the West Bank, together with a water supply network serving settlements that linked into the Mekorot network. Palestinian water rights in the West Bank were abrogated, including from the Jordan river. The amount that Mekorot supplies to the settlements is unofficially estimated at some 75 MCM, of which 44 MCM is produced from wells controlled by Israel or settlers within the West Bank.

Economic disparities between West Bank Gaza (WBG) and Israel are large – in 2005, Israel's Gross National Income (GNI) per capita was almost eighteen times the Palestinian GNI per capita. Water resources availability in the two neighbors is likewise far apart, with fresh water per capita in Israel about four times that of WBG. Whereas Israel is known for efficient water infrastructure and management, Palestinians are struggling to attain the most basic level of infrastructure and services of a low income country

Oslo II arrangements on water

In 1995, the Oslo II agreement Article 40 contained provisions on water and sewage that recognized undefined Palestinian water rights, and returned some West Bank water resources and services responsibility to the PA.

Essentially Article 40:

- Set governance arrangements for a five year interim period, notably a Joint Water Committee (JWC) to oversee management of the aquifers, with decisions to be based on consensus between the two parties.
- Allocated to either party specific quantities of the three West Bank aquifers underlying both territories - the share allocated to the Palestinian West Bank was about one quarter of the allocation to Israel and the settlements.
- Provided for interim extra supplies from new wells and from Mekorot - an extra 28.6 MCM was to be allocated to Palestinian needs.
- Estimated "future needs" for the Palestinian West Bank at 70-80 MCM.

This Report investigates the development of the Palestinian water sector under these "interim" arrangements. The general expectation was that this interim agreement would be revised within a five year period. However, it still governs the water sector today, thirteen years after Oslo and nine years after the expected end of the interim arrangement. This Report, examines in turn: (1) the current situation – progress and impacts since Oslo; (2) the principal problems of the Palestinian water sector; and (3) the underlying constraints and their relation to the overall governance environment established under Oslo and to other institutional aspects. A fourth and final section looks at the agenda that faces the Palestinian Authority in trying to develop water resources and services as a means to improve living standards and to increase economic growth.

Part I. The current situation in the Palestinian water sector

Part I of the Report reviews the status of the Palestinian water sector thirteen years after the Oslo accord, and quantifies and discusses impacts on the Palestinian people, on water resources, and on the environment.

West Bank water resources and services

Palestinians have access to one fifth of the resources of the Mountain Aquifer. Palestinians abstract about 20% of the "estimated potential" of the aquifers that underlie both the West Bank and Israel. Israel abstracts the balance, and in addition overdraws without JWC approval on the "estimated potential" by more than 50%, up to 1.8 times its share under Oslo. Over-extraction by deep wells combined with reduced recharge has created risks for the aquifers and a decline in water available to Palestinians through shallower wells. (Chapter 1)

Water withdrawals per head of the Palestinian population have been declining, and there are real water shortages. Palestinian abstractions have actually declined over the last ten years, under the combined effect of dropping water tables and restricted drilling, deepening and rehabilitation of wells. Water withdrawals per capita for Palestinians in the West Bank are about one quarter of those available to Israelis, and have declined over the last decade. By regional standards, Palestinians have the lowest access to fresh water resources. The low availability and high cost of water have led to shortages and coping strategies, with some West Bank Palestinian communities carrying out unlicensed drilling to obtain drinking water. (Chapter 1)

Access to network water supply has increased, with almost half the water now supplied by Mekorot. Since Oslo, there has been a 50% increase in the West Bank Palestinian population covered by network water supply. Overall supply quantity has increased, with increased reliance on water purchased from Mekorot. About 45% of M&I water for West Bank Palestinians is now supplied by the Israeli Water Authority and the settlements. (Chapter 2)

Domestic water availability averages 50 lpcd. Per capita domestic supply is very variable and discontinuous, with relatively small improvements since Oslo. Nominal supply rates to a quarter of the connected population are less than 50 lpcd, with some network services providing as little as 10-15 lpcd, which is at or below the supply threshold adopted by international humanitarian disaster response agencies to avoid epidemics. Actual household use in the West Bank (after deducting industrial use and water losses) is estimated to average 50 lpcd. Precarious and discontinuous operations contribute to the fact that about 50% of households claim quality problems in their drinking water supply. (Chapter 2)

A third of communities, comprising about 10% of the population across the West Bank, still lack network services. Coping mechanisms for the unconnected are typically accessing springs, cisterns and tankers. Unconnected communities pay very high prices for often poor quality water (typically four times more than network water). (Chapter 2)

There has been little progress on wastewater collection and treatment, with negative environmental results. There has been little investment in sanitation since Oslo II, and only 31% of West Bank Palestinians are connected to a sewerage network. Just four towns have wastewater treatment plants, producing poor quality effluent, and there is no planned or regulated reuse of effluent. 25 MCM of raw sewage is being discharged each year in 350 locations. Settlements are also discharging raw sewage to the environment. The failure to develop wastewater systems is the more damaging because under Oslo, water supply quantities – and hence wastewater

quantities – have gone up. The environment and groundwater quality have been the major victims. (Chapter 3)

There are negative impacts on household budgets and on health, particularly for the poor. Water is a significant item in household expenditure, 8% of West Bank Palestinian household income on average, twice the globally accepted standard. In the current economic situation, low capacity to pay is undermining utility bill collection and finances. It is, however, the poor unconnected consumers who pay the highest costs – up to one sixth of their household budget or more. Tanker water costs have been driven up by movement and access (M&A) restrictions, and communities are reducing consumption by up to half. A preliminary study estimates that the extra cost to users of tanker water may add up to 1% of GDP. Water quality is also deteriorating, and there is evidence that water related illness is common. Public health costs associated with waterborne diseases in children below the age of five alone are estimated at 0.4% of GDP based on preliminary assessments. (Chapter 4)

M&A restrictions in agriculture and declining availability of agricultural water carry significant opportunity losses in terms of output and employment. Irrigated agriculture is an important economic sector, contributing about 12% to GDP and employing 117,000 people. Potential exists to expand the irrigated area if water resources are available, and agriculture can play a key economic, social and political role in rebuilding the Palestinian economy. However, the economic downturn, M&A restrictions on movement and export of goods, and dwindling water availability, with almost no new or replacement water sources receiving permits, are sapping the sector. The cost to the economy of foregone opportunity in irrigated agriculture is significant, with upper bound preliminary estimates that could be as high as 10% of GDP and 110,000 jobs. (Chapter 5)

Water resources and services in Gaza

No new sources have been officially developed in Gaza since Oslo II and heavy over drafting of groundwater has led to groundwater quality decline and seawater intrusion. Only 5-10% of the aquifer is now yielding drinking quality water. The population has responded to water shortages with private well drilling and desalination for domestic supply purposes. (Chapter 6)

Network coverage rates are high and supply and availability had improved but border closures and conflict have now led to severe deterioration of water supply reliability. Water supply coverage and water availability are, in principle, better than in the West Bank and availability had risen by 50% between 2000 and 2005. However, since 2005, water supply has become very intermittent and has fallen to crisis levels, largely due to the deteriorating political and security situation which curtails access to power, fuel and spare parts. The private sector and households are coping through unlicensed wells and small scale desalination. The utility revenue base has collapsed and the collection rate has fallen to 20%. Following the December 2008/January 2009 military offensive on Gaza, all conditions have worsened. Damage to infrastructure has had important consequences for service delivery, and substantial rehabilitation is required. (Chapter 7)

Sanitation services in Gaza are also in crisis. Gaza's wastewater collection and treatment infrastructure is inadequate and existing plants provide partial and intermittent treatment. Most sewage is either returned raw to lagoons, wadis and the sea, or seeps through the soil ultimately reaching the aquifer. Unconnected households use cess pits, which in the current economic climate, are not being properly emptied. (Chapter 8)

With such poor water supply and sanitation conditions, health and environmental impacts are predictably severe. Contaminants in water, including high levels of nitrates, are having health impacts on the Gaza population, including reported incidence of "blue baby syndrome"[3]. Terrestrial and marine environments are choked with untreated sewage, threatening health and life. Five people died at Beit Lahia in 2007 in a flood of sewage upon failure of the embankment of an emergency lagoon of partially treated wastewater. One of the two temporary lagoons built after the 2007 accident also collapsed in March 2009. (Chapter 9)

Conflict and closures have undermined Gaza's agricultural potential. Although Gaza is urbanized, it has a vital and potentially profitable irrigated agriculture sector. However, activity has been reduced to low levels. The main problems are the controls and closures that impede flow of goods and access to markets. (Chapter 10)

II. Principal causes of the current situation

Part II of the Report discusses two principal causes of the impacts described in Part I: (i) failings in water resources development and management that have contributed to the low and declining per capita water resource availability; and (ii) the low investment rates and weak management of water services that have led to poor access, high costs and negative health and environmental impacts.

Failings in West Bank water resources development and management

The PWA is unable to conduct integrated management of the resource in the West Bank within the current governance framework. The governance system established by Article 40 requires the approval by Israeli authorities of any proposed PA management measure or infrastructure project within the West Bank. This arrangement, together with the way it has been implemented, gives Israeli authorities control over the allocation and management of West Bank water resources. Israeli territorial jurisdiction in Area C (60% of the West Bank) consolidates this control, which makes integrated planning and management of water resources virtually impossible for the PA. At best, the PA role is reduced to improving water and sanitation services to Palestinian communities within the constraints laid down. As an illustration, the Israeli Water Authority has used its role as de facto regulator to prevent Palestinian drilling in the Western Aquifer, despite growing demand from Palestinian consumers and whilst increasing its own off take from the aquifer above agreed levels. (Chapter 11).

Despite ambitious plans little more than half of the Oslo II "immediate needs" for the West Bank has been developed. So far, planning has been based on the assumption that the PA will develop all new resources agreed at Oslo and in addition get increased access to shared aquifer waters. Actual outcomes have fallen far short of expectations. The new resources accorded under Article 40 for the interim five year period have still not been fully developed. Three wells under the "future needs" allocation have been developed, none of which is operating. Causes of these sub-optimal results include governance and occupation-related constraints, institutional weaknesses, lack of finance, and technical problems with developing the groundwater resource. (Chapter 12)

Palestinian abstractions in the West Bank have dropped below the basic level recognized in Oslo II (113 MCM in 2007 against 118 MCM in Oslo). The main shortfall is in the North East Aquifer. Part of this is due to a drop in the water table because of over-extraction by Israel, and part to

[3] Abu Naser, Ghbn et al. 2007.

inadequate maintenance or impaired rehabilitation of wells. The supply shortfall is made up by Mekorot, increasing Palestinian dependency on Israeli water supply. (Chapter 13)

Water resources are not currently efficiently used in the West Bank and scarce resources are being wasted. High rates of physical losses in conveyance and network supply systems reduce by one third the water resources available in M&I uses, and wastewater reuse in agriculture is currently limited to a small pilot scale.

Low investment and weak management of West Bank water services

Investment – and investment efficiency - in West Bank water supply and sanitation infrastructure have dropped to very low levels. Current investment in the West Bank water sector is one tenth of planned levels. Few major investments are going ahead and more is being invested in small local emergency projects than in large infrastructure projects, such as those required for optimal integrated regional management of resources. In effect, emergency projects have become the norm. Waste water treatment investments have been blocked for a decade, and only one of seven planned new plants (al-Bireh) is operational. Sector investment is inefficient due to poor planning, implementation delays, political and security problems, and the resulting costs. Many investments never get off the drawing board, and when they do, they encounter multiple administrative hurdles for permitting and implementation that lead to higher costs. Finally, in the deteriorating political and economic climate, investment alone is not enough to improve service delivery. (Chapter 14)

Under the prevailing security, economic, water resource and institutional constraints, the performance of the utilities is deteriorating. Utility performance is typically poor, with unaccounted for water averaging 34% and bill collection rates averaging only 50%. However, the performance of the Jerusalem Water Undertaking, a regional utility serving Ramallah-El Bireh, and belt communities east of Jerusalem, shows that in the right conditions, Palestinian operators can be efficient. For most other utilities, lack of institutional autonomy and capacity, water scarcity, run down infrastructure, and security problems, combined with an impoverished and resentful customer base, have led to very poor services and to financial difficulties. Increasing dependence on Mekorot by the water supply utilities makes them vulnerable to Israeli decisions and interventions, and may increase commercial risks and costs. There is a strong need for integrated planning for water resources and services, including at the local level. (Chapter 15)

Underinvestment in Gaza

Gaza has a well designed Master Plan for water and sanitation, but less than 2% of the investment program has been implemented. The Plan provided for an integrated production and conveyance system, and a major expansion of wastewater treatment capacity, including three new plants. It has proved impossible to implement the Plan under emergency closure conditions. By November 2008, with the deterioration in the political and security situation, less than 2% of the investment program was being implemented. Even small relief projects had to be abandoned across the board, due to blocked imports of materials, while hardly any international contractor is prepared to work in Gaza. All conditions worsened with the December 2008/January 2009 military offensive. Fundamental change in the political and security situation is needed to create an environment for renewed investment. (Chapter 16)

III. Constraints to improved investment and management

Part III of the Report analyses the multiple inter-related constraints that have resulted in the poor outcomes described in Parts I and II.

Constraints stemming from Oslo and the occupation

JWC has not fulfilled its role of providing an effective collaborative governance framework for joint resource management and investment. The JWC was established under Article 40 to implement the Oslo Interim Agreement on Water. However, it has not been an effective mechanism for facilitating sector investment. A high proportion of Palestinian projects has been rejected or long delayed in the JWC. Records show that 106 water projects and 12 large scale wastewater projects are awaiting JWC approval, some of them since 1999. According to the records, the pending water projects would have benefited 1.1 million beneficiaries, and the pending sanitation projects almost 800,000. Out of the $121 million of projects presented to JWC in the 2001-2008 period, 50% by value ($60.4 million) have been approved, and one third have been implemented or begun implementation. By contrast, records suggest that all Israeli-proposed projects for development in the West Bank except one have been approved by the JWC. Israeli projects drawing on the shared aquifers on Israel's side of the Green Line, are not presented to the JWC. (Chapter 17)

The JWC does not function as a "joint" water resource governance institution because of fundamental asymmetries - of power, of capacity, of information, of interests – that prevent the development of a consensual approach to resolving water management conflicts. The consensual formal rules, set out in Article 40, are undermined by the informal practices of decision-making and enforcement. A further concern is that some water-related actions and decisions are taken unilaterally by Israel, without consultation in the JWC: for example, where sewage runs untreated towards Israel, Israel has - in some instances - treated it and charged respective costs to the PA. (Chapter 17)

Civil Administration rules place additional constraints on Area C planning and investment. Current project approval rules require a second approval by the Israeli Civil Administration if projects touch on Area C land[4]. The formal rules applied by the Civil Administration are in some ways similar to regular physical planning applications, but are based on outdated regional plans and lack Palestinian participation. Moreover, when combined with security, M&A restrictions and other Israeli concerns in the West Bank, the application of the rules has presented a formidable, often insuperable constraint for Palestinians to get projects implemented. The Civil Administration requirements on effluent quality and connection of settlements have prevented all but one wastewater treatment plant from going ahead. Overall, the result is sub-optimal development and loss of donor funds for Palestinian projects. The added constraints imposed at the Civil Administration further reduce the pace of development and quality of services in WBG's water sector. (Chapter 18).

Taken together, the operation of JWC, Civil Administration rules, the physical M&A restrictions, the institutional weaknesses of the PA and the shortfalls in aid effectiveness have reduced the development of water resources and services for Palestinian people below levels expected at the time of Oslo.

[4] Per Oslo, Area C is under Israeli territorial jurisdiction.

In Gaza furthermore, the closure severely limits the movement of goods and people with negative effects on basic delivery of water supply and sanitation services. The closure of Gaza from Israel and Egypt since August 2007 hinders normal water operations, e.g. by preventing CMWU's ability to drill wells, to stand as conduit and guarantor for donors, or to import chlorine for water disinfection and fuel for operating water and sanitation pumps. Since the December 2008-January 2009 military offensive on Gaza, the continued closure is preventing the import of pipes and other materials needed to rehabilitate destroyed water supply and sanitation systems.

Constraints stemming from Palestinian institutional weaknesses

The institutional architecture proposed for the sector has not been fully implemented. The Water Law provides for sector governance, including separation of resource management and regulation from resource use. However, this vision is not reflected in the present organizational arrangements. The National Water Council has never functioned as intended, PWA operates both as regulator and implementer, and water supply service remains in the hands of several hundred separate municipal water departments and local councils. (Chapter 19)

After a promising start, PWA lost momentum, which needs to be restored. PWA is not performing up to expectations, and has lost capacity because of a range of governance and management problems. One yardstick of institutional capability is PWA's weak ability to negotiate effectively in the JWC. Priorities are to: (1) revise and update the water strategy and investment program; (2) re-launch implementation of major investments; (3) rebuild internal capacity for key functions, particularly planning, strategy and investment programming; (4) strengthen relationships and planning at the decentralized level, with the municipalities and the Joint Service Councils (JSC); (5) work to integrate donors and NGOs better within planning and investment programming; (6) revise by-laws and policies to attract and reward qualified staff; and (7) adopt a more participatory approach with stakeholders and staff. In considering reform of the PWA, there is a need to be realistic about the huge challenges. There are already signs that reform is afoot, and an immediate reform program is emerging, but prioritization and integration will be key. (Chapter 20)

Fragmented water resource access makes water management difficult and may result in inequitable access. Water resource access in the West Bank is fragmented, and largely not in PWA hands. As a result, there is inequity in availability, with Ramallah citizens enjoying 150 lpcd whilst some Hebron households get 10 lpcd. PWA needs to think through resource access issues in anticipation of any future agreement on new resources. (Chapter 21)

Multiple problems have slowed the implementation of the consolidated regional model for water supply, although for groups of smaller communities, the JSC model appears viable**.** The key institutional constraint in water supply remains the "jungle of hundreds of small providers". To resolve the problem, stakeholders have been working on the architecture of regional utilities for a decade, but multiple problems and tensions, exacerbated by security restrictions, are holding up the realization of this institutional vision in the West Bank[5]. While regional consolidation continues to present decisive benefits, it may be time for an institutional review to update its feasibility – especially in the West Bank – linked to revision of the water resources strategy and the investment program. At the level of smaller towns and villages, however, the Joint Service Council idea seems to be making good progress. What is needed are the mechanisms to link JSCs to broader planning and investment capacities. (Chapter 22)

[5] The vision has indeed been implemented in Gaza with the establishment of the consolidated Coastal Municipalities Water Utility.

Constraints related to development partners

PWA leadership is required to bring donors back within a framework for more coordinated and strategic investment. Donors are important stakeholders in the Palestinian water sector, and their incentives and behavior greatly affect investment outcomes. The political situation has often complicated donor positions, and there has been frustration at lack of development effectiveness and at the frequent need to work on an emergency rather than a strategic basis. Coordination is generally held to be quite weak, although a start has been made with a recent strategy note prepared with the donors' Water Sector Working Group (WSWG). Despite the challenges, some donors do see the scope for moving towards a more harmonized and systematic approach. The immediate need is a lead from PWA to bring donors within a framework for coordinated and strategic investment. (Chapter 23)

NGOs are integrating progressively into a more coordinated framework. With the near-permanent crisis conditions, NGOs and small projects have come to play an important part in the investment effort and in the monitoring of water service access conditions. NGOs have a comparative advantage in being nimble – but their interventions may be small scale and short term, and their growing role has brought challenges of planning and coordination. Recently PWA and the NGOs have worked out a scheme of cooperation in EWASH that is working relatively well. One complementarity is that EWASH can take on a vocal advocacy role in the sector. (Chapter 24)

Gaza

PWA operations – and water resource management - in Gaza are effectively suspended. PWA developed a relatively strong presence in Gaza, which is now effectively suspended. As a result, PWA's regulatory function is in abeyance and unlicensed wells are proliferating. The political situation has reduced the effective linkages with Ramallah. (Chapter 25)

Gaza's CWMU is the most advanced of the regional utilities and some benefits have been won, but the model is now vulnerable to the political and economic situation. Since 1996, work has been going on to create the CWMU, and there are already some gains from the model. Although the recent crises have led some municipalities to hesitate, stakeholder views on the CWMU remain cautiously positive and management say there is still determination that the model will work. However, it cannot function properly under the current crisis situation and hence remains essentially still under test. (Chapter 26)

IV. Conclusion: Towards an Agenda

It might have been hoped that Oslo would bring water resources for a viable state under Palestinian control, that enhanced water and sanitation services would improve the living standards of the population, particularly the poor, and that water for agriculture would underpin growth. These hopes have only very partially been realized.

The causes identified in this report are failings in water resources development and management, a low and declining investment rate, and weak management of water services.

The problems that underlie these failings are clear.

- A joint governance system, with asymmetries of power and capacity, that does not facilitate rational planning and development of Palestinian water resources and infrastructure.

- An investment environment that creates huge costs and delays

- Implementation constraints that can make the movement of even one pipe a logistical and administrative challenge

- Weak institutional capacity of the PA for planning, implementation and management

- Development partnerships with donors that move uneasily between the political context and the development challenge and are often stuck in emergency rather than strategic mode.

Essentially, integrated resource management is impossible under current conditions, and the development effort has dwindled to a series of stop gap coping strategies that preclude rational development of the resource and the provision of quality water services to the Palestinian population.

There is also a need to work collaboratively to resolve current unsustainable water practices, particularly aquifer over pumping and lack of pollution control, that – together with a predicted decrease in rainfall in coming decades - could compromise the welfare of future generations in this part of the world

Clearly, the resolution of all these problems will require movement on the political front. Reforming the way in which the JWC and Civil Administration address Palestinian development needs is a priority until such time that the political issues are resolved in final status. The PA does, however, have a narrow margin for improvement, and there is a strong need to prioritize, especially given limited institutional capacity. What then could be priority agenda items for action in the nearer term?

One key area is strategic planning and reformulation of the investment program. A start has been made on this, with the recent *Audit of Operations and Projects*, together with the *Governorates Report* prepared by PWA. These building blocks could form the basis for a participatory planning process involving all stakeholders, including decentralized actors, donors and NGOs.

A second key area is water supply and sanitation investment implementation, where focus could be on high priority projects that bring real benefits to the Palestinian population, particularly the poor, and notably the rural poor. Development of new sources will be a priority, and reduction of unaccounted-for water could also increase supply considerably. Wastewater projects, too, are a priority because of their high social and environmental benefit.

A third area of focus could be on irrigated agriculture, a key sector for the revival of the Palestinian economy. Despite the major impediments described in the Report, there are steps that could be taken in the nearer term, including the technology transfer agenda and the development of plans for wastewater reuse in tandem with investment in treatment.

A final area of focus could be institutional reform, to redefine sector architecture in the light of today's reality and to equip and build capacity in the agencies that have to carry the agenda forward. The challenge is not just at the top, with the PWA, but throughout the system, from the villages leagued in Joint Service Councils and on up through all the small and large service providers.

Work on these four areas could go forward whilst the larger questions of water for a viable Palestinian state are negotiated.

Introduction

A. Background to the Study

Origins and rationale

1. Intensified since the second Intifada in 2000, Israel's restrictions on movement and access (M&A) of people and goods - both within West Bank and Gaza (WBG) and through Israel to the rest of the world - have had dramatic impacts on the Palestinian economy and livelihoods. The multi-faceted restriction system consists of physical impediments (roadblocks, barriers, etc.) as well as permit policies, administrative practices and informal governance processes that effectively limit the freedom of the Palestinian people to move about within WBG, access resources, and engage in sustainable economic and social life, for instance obtain work, invest in business or construction, import, transfer or export goods, etc. The effects of these restrictions are far-reaching, as they impair planned development, private sector initiatives and livelihoods across all sectors.

2. Impacts are indeed felt in the water sector, where such restrictions, adding to the joint resource management and permitting processes agreed under the Oslo treaty, affect normal access to additional water resources, infrastructure development and utility operations and maintenance.

3. The November 2005 '*Agreement on Movement and Access'* recognizes that Israel has legitimate reasons to protect its citizens from violence. However, it also states that this could not occur against the backdrop of Palestinian economic hardship and collapse, and that the relationship between Palestinian economic growth and stability and Israeli security remain unarguable and of fundamental importance to both societies' well-being. According to a 2007 World Bank report[6], access is restricted for about 60% of the land of the West Bank, and M&A restrictions have fragmented the territory into ever smaller and more disconnected cantons. A subsequent World Bank report[7] has described how M&A restrictions relate not only to movement of people and goods, but also to restrictions on access to resources, including land and water. At its May 2008 meeting, the donors' Ad Hoc Liaison Committee (AHLC) expressed concern that the M&A restrictions have increased since the December 2007 donor conference.

4. Many factors contribute to WBG's precarious water services and resource management, starting with the impacts of conflict and water scarcity, as well as governance and capacity limitations in WBG's water institutions. Amongst these factors, exogenous water governance[8] rules and restrictions are perceived as playing a systematic and decisive role in the slow development of Palestinian water resources, infrastructure and services.

5. For this reason, in May 2008, the Ministry of Planning (MOP) and PWA expressed the need for World Bank support to conduct a formal assessment of the systematic delays incurred by

[6] World Bank. 2007. Movement and Access Restrictions in the West Bank: Uncertainty and Inefficiency in the Palestinian Economy (Report No. 40445). World Bank Technical Team, May 2007 http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2007/08/06/000020953_20070806160232/Rendered/PDF/404450GZ0West0Bank0restrictions01PUBLIC1.pdf

[7] World Bank, 2008 *Economic Effects of Restricted Access to Land in the West Bank.*

[8] The term governance in the report refers to decision making structures and processes, unless otherwise qualified in the text.

water infrastructure projects, many of them believed to result from approval deferments and implementation obstacles beyond PA's control. The tailoring of *Poverty and Social Impact Analysis* (PSIA) methodologies to the WBG water sector context, coupled with focused economic assessments, supported by available data on water pricing, public health, and agriculture, was deemed relevant. In July 2008, the Palestinian Water Authority (PWA) asked to also include under explored governance, social and equity issues. PWA expanded the request to an integrated macro-level assessment of the economic, socio-political, conflict, governance, and environmental impacts that M&A and governance restrictions have on Palestinian water sector development.

World Bank role

6. The Bank has been providing technical assistance to PWA since 2006 aimed at building capacity to improve its management of water resources. This has largely taken the form of workshops and learning events for Palestinian stakeholders to share experiences and learn about good Integrated Water Resources Management (IWRM) practices. In 2008, with the new leadership in PWA, a more specific request was received to help build capacity in the organization.

7. A preliminary institutional analysis indicated that while PWA had several internal challenges of improving its performance in its role of resource management and regulation of service provision, an undocumented aspect was the "exogenous" constraints it faced because of the unique nature of Palestinian access to shared water resources with Israel. Constraints to improved performance were therefore at three levels as shown below:

Level I	Palestinian Authority	Access to shared water resources
Level II	PWA	Functions of resource management and regulation
Level III	Palestinian water users	Access to reliable, safe and affordable water services

8. While the "exogenous" constraints appeared to directly impact Level I, and indirectly impact Levels II and III listed above, there had been no systematic documentation of the consequences on the Palestinian economy. The Bank agreed to conduct an objective awareness-raising assessment that would document impacts on project delays; decision-making over access to and control over water sources, wastewater management and infrastructure; livelihoods and coping mechanisms of service providers and consumers; environmental issues; donor activities; and sector dialogue between Palestinian and Israeli authorities and donor community.

9. The goal of the study is therefore to develop a balanced analysis and create awareness of the factors restricting West Bank and Gaza's water sector development (including governance and physical M&A restrictions, capacity weaknesses, etc.) as well as the economic, socio-political, and environmental impacts of such restrictions, duly accounting for other contributing factors (notably governance and capacity weaknesses among Palestinian sector actors). The study is complementary to the economic and sector work that the Bank as well as other donors are engaged in with the objective of building capacity in Palestinian water institutions to serve the population with reliable and safe water services.

10. This assessment is the fourth study in the Bank's "Movement and Access" series[9]. The target audience is PWA, Palestinian and Israeli officials, the donor group active in West Bank and Gaza, and stakeholders engaged in the water sector, including Palestinian water providers and users. The study findings are also expected to be of immediate interest to the donors' Ad Hoc Liaison Committee.

Methodology

11. The study methodology combines standard data gathering and analysis techniques of economic and sector work and of updated poverty and social impact analysis[10], designed to contextualize and deepen the analysis, particularly of the socio-political, governance and environmental aspects. The study approach is tailored to the three levels of constraints discussed in paragraph 7 above. The multi-disciplinary team combined international and local expertise on water resource management, water supply and sanitation, irrigation, sociology, public policy, and conflict.

12. Data was collected through desk research of secondary sources, and through primary fieldwork (in Jenin city and eastern villages, Jayyous, Falamieh, Tulkarem, Hebron, Ramallah, Bethlehem, Gaza City, and Khan Younis, as well as in Tel Aviv and Jerusalem) with a participatory approach using extensive key-informant interviews, focus groups, and consultations with Palestinian and Israeli stakeholders, including five stakeholder roundtables and workshops in September and November 2008, and in February 2009. A distributional analysis showing the disaggregated interests of, and impacts on, the main water sector stakeholder groups was also prepared as part of the analysis and is available separately.

13. The rationale for the participatory approach was threefold: first, to allow for continuous stakeholder dialogue (already begun in 2006) during analysis, to ground the study in Palestinian and Israeli water sector realities, and to facilitate the integration of sector knowledge and local expertise into data collection and analysis. A second purpose was to help to strengthen the institutional capacity of the PA to listen to its clients, and identify critical follow-up actions at all three levels. A third purpose was to provide supplementary qualitative evidence to compensate for the difficulties in collecting reliable data in a challenging political environment. To this end, in addition to working with PWA as principal partner, the Bank met the specific request of the PA Ministry of Planning to involve selected government and non-government stakeholders throughout the study's data collection, analysis and reporting stages. This involvement was principally achieved through the creation of an informal *country counterpart team* comprising representatives from the PWA, MoP, MoA, NSU, NGOs (through EWASH), donors (through the co-chair of the Water Sector Working Group), and local consultants.

[9] The first three reports in the series were: World Bank, 2007, *Movement and Access Restrictions in the West Bank: Uncertainty and Inefficiency in the Palestinian Economy;* World Bank, 2007 *Potential Alternatives for Palestinian Trade: Developing the Rafah Trade Corridor; and* World Bank, 2008 *Economic Effects of Restricted Access to Land in the West Bank.*

[10] World Bank, 2003, *A User's Guide to Poverty and Social Impact Analysis*; World Bank 2008; *Political Economy of Policy reform – Issues and Implications for Policy Dialogue and Development Operations* (Report No. 44288-GLB). Also see Lampietti, Julian A., Sudeshna Ghosh Banerjee and Amelia Lampietti, *People and Power – Electricity Sector Reforms in Central Asia,* World Bank 2006 for an illustration of the use of PSIA for economic policy analysis.

14. Preliminary study findings were discussed during consultations with Palestinian and Israeli stakeholders in February 2009, and the study report was finalized based on stakeholder feedback. In view of the difficulties in obtaining relevant and reliable data, the study should be viewed as a preliminary analysis, with the idea of raising issues for policy debate and questions for additional research.

B. The political and economic context

Disparity between neighbors in economic status

15. *The analysis in this study is necessarily set in a context of unbalanced opportunities between neighbors.* Economic disparities are large. In 2005 Israelis had a GNI per capita of US$21,900, versus the Palestinians' US$1,230 (an eighteen fold difference)[11]. Whilst the Israeli population of 7 million lives at a standard resembling that of Europe or the US, more than 40% of the Palestinian population of 4 million are classified as poor, 38% are food insecure (56% in Gaza),[12] and 16% cannot afford the minimum caloric intake, the basics of survival. Malnutrition rates among Palestinians rose from 12% during the 1995-1997 period to 16% in 2001-2003.

16. *Water resources availability in the two neighbors is likewise far apart*[13]. Each Israeli, including West Bank settlers, enjoys a per capita availability of fresh water resources over four times that of a Palestinian. Although agriculture affords a bigger share of economic output and overall employment in Palestine than in Israel, the Palestinian per capita water budget for agriculture is one fifth that of Israel.

17. *Israel has invested heavily in water management.* Israel has invested extensively over many years in an integrated water resources diversion/abstraction and conveyance system, with a National Water Carrier that transfers water from the Jordan basin and other sources throughout the country. Seawater desalination plants, developed through public-private partnerships, already provide more than 100 MCM of potable water at around 0.50 US$/m3, with more plants planned. An extensive wastewater treatment and reuse system also achieves an exceptionally high rate of water reuse for irrigation, with half of the agricultural water budget being met by treated wastewater. The Israeli Water Authority has over 200 professional staff, and effectively controls water allocations and management throughout the country. Set against this benchmark, Palestinian infrastructure and management capacity are frail indeed.[14]

The history of water in the West Bank and Gaza

18. *Prior to 1967, Israel had developed part of the water resources to which it had exclusive or shared access*. This included about 60% of the total flow of the Jordan River and about 300 MCM of the groundwater of the Western Aquifer.[15]

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[11] World Bank, 2007, *World Development Indicators*.
[12] WFP 2008 cited in preliminary findings of MAS 2009c (draft)
[13] Corresponds to Level 1 as described in Paragraph 7.
[14] Corresponds to Level II described in paragraph 7
[15] For the characteristics of the shared aquifers, see Box 1 in Chapter 1 below. According to the Hydrological Service of Israel (*Development of Utilization* 2006), in 1967 Israel had developed about 300

19. *Following the 1967 war, Israel took control of West Bank water resources.* After Israel occupied the West Bank in 1967, authority over West Bank water resources was transferred to the area military commander (MO 92 of August 15th, 1967). Unlicensed construction of water infrastructure was forbidden (MO 158 of November 19th, 1967). Prior water settlements were declared invalid, and the Military Commander assumed regulatory jurisdiction over water (MO 291 of December 19th, 1968). In 1982, Mekorot, Israel's national water company took control of water resources development and management.

20. *Since 1967, Palestinians have lost access to the water of the Jordan River.* The Jordan River is the most important surface water resource in the region. The West Bank lies within the Jordan basin, and accounts for about 11% of the basin area over the 300 mm isohyet. Prior to 1967, Palestinian farmers had about 150 pumps in the Jordan River, pumping about 30 MCM annually.[16] At the time of the 1967 occupation, Israel abrogated these Jordan River water rights along with all other water rights in the West Bank and it is reported that the pumps were destroyed. At present, Palestinians have no access to the Jordan River, and no Jordan River water is extracted for Palestinian benefit.[17]

21. *Since 1967 Israel developed wells in the West Bank (largely in the Jordan Valley), and a network serving settlements that is linked into the Israeli national network. The settlements are consuming about 44 MCM of water extracted from wells within the West Bank.* The first Mekorot well in the southern West Bank was drilled in 1971, but establishment of a potable supply network to the settlements began in earnest with the settlement expansion under the 1981 Drobless Plan. This network is integrated into the Israeli national water supply network. The amount that Mekorot supplies to the settlements is unofficially estimated at some 75 MCM, of which 44 MCM is produced from about 40 wells controlled by Israel or settlers within the West Bank.[18]

22. *Israel also pumps 10 MCM from wells in the West Bank to sell to Palestinian providers and consumers.* In addition to extraction of water within the West Bank to supply to settlements, Israel also pumps about 10 MCM of water from wells in the West Bank that it then sells to the Palestinians through Mekorot.[19]

Oslo II arrangements on water

23. *In 1995, the Oslo II agreement contained provisions on water and sewage that recognized undefined Palestinian water rights, and returned some West Bank water resources and services responsibility to the PA.* In the context of the Peace Process, water was referred to as a final status issue, but interim arrangements were made until status could be resolved..

MCM of well capacity in the Western Aquifer, 6.5 MCM in the North-Eastern Aquifer, and zero in the Eastern Aquifer.

[16] Estimate by ARIJ, cited in Shuval and Dweik.

[17] Source: Shuval and Dweik: 22, 10

[18] Foreign observers estimated total settler supply at 117 MCM. Sources: Selby:83ff. Shuval and Dweik:13, Messerschmid: "Wassernotstand im Gazastreifen" in: INAMO (informationsstelle naher & mittlerer osten) No. 53, Fruehjahr 2008 (Jahrgang 14) p.46-51 www.inamo.de), and fieldwork interviews, Jerusalem, November 2008

[19] Source: PWA 2008: 9

24. *Oslo allowed the PA jurisdiction over all affairs in Areas A and B of the West Bank, but restricted PA control over "territory-related" issues, including infrastructure planning and water resource management, in Area C*, i.e. over nearly 60% of the West Bank. The general expectation was that the Oslo Agreement would be revised within five years, and that the arrangements with respect to Area C would have ended within eighteen months of signing, except for territorial arrangements to be resolved as part of final status negotiations (i.e. settlements and Jerusalem).

25. The Interim Agreement concluded on September 28th, 1995 contained Article 40 on Water and Sewage (see Box).[20] Essentially Article 40:

- recognized that Palestinians had water rights in the West Bank, although these were not defined
- set governance arrangements for a five year interim period, notably a Joint Water Committee (JWC) to "deal with all water and sewage related issues in the West Bank"[21]
- allocated specific quantities of the three aquifers underlying both territories
- provided for interim supplies from new wells and from Mekorot
- stated Israel's intention to return water supply institutions and infrastructure to the PA.

[20] The significance of this Agreement, as with the Indus River Treaty between India and Pakistan, was that it created a joint governance structure for future access to the region's limited water resources.
[21] i.e. not any issues relating to the portion of the shared aquifer underlying Israel.

Summary of Article 40

Water rights and management principles: "Israel recognizes the Palestinian water rights in the West Bank, to be negotiated in the permanent status negotiations". Additional resources are to be developed. In the interim, management of water and sewage is to be coordinated, according to the following principles:

- Maintain existing levels of resource use
- Water to be managed sustainably
- Use to be adjusted in case of climatic or hydrological variations
- Harm to the resource to be prevented
- Sewage to be properly treated and reused
- Harm from sewage to be prevented

Yields and extraction: A total estimated recharge of 679 MCM of the three shared aquifers is allocated between Palestinians and Israeli users (within Israel and in the West Bank)

Additional water: Future Palestinian needs are estimated at 70-80 MCM a year.

Immediate needs: An extra 28.6 MCM annually will be made available to meet Palestinian needs during the interim period.

Transfer of authority: PA is to have responsibility for water and sewage management for the Palestinian population. Ownership of infrastructure will be addressed in the permanent status negotiations.

Governance and pricing: A Joint Water Committee (JWC) will be established to deal with all water and sewage related issues in the West Bank, to coordinate management of water resources, monitor the resource, oversee the joint supervision and enforcement mechanism, licence wells and approve water resource systems . Joint Supervision and Enforcement Teams (JSETs) will supervise and enforce decisions of the JWC. Water purchases will be at supply cost at the point of delivery.

Source: Article 40

26. *The share of resources from the three aquifers that was allocated to the PA was about one quarter of the allocation to Israel.* Of the total "estimated potential", 483 MCM was allocated to Israel (71%), 118 MCM was allocated to PA (17%),[22] and a quantity of 78 MCM (12%) was left "to be developed" from the Eastern Aquifer (see Table).[23]

Table 1.0 West Bank: Allocation of water resources of the three shared aquifers under Article 40 (MCM)

		Article 40 allocation		
Aquifer	**"Estimated potential"**	**Total Palestinian**	**Total Israeli**	**Total**
Western	362.0	22.0	340.0	362.0
North Eastern	145.0	42.0	103.0	145.0
Eastern	172.0	54.0	40.0	94.0
Eastern (unallocated)				78.0
Total	**679.0**	**118.0**	**483.0**	**601.0**

Sources: Article 40, Table 2

27. *An extra 28.6 MCM was to be allocated to Palestinians for "immediate needs" during the interim period.* In addition to the 118 MCM, an extra quantity of 23.6 MCM of fresh water for

[22] In addition to the 118 MCM, Section 7 of Article 40 provided for a further 20.5 MCM of "immediate needs" to be developed for Palestinian use from the "unallocated" resources of the Eastern Aquifer (see below). Total allocation of West Bank water resources to Palestinians was thus 138.5 MCM.

[23] "Estimated potential" is taken from Article 40 Schedule 10, which also uses the term "total annual recharge", apparently with the same meaning. Subsequent studies show somewhat higher "long term yields" for the Western Aquifer. See Chapter 1 and Table 1.1 below.

domestic use was to be made available to the PA for the West Bank during the interim period, and 5 MCM for Gaza. Of the West Bank increment of 23.6 MCM, 20.5 MCM was to come from additional wells, and 3.1 MCM from Israel supply through Mekorot (in addition to 27.9 MCM already being supplied by Mekorot at the time of the agreement). Of the wells, one for Jenin was to be developed by Israeli authorities, the others by the PA. The wells to supply Hebron, Bethlehem and Ramallah were to be in the Eastern Aquifer or from other agreed sources.

28. *In addition, "future needs" of the Palestinians were estimated at 70-80 MCM.* It has never been clear whether this was an indication of expected future demand over some defined period, or a statement of intent that these resources would be provided from within the water balance.

29. *Has the governance structure envisaged in the "interim" arrangement balanced the interests of Palestinian and Israeli stakeholders?* The general expectation was that this interim agreement would be revised within a five year period as part of the final status negotiations. Thirteen years later the "interim" agreement is still in place. To its credit, the JWC has the merit of being one of only two survivors of 26 joint committees set up at Oslo. More broadly, the question is asked whether the "interim" arrangement can still claim to balance the interests of Palestinian and Israeli stakeholders, ensuring the sustainable use of the resource while supporting a viable Palestinian economy.

C. Structure of the Report

30. This Report examines in turn:

- The current situation – and progress and impacts since Oslo
- The principal problems of the Palestinian water sector
- The underlying constraints and their relation to the governance and political economy environment established under Oslo
- The water agenda that faces the Palestinian people in trying to develop water resources and services.

Part I. The current situation in the Palestinian water sector

31. This Part of the Report reviews the status of the Palestinian water sector thirteen years after the Oslo accord and quantifies and discusses impacts on the Palestinian people and on water resources and the environment. Subsequent parts of the Report examine the causes underlying the current situation and the constraints to improved investment and management.

Note: Because of significant differences in respect of water resources and management, the case of Gaza is examined separately from the overall case and that of the West Bank.

A. Overall and West Bank

1. Water resources and abstractions in the West Bank

Key messages

- Palestinians abstract 20% of the "estimated potential" water resources underlying the West Bank, Israel abstracts the balance and overdraws on its agreed quantum by more than 50%[24]
- Palestinian per capita access to water resources in the West Bank is a quarter of Israeli access and is declining
- Some West Bank communities are resorting to unlicensed drilling to obtain drinking water

West Bank water resources

32. *Most of the West Bank's natural water resources lie beneath its soil in three shared aquifers sometimes collectively known as the "Mountain Aquifer"* (see Box 1). All three of these aquifers derive most of their recharge from rainfall and snowmelt on the Palestinian side of the Green Line. Two of the three aquifers (the Western and North-Eastern, see map) also underlie Israeli territory, with a flow that follows the surface topography, from the West Bank towards Israel. The third aquifer – the Eastern – lies almost completely within the West Bank and discharges towards the Dead Sea. An overall view of Israel's and West Bank and Gaza's shared and non-shared groundwater aquifers is provided in a map below.

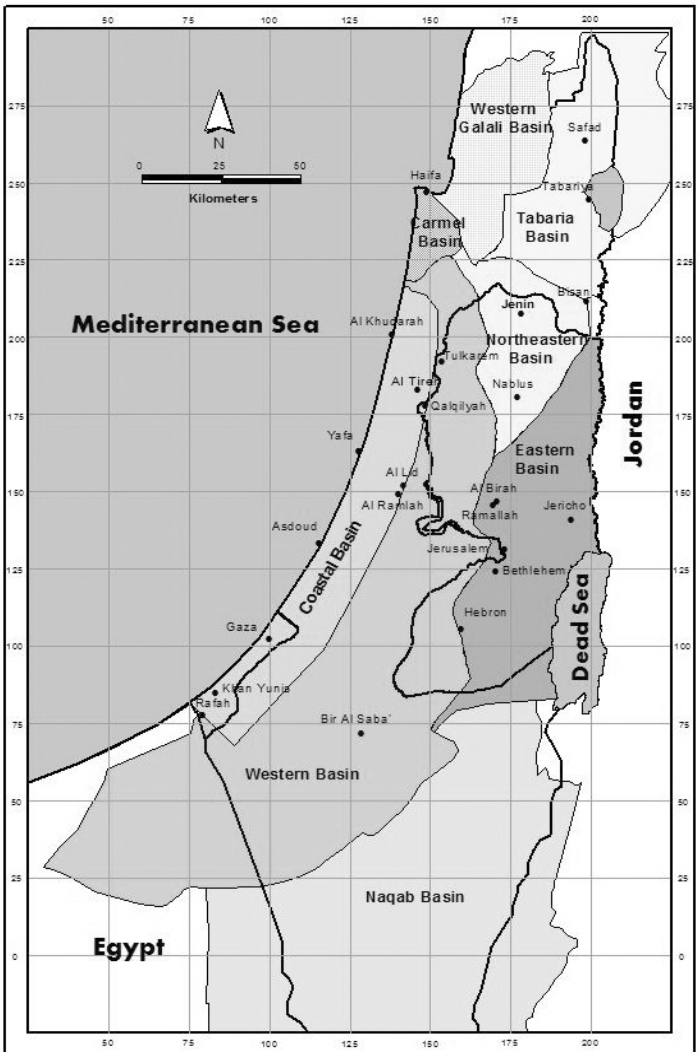
Box 1: The three component aquifers of the "Mountain Aquifer"

With a recharge area that largely lies within the West Bank, three aquifers are commonly referred to collectively as "the Mountain Aquifer". All three aquifers share the same predominant geology, largely karstic limestone formations, and are hydrologically characterized by great depth (average 250 metres) and relatively rapid flow.

The Western Aquifer, with an estimated renewable yield of about 335-450 MCM, flows from the western slopes of the Palestinian hills towards the coast. Water from this aquifer, typically of a very high quality, provides about one fifth of Israel's fresh water, pumped from numerous wells located just west of the Green Line. In the North-Eastern Aquifer, natural replenishment is estimated at between 130-200 MCM. The Eastern Aquifer, estimated recharge of 155-237 MCM, drains to the Jordan River and the Dead Sea. The aquifer lies almost completely within the West Bank and contains locally more saline waters.
Source: Tal & Abed-Rabbo: 14

[24] "Estimated potential" refers to the numbers in Article 40. Observed yields in recent years show variation with those numbers (see Table 1.1 below).

Map of shared and non shared groundwater aquifers



Source: PWA-SUSMAQ (DFID-funded project)

33. *The volume of recharge of the three aquifers is variable, and overall about 4% above the Oslo "estimated potential".* The volume of recharge of the three aquifers varies between years. The long term average sustainable yield of the Western Aquifer appears to be about 10% higher than the Oslo "estimated potential". For the other two aquifers, the long term yield is below the Oslo estimates. Table 1.1 shows a range of estimates of recharge, together with the planning assumption of "estimated potential" that was adopted at Oslo and the long term average yields recorded by the Hydrological Service of Israel.

Table 1.1: Estimated recharge and "estimated potential" of West Bank aquifers (MCM/year)

Aquifer	Estimated recharge range	"Estimated potential"	HSI observed yield 1988-2005
Western	335-450	362	405.3
North Eastern	130-200	145	138.6
Eastern	155-237	172	165.3
Total	**620-887**	**679**	**709.2**

Sources: Recharge range from Tal and Abed-Rabbo: 24. ; "Estimated potential" from Article 40
HSI observed yield from HSI Development of Utilization and Status of Water Resources: 211, 296-8

Current water abstractions

34. *Palestinians abstract about 20% of the "estimated potential" of the aquifers lying beneath the West Bank, Israel abstracts the balance, and in addition overdraws on the "estimated potential" by more than 50%.* Although reliable numbers are hard to find, evidence is that over the years since Oslo, Palestinian abstractions in the West Bank have been in the range 113 MCM – 138 MCM, or about 17-20% of the "estimated potential". The balance from the aquifers – together with a substantial overdraft - was abstracted by Israel, both within the West Bank and west of the Green Line. The figures for 1999 illustrate this pattern (see Table 1.2), showing a Palestinian extraction in line with its Article 40 allocation (118 MCM plus 20.5 MCM = 138.5 MCM, see paragraphs 25 and 26 above), and an Israeli over-extraction of 389 MCM (80%) more than the agreed Oslo allocation of 483 MCM.[25]

Table 1.2: Abstractions from the three shared aquifers within West Bank and Israel 1999 (MCM)

		Abstractions			Excess over Article 40 allocation		
Aquifer	**"Estimated potential"**	**Total Palestinian**	**Total Israeli**	**Total Abstracted**	**Palestinian [26]**	**Israeli**	**Total over-extraction**
Western	362.0	29.4	591.6	621.0	7.4	251.6	259.0
North Eastern	145.0	36.9	147.1	184.0	(5.1)	44.1	39.0
Eastern	172.0	71.9	132.9	204.8	(2.6)	92.9	90.3
Total	**679.0**	**138.2**	**871.6**	**1,009.8**	**(0.3)**	**388.6**	**388.3**

Sources: "Estimated potential" from Article 40. Other numbers from Table 1, Shuval and Dweik:24 Figure 2.9

[25] According to Article 40 (Schedule 8.1a) increases in extraction above the Article 40 allocations "shall require the prior approval of the JWC".

[26] For the Eastern Aquifer, the Article 40 Palestinian allocation from the Eastern Aquifer has been calculated as 54.0 MCM (Schedule 10) plus 20.5 MCM "immediate needs" under Section 7, making a total of 74.5 MCM allocation.

35. *Palestinian abstractions have actually declined over the last ten years.* Contrary to expectations under Oslo II, the water actually abstracted by Palestinians in the West Bank has dropped – from 138 MCM in 1999 to 113 MCM in 2007.

36. Table 1.3 shows reduced Palestinian withdrawals from all three aquifers over the last decade.[27]

Table 1.3: Palestinian abstractions from the three shared aquifers 1999 and 2007 (MCM)

Aquifer	Article 40 allocation	1999	2007
Western	22.0	29.4	27.9
North Eastern	42.0	36.9	26.8
Eastern	74.5	71.9	58.8
Total	**138.5**	**138.2**	**113.5**

Sources: Article 40 allocation from Schedule 10 and Section 7. 1999 numbers from Table 1, Shuval and Dweik:24 Figure 2.9. 2007 numbers from Water Sector Status in West Bank, PWA October 2008

The situation of the shared resources

37. *Over-extraction has created risks for the aquifers.* At a public meeting in Jerusalem on November 26, 2008, the Chairman of the Israeli Water Authority stated that abstractions over the last five years have brought aquifer levels "to the point where irreversible damage is done to the aquifer."

38. *This situation has contributed to a decline in water available to Palestinian people.* In the Western Aquifer, excess abstraction may cause water levels in the upper part of the aquifer beneath the West Bank to drop, reducing the amount of water that could potentially be exploited within the West Bank. In the Eastern Aquifer, there is evidence of deep Israeli wells affecting Palestinian wells and springs (see Box 2). By one report, half of Palestinian wells have dried up over the last twenty years and effects are particularly severe for the generally more vulnerable population groups living in Area C: in 2005, the PWA reported that 328 Palestinian wells were operational in the West Bank, compared to 774 wells in 1967.[28]

Box 2: Israeli wells in the West Bank have dried up local Palestinian wells and springs

At Bardala, in the North Eastern corner of Tubas Governorate, eight Palestinian wells were constructed before 1967 for domestic and agricultural purposes, with depths ranging from 30 to 65 metres. After the 1967 war, Israel constructed two deep wells (Bardala 1 in 1968 and Bardala 2 in 1979) a few hundred metres from the Palestinian wells. The water level in the Palestinian wells dropped at the rate of 2 metres a year, and salinity increased. Now the Palestinian wells are dry, as are most of the local springs used by Palestinian consumers for domestic and agricultural purposes.
At Fasayil in Jericho governorate, Israel has drilled six production wells. The yield of the single Palestinian well in the area has fallen to zero, and the formerly abundant local springs have dried up.
At Auja, the very productive Auja spring, which formerly discharged up to 9 MCM a year, has dried up for months on end through the action of five nearby Israeli production wells. A formerly water-abundant village is now buying back water from nearby settlements.

Source: Jayyous 2008

[27] According to PWA, the main causes for this reduced abstraction are: (1) a drop in spring discharge; and (2) a drop in well production, both of which are attributed to lowered water table.
[28] Applications to deepen or replace these wells have not typically been approved by the JWC or the Civil Administration (see Chapters 17 and 18 below). PWA commented that mention should be made of "the loss of quantum from the Western Aquifer with regard to both agricultural and domestic wells that have been lost to the Palestinian communities due to the separation wall."

Water availability

39. *Water withdrawals per capita for West Bank Palestinians are about one quarter of those for Israelis, and have declined over the last decade.* Water withdrawals per capita (gross water withdrawals divided by the population) were calculated in 1999 as 190 lpcd for West Bank Palestinians, about 1,000 lpcd for Israelis, and about 870 lpcd for settlers. By 2007, availability had declined, and the Palestinian population had access to only about one quarter of the ration of their Israeli counterparts: West Bank Palestinians had about 123 lpcd, and Israelis about 544 lpcd.[29] At the time of Oslo II, Palestinians were using 118 MCM from the West Bank aquifers. By 2007, this had decreased to 113 MCM, whilst the population had grown by about 50% over the same period.[30]

40. *By regional standards, Palestinians have the lowest access to fresh water resources.* The West Bank is the last amongst Jordan Basin riparians in access to available water, with a quarter of the resources available to Israel (Table 1.4).

Table 1.4: Per capita availability of renewable water resources in Jordan basin riparians (2005) [31]

	m3 per capita per annum
West Bank	75
Gaza	125
Jordan	200
Israel	240
Lebanon	1,200
Syria	1,500

Sources: World Bank, 2007 Making the Most of Scarcity PWA, 2007; Shuval and Dweik ;14

Coping strategies of Palestinian water users

41. *The low availability and high cost of water have led to coping strategies.* In Jenin governorate, where poor quality domestic water costs up to 14 NIS/m3, and where the JWC has not licensed further wells, coping strategies may become extreme. In one case (see Box 3), the IDF destroyed an unlicensed village water supply well that villagers were drilling because they had run out of all alternatives for access to safe water at a reasonable cost.[32]

[29] Based on: West Bank Palestinians – 105.9 MCM (113 .5 MCM from Table 1.3 less 7.1 MCM brackish water) and population of 2.35 million (PCBS census December 2007); and Israel – 1,408.6 MCM and population of 7.1 million (source: Israeli Water Authority, data provided November 2008 to the Israeli press for a Global Water Intelligence report *Water Market Middle East*). In addition, Israel had the use of a further 277 MCM of brackish water and storm water, and produced (in 2006) a further 450 MCM of non-conventional water from wastewater treatment and desalination. Taken together, these resources equal a further 280 lpcd, making an aggregate of 824 lpcd, more than six times the water availability for West Bank Palestinians.

[30] A point made in the recent Audit (Audit: 64)

[31] The table shows best estimate orders of magnitude for indicative purposes. PWA commented that numbers for West Bank and Gaza would be lower if brackish water were excluded, especially in Gaza where only a small percentage of water is technically "sweet".

[32] On the topic of unlicensed wells, PWA commented: "all unlicensed Palestinian wells in the West Bank are drilled into the shallow aquifers (either Eocene in Jenin, or Pleistocene in the Jordan Valley) and therefore are not part of the Mountain Aquifer system regulated under Oslo. These wells only draw on Palestinian resources and do not impact Israeli wells."

Box 3: Arrabona village drills an unlicensed well for drinking water

The village of Arrabona lies right on the Separation Barrier, and 2000 dunums of its land are in fact on the other side of it. Although the village itself is in Area B, it is surrounded by Area C. The village uses cisterns and tanker water, at a cost of up to $4/m3. The quality is very poor and there is water-related disease.

For years villagers tried to get a licence to drill a well, but without success. In early 2007, they started to drill an unlicensed well for water supply. When they got to 100m they received a notice from the Civil Administration. They continued drilling. They received a second notice, but continued drilling and reached 274 metres. A villager explains: "The contractor was drilling day and night. But he was afraid. He left, and another came."

One morning soon afterwards, a villager states that "40-50 military vehicles came with a bulldozer. The IDF surrounded the village and called a curfew. They bulldozed two houses and filled in the well."

The villagers have turned the well site into a small play park, with a dry fountain in the middle. They say, "We spent 90,000 shekels for nothing. All we wanted was safe water for our children. Now we have a very expensive play park - and the same contaminated expensive water."

Source: Fieldwork interviews and focus groups, Jenin Governorate, November 19-20, 2008; Jenin case study (Annex 7)

2. The water supply situation in the West Bank

Key messages

- There has been a 50% increase in the West Bank Palestinian population covered by network water since Oslo
- Actual domestic consumption averages 50 lpcd, with some network services providing as little as 10-15 lpcd
- A third of Palestinian West Bank communities are still not connected to networks
- Unconnected households are paying one sixth of their income or more for tanker water
- Almost half of M&I water is now supplied by Israel, 50% of which comes from sources within the West Bank

42. *Since Oslo, connection to safe water supply has improved.* Since 1994, investment has been made to bring safe network water to households and communities, and by 2005 90% of the West Bank population were connected (Table 2.1).[33] As population has risen fast, this represents a 50% increase in the population served, although just a small rise in percentage coverage, up from 87%.

Table 2.1 : West Bank: Population and communities served with network water supply 1994 and 2005

	1993		2005	
Total population	1,492,000		2,123,000	
Population served	1,299,000	87%	1,906,000	90%
Total communities	608		608	
Communities served	326	54%	388	64%

Source: World Bank 2007a II: 38, based on PCBS Census Web Page April 2007 and on PWA 2005 Annual Report

[33] However, a 2006 PCBS sample survey found only 84% of households surveyed were connected to public networks.

Table 2.2: West Bank: Population and communities with network service by region 2005

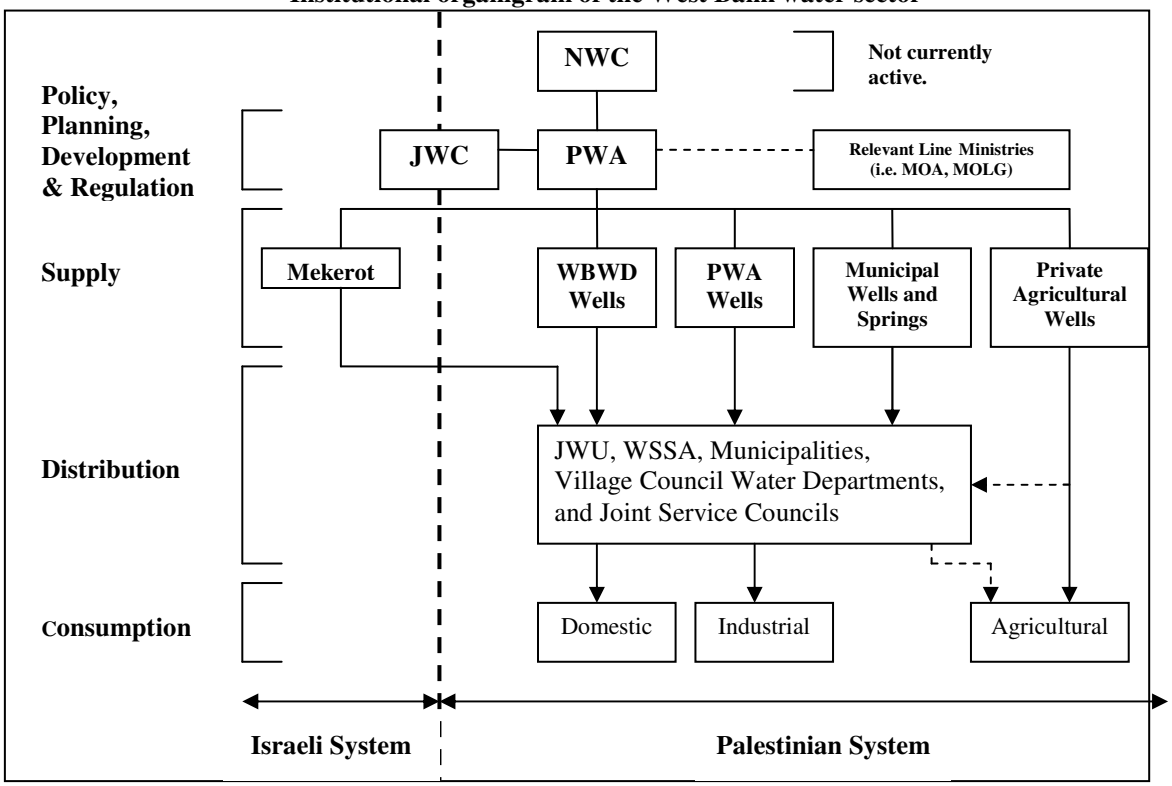
1	% population served	% of communities served
Northern	82%	58%
Central	99%	94%
Southern	94%	54%
Total	**90%**	**64%**

Source: World Bank 2007a II: 40

43. *However, a third of communities across the West Bank still lack network services.* Access remains most problematic in the northern governorates, although significant problems also remain in the south (Table 2.2). The Northern region still has one fifth of the population not served by networks, and almost half of the communities in the Southern region are not connected to networks. The Nablus, Jenin and Tubas governorates in the north are the most poorly served. In the south, almost 60% of communities in the Hebron governorate lack access.

44. *Despite water scarcity and a relatively small geographical reach, the Palestinian water sector in the West Bank features a fragmented and heterogeneous make-up.* As illustrated in the diagram below, the policy, planning and regulatory roles belong to an interministerial body that has met only once, the National Water Council (NWC), and to the Palestinian Water Authority (PWA), along with the Ministry of Agriculture for matters relating to irrigation. On the service side, water production is carried out by the West Bank Water Department (WBWD), PWA, as well as through municipal or private well operators. Depending on the community, water distribution is ensured by regional utilities (JWU, WSSA) and municipal utilities in urban areas, or by Village Council water departments and Joint Service Councils (JSCs), in rural areas. To varying degrees the bulk water supply of these fragmented, often low capacity operators, is dependent on a single high capacity Israeli water company (Mekorot) managing the scarcity through interconnected systems.

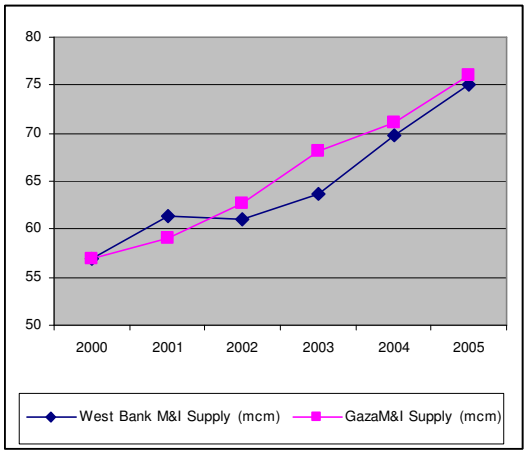
Institutional organigram of the West Bank water sector



Source: PWA (2008) Water Governance Programme and World Bank (2007)

45. *Overall supply has increased, but with increased reliance on purchased water.* Municipal and industrial (M&I) supply quantities have been increasing (Chart 2.1). However, in 2007, 45% of the M&I supply of 84 MCM was purchased from Mekorot, including 10 MCM produced within the West Bank. Despite the development of new "Palestinian" resources under Oslo, reliance on Mekorot water has actually increased – from 22 MCM in 2000 to 38 MCM in 2007.

Chart 2.1: Municipal & Industrial Water Supply WBG 2000-2005 (MCM/year)



Source: World Bank 2007a

Table 2.3: West Bank: M&I water supply by source 2000-2007 (MCM)

Source	**2000**		**2007**	
	MCM	%	MCM	%
Municipal wells	16.5	25%	19.8	24%
PWA wells	2.9	4%	9.7	12%
JWU wells	1.9	3%	2.8	3%
Springs	5.4	8%	5.4	6%
Agricultural wells	2.9	4%	2.9	3%
WBWD	11.5	18%	7.5	9%
Mekorot	21.9	34%	38.1	45%
Settlements	2.0	3%	(2.0)	(2%)
Total	**65.1**	**100%**	**84.2**	**100%**

Source: World Bank 2007a II.42, 6.9

46. *Per capita supply is variable – and extremely low in some towns, with small improvements since Oslo.* Average per capita supply in the West Bank has edged up from 88 lpcd in 1997 to 97 lpcd in 2005, but with wide variations between the best served towns like Jericho (175 lpcd) and Bethlehem (142 lpcd), and the worst served like Tubas (46 lpcd) and Hebron (79 lpcd). Preliminary PWA figures for 2007 show average supply virtually unchanged, at about 98 lpcd.[34] Service is very variable (Box 4), with JWU generally able to supply a 24 hour service, whilst parts of Hebron receive 10-15 lpcd, with water supplied every 40 days. People living in Area C suffer from water shortages due to their generally remote locations.[35]

[34] Source for 1997 and 2005 is World Bank 2007a (Table A2-11), which is based on PWA and PCBS data. Figures for 2007 are based on total supply of 84.2 MCM (Table 2.3) and a population of 2,350,583 (PCBS census, December 2007).

[35] In some cases, supply intervals have extended up to 100 days. For example, it is reported that Dura, despite having a new network, received no water at all May-August 2008

47. *Supply rates to a quarter of the connected population are less than 50 lpcd.* Supply rates to about one quarter of the population connected to the network are less than 50 lpcd. In the southern towns, supply to 16% of people living in connected households is less than 20 lpcd (Table 2.4).

Table 2.4: West Bank: % of connected population with supply of less than 50 lpcd

Region	< 20 lpcd	20-50 lpcd
Northern	3%	14%
Central	1%	12%
Southern	16%	20%
Total	**7%**	**15%**

Source: World Bank 2007a II:.41, PWA 2005

48. *…and there is a big difference between supply and actual household use, with actual household use in the West Bank estimated at 50* lpcd. Actual per capita household availability is typically less than one half of the M&I supplied amount, after taking account of industrial, commercial and public consumption and after deducting the high loss rate, averaging 34%. As a result, it is estimated that the average actual domestic availability and consumption is about 50 lpcd, with many households consuming as little as 20 lpcd.

49. *These extremely low levels of consumption place most West Bank communities well below accepted international standards.* The above average consumptions should indeed be compared with the World Health Organization (WHO) recommended standard of 100 lcpd for optimal water supply, as well as with the "*15 lpcd, 500 meters minimum distance to source*" criterion adopted by international humanitarian disaster response agencies [36] as the bare minimum to avoid epidemics. With water usage as low 10 lpcd in some areas, some communities of the West Bank, notably in Area C, face water access comparable to that of refugee camps in Congo or Sudan. While water salinity is a major problem in Gaza, standards are also not met in some areas of the West Bank, including for some Mekorot supplies, with chloride locally in excess of 250 mg/l.

Box 4: Although connected to the network, households in Bethlehem have very poor water service – and have suffered from the security situation

Bethlehem is connected to the network for both water supply and sewage. The water comes from three wells in Herodian, and from Mekorot. There are also five other wells which are not working. All wells are always pumping at maximum capacity, but cannot meet demand. Water is supplied to households every 2-3 weeks. There were many technical problems in the summer of 2008, and this led to demonstrations against the utility in which people were injured. Water supply is highly intermittent. One customer, Nader, waits for the water to come, then he stays awake pumping until he has filled all the tanks he has on his roof.

Source: Fieldwork interviews, Bethlehem, November 28, 2008

Table 2.5: West Bank: Population not connected to network 2005

Region	Unserved population	Total population	%	Unserved communities
Northern	***173,000***	***952,000***	***18%***	***113***
- Nablus	69,000	332,000	21%	27
- Jenin	45,000	258,000	17%	39
Central	***4,000***	***472,000***	***1%***	***7***
Southern	***40,000***	***699,000***	***6%***	***100***
- Hebron	37,000	533,000	7%	88
Total	**217,000**	**2,123,000**	**10%**	**220**

Source: World Bank 2007a II:.46B, 44

50. *Some 10% of the population is still not connected to any network.* Nationwide, about 10% of the population have no network access (Table 2.5). The situation is worst in the north, with almost 20% of the population without network access, and also severe problems in the southern governorates.[37]

36 http://www.sphereproject.org/ content/view/40/84/lang,English/

37 WaSH MP 2004, monitoring 643 communities, found 200 communities (31%) with no network, and a further 98 communities (15%) with networks in bad condition. Note that WaSH MP data for the total

51. *Coping mechanisms for the unconnected households are typically to use springs, cisterns and tankers. Unconnected communities pay high prices and suffer poor quality - caused in part by M&A restrictions and other Israeli intervention - particularly in Area C.* The unserved communities are mostly small villages in the northern and southern governorates. These generally get water from springs, cisterns or from shallow agricultural wells that are often unsuitable for drinking. Alternatively, they rely on uncertain supplies of dubious quality from tankers, and at prices of 12 NIS per cubic meter or more (see Box 5).[38] This is four to five times the price of piped water purchased from Mekorot (2.6 NIS per cubic meter).

Box 5: Water from non-network sources costs up to four times more than network water

A Household Environment Survey conducted by the Palestinian Central Bureau of Statistics (PCBS) in 2006 found that 84% of West Bank households surveyed were connected to networks.

Households not connected or receiving insufficient water had varying coping strategies:

- 6.6% of households buy water from tankers, of a median quantity of 9 m3 and an average cost of 12 NIS/m3
- 19.2% of households use rainfall collection wells, of a median quantity of 4 m3 and average cost of 6 NIS/m3
- 0.6% of households use spring water, of a median quantity of 4 m3 and an average cost of 3.5 NIS/m3
- Around 1% of households use water from other sources, of a median quantity of 3 m3 and average cost of 13 NIS/m3.

The worst served governorates were Jenin, Tubas and Hebron, where more than one quarter of households were either buying from tankers or using harvested rainwater.

Source: MAS 2009

52. *The case of the villages in North Eastern Jenin illustrates the challenge faced by communities to secure water supply from sustainable approved sources. Some villagers are spending one sixth of their income just on water.* In North Eastern Jenin (Box 6), villagers suffer from very high cost and poor quality water supply, and encounter health and environmental problems from lack of proper water and sanitation services. Current ad hoc solutions rely either on supply from licensed agricultural wells, from unlicensed wells, or from the Mekorot supply point. However, water from the shallow aquifer is of very poor quality, and the spread of unlicensed wells is rapidly depleting the resource. *Some villagers are spending one sixth of their income just on water.* The least cost and most sustainable solution would probably be networked supply from the deeper aquifer, but plans and projects to bring network water to the area have been around for a long time without coming to fruition. The new water that came to the governorate under Oslo is proving inadequate even for Jenin town. While waiting for a solution, local people are continuing to deplete and contaminate the shallow aquifer, with growing competition – and risk of conflict – between farming and domestic needs.

number of communities in the West Bank (674 in 2005, see WaSH MP 2005:13) cite a PCBS source but the number is higher than that used in Table 2.1 (608), also derived from PCBS.

[38] Given the public health problems related to the tanker trade, there may be a case for regulation, and further analysis on this issue would be useful.

Box 6: The villages of the Joint Service Council in North Eastern Jenin

Villages in North Eastern Jenin, along the border with Israel, are trying to improve their status by leaguing in a Joint Services Council. The villagers say "The main problem of our communities is water, the absence of a permanent water source, the high costs of our present supplies. We don't have enough resources for drinking – and we are an agricultural and pastoral area, reliant on water for our livelihood. Even when we pay 12 shekels a cubic metre ($4/m3) for drinking water, the quality is very poor. *Water is our number one problem*". For sanitation, the only solution is cesspits, with emptying that is an environmental and health hazard.

In Deir Abu Daif, the water source is tankers. They buy from the unlicensed wells because it is cheaper. But quality is very poor. "There is a lot of diarrhoea and vomiting, especially during the summer. But what can we do? This is a poor village where agriculture is the only employer. Water is so short that the farm workers often get paid in water." The village council is aware that water stored in underground cisterns may be contaminated by adjacent household septic tanks and cesspits.

Faqua sources its water largely from the Mekorot filling point, by tanker. Ali Abu Dukar says, "The Mekorot water pipe is a few metres from our village. But we have to get our water by tanker. Typically you have to wait two weeks to get a tanker, as demand is so great, and in summer it's worse. For sanitation, we all use cess pits, but with our permeable soils we know that the sewage is polluting the aquifer, and perhaps our cisterns too."

The head of the village council of Jalboun, Ali Khatib, considers "water as a key problem – it affects all social and economic issues. Disease is spreading due to contaminated water. Our problem is that sewage from other areas is contaminating our water. The water we buy is from Abu Daif, and it is contaminated". And water is extremely expensive. The council buys the water at 12 shekels/m3, and sells it to households at 10 shekels/m3. The monthly cost per household is about 350 shekels ($87) or about $1000 a year, *one sixth of the typical household income*. Ali Khatib says: "We have no unlicensed wells in our village. We are against all unlicensed wells – I represent my people on this. But we are penalized, as no unlicensed wells means higher cost water." Jalboun has finally got a licence for a local network project. But the project needs half a million dollars.

Jalama is the only village connected to the Mekorot line, so they get water at one third of the cost.

Arrana gets its water by tanker from a private well nearby, and recently they got a licence to build a conveyor and network to use the well for village water supply. Now for over a year, the village has been seeking financing. The problem is that the yield of the well has dropped (from 45m3/hour to 20m3/hour), and the outlook is very dim.

Deir Ghazala is hooked up to a private well, and has its own network. The well owner sells at the well head at 2 shekels/m3. The village pumps to a reservoir, and then by gravity to households, where the charge is 4 shekels/m3. But unlicensed drilling and drought are leading inexorably to the exhaustion of this village water supply well, which is expected to run dry in 2009.

Source: Fieldwork interviews and focus groups, Jenin Governorate, November 19-20, 2008

3. The sanitation situation in the West Bank

Key messages

- In sanitation, 69% of West Bank Palestinians still rely on septic tanks
- Four towns have treatment plants, effluent quality is poor, and there is no reuse
- 25 MCM of sewage discharged in 350 locations is damaging the environment and groundwater
- Settlements are also discharging raw sewage to the environment

53. *Sewage and wastewater treatment have low coverage and reuse is virtually non-existent.* In the West Bank, only ten towns are served by sewerage systems, of which four towns have treatment plants and none has a reuse scheme. According to PCBS surveys about 69% of the West Bank population still rely on septic tanks. Of the remaining 31% of sewage that is collected by sewers, little is adequately treated. Existing plants at Hebron, Jenin, Ramallah and Tulkarem are performing well below design capacity: current efficiency is 10-30%, and effluent quality is poor.

54. *The failure to develop wastewater systems is the more damaging because under Oslo, water supply quantities – and hence wastewater quantities – have gone up. The environment and groundwater quality have been the major victims.* It is estimated that there are 25 MCM of untreated sewage discharged to the environment each year at over 350 locations in the West Bank. One concerned and experienced Israeli environmental NGO representative commented: "Since Oslo, we have not given enough attention to the environment. Yet more water leads to more wastewater, and hence inevitably to environmental problems. So the environmental problems are in a way a result of success, but the environmental implications were neglected." Settlement sewage has also become a major environmental problem (see Box 7).[39] The Israeli occupation may also prevent the normal operation of wastewater treatment plants: see the case of Qalqiliyya in Box 7.

Box 7: Three settlement sewage problems – and the flooding of an entire city by sewage

An Israeli NGO, B't Salem, is planning to publish a report on three study cases.

- At Azmuth village, the Dar al Khaled wastewater facility was not operating for three years. The leather factory in the nearby settlement was producing highly toxic effluent and a noxious odors. Palestinian protests produced no response from Israeli authorities. Only when the Israeli NGO complained and publicized the problem was the facility repaired.

- Ariel-Salfit has become notorious. Untreated waste water from the large Ariel settlement flows just 15 metres from the spring of Salfit. The sewage recently flooded the spring which is the source of Salfit water supply, and the Palestinian community had to build a 15 m high protection wall. Germany allocated money for a treatment plant for Salfit itself, but for three years Israeli authorities demanded a joint project. Eventually the project was approved. However, when work started, it was said to be close to site of future settlements, and construction halted in 2000. Israel paid 1 million shekels in compensation to Germany. Now a new site has been proposed, but this has been held up by "planning considerations", because the new site is also in Area C. Now Germany is withdrawing – and sewage is still running untreated in the wadi.

[39] PWA commented: "the PA lacks enforcement tools to regulate wastewater in Area B & C, and certainly not to control the pollution generated from settlements."

- At Wadi Fukin, the Beit Ilia settlement treats its wastewater and pumps it to the wadi. But this ultra-orthodox settlement cannot work on a Saturday, and then the sewage runs raw in Wadi Fukin.

In another case, M&A restrictions led to the flooding of an entire city by sewage. In Qalqiliyya, 45,000 people are connected to the sewerage network, and the outflow goes for treatment to Israel. On February 5-8, 2005, the trunk line blocked and the entire city was flooded with sewage and waste water. It took three days to get permission from the army to go out to clear the blockage. This is well documented in a 20 minute film made by AFD.

Source: Fieldwork interviews, Tel Aviv, November 26, 2008 and Jerusalem, November 27, 2008

4. Costs, water quality and health impacts

Key messages

- Water accounts for 8% of West Bank Palestinian household income on average
- Low capacity to pay is undermining utility finances
- M&A restrictions have driven up the cost of tanker water, with an extra cost estimated to be almost 1% of GDP, and communities are reducing consumption by up to half
- Water quality is deteriorating, and water related illness is on the rise, at a cost equivalent to 0.4% of GDP

Costs

55. *Domestic tariffs for network supply are on the whole reasonable – but overall, water is a significant item in household expenditure.* Generally, water supplied through the domestic network costs consumers around NIS 4/m3, and people find this fair. However, given the very low income levels, the PCBS 2003 survey found that average expenditure on water from all sources was about 8% of household income – and much more for low income households (see Chart 2.1 below). This level of water expenditure is double the standard of 3.5% of household expenditure recommended by Unicef/WHO.

56. *High costs and poor service contribute to low payment rates, which may lead to increased dependence on Israel.* This high cost of water in relation to income is one reason why the cost recovery rate for network supply averages 50% nationwide. The government ends up footing the bill – and even then the cost is deducted at source by the Israelis. The case of Bethlehem (see Box 8) illustrates how this failure to pay is undermining the utilities and creating distorted incentives to use Mekorot water, which increases dependence on Israel.

Box 8: Non-payment for water services at Bethlehem

At Bethlehem, the utility charges 5 NIS/m3, flat rate for water, plus 30% for sewage, to make a total of 7 NIS/m3. However, the collection rate is very low. Disconnection is not an option, according to an NGO representative, as "people will hook up illegally", and enforcement is weak. The utility copes by not paying for the bulk water supplied by either Mekorot or PWA. Bethlehem now owes NIS 40 million to PWA (although they say in defence "Hebron owes still more!"). The sewage goes to an Israeli plant, and the Israelis charge 1.7 NIS/m3. The utility does not pay for this either.

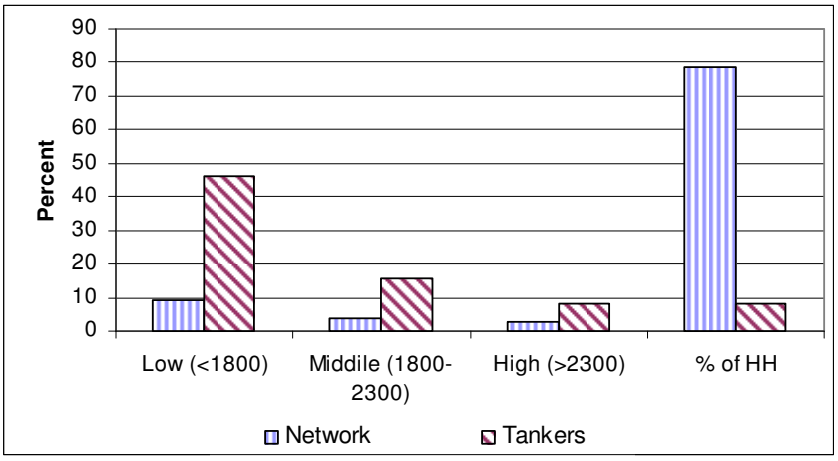
The combination of politicization, poor services, erosion of the economic capacity of the customer base, and the Intifada have brought the utility to a dangerous situation in which service levels are low and declining, and willingness to pay is very low , so that the utility is facing bankruptcy. Collections from customers do not cover operating costs even when excluding bulk water costs. The utility is thus dependent on handouts from the municipality from which it is supposed to be independent.

The utility survives because the unpaid Mekorot invoices are paid by PWA through Israel offsetting of those charges against the VAT it collects on Palestinian imports. The fact that a utility does not actually pay out itself for the bulk water may create distorted incentives to use Mekorot water, and it undermines prospects for the financial autonomy and viability of the utility.

Source: Fieldwork interviews, November 28, 2008

57. *It is the poor unconnected consumers who pay the highest costs – up to nearly half of their household budget – and run the biggest health risks.* The poorest and most vulnerable communities are those in Area C. They are vulnerable to both access controls and to the high cost and poor quality of water. The summer months of June-October are when these communities are most vulnerable. The PCBS 2003 survey was used to compare average water expenditure share of income for each income group (Chart 2.1). The poor who are dependent on tankers may pay out almost half their income on water, five times more than the poor who are connected.

Chart 2.1: The proportion of income spent on water for the different groups[40]



Source: PCBS 2003, MAS 2009

58. *The cost of tanker water has "risen exponentially" since M&A restrictions were introduced – and consumption has dropped.* The very high cost of water is confirmed by surveys

[40] Survey results regarding the percent of income spent by low income households on tanker water appear uncommonly high in 2003, and may be subject to confirmatory updates.

carried out by the Water, Sanitation and Health Monitoring Program (WaSH MP)[41]: "Occupation checkpoints and curfews severely limit tanker access to communities. (The survey showed) that there are 36 fixed checkpoints across the West Bank, including the gates of the Separation Barrier, that seriously affect access of water tankers and maintenance teams to communities….Given the risks faced by drivers for their physical safety coupled with the longer routes, the price of water through tankers has increased exponentially…"

59. WaSH MP has carried out research on the costs faced by communities before the M&A restrictions, and after. The survey found in 85 communities that water prices had increased by a minimum of 60%, and a maximum of 300%. Water prices that before the Intifada were generally in the range 5-10 NIS/m3 were now typically in the range 10-20 NIS/m3. In addition, 68 communities had reduced their purchases of tanker water by at least 50%.[42]

60. *The cost to the economy of tanker water over network water could be as much as 1% of GDP.* Using PCBS 2003 data, a preliminary study estimated that the additional cost at the national level of the use of tanker water over network water could be as high as 176.5 million NIS annually, equivalent to 0.93% of GDP.[43]

Water quality and diseases

61. *Water quality and environmental contamination are of increasing concern in the West Bank.* There is a growing problem with biological contamination, particularly with springs and water tankers. A World Health Organization (WHO) program to treat all West Bank spring water was completed in 1999. Some seven years later, few of the chlorinators installed under that program were functioning and the risk of contamination was evident. Similarly, for the more than 200,000 people without piped water who are served by rainwater and water tankers, alarmingly high rates of BOD pollution are reported. Studies recently undertaken by USAID in the rural areas of Nablus and Hebron governorates reveal the contamination level for tankered water – 38% zero-level faecal coliforms – versus 80% zero level faecal coliforms for piped water.[44] The USAID report goes on to identify "the provision of reliable, piped, treated water as the single most important intervention for increasing health and quality of life in the West Bank".[45] The problem is amply confirmed by the Jenin rural case study (Annex 7).

[41] WaSH MP, founded under the auspices of Palestinian Hydrology Group (PHG), undertakes monitoring of water supply, sanitation and health in Palestinian communities, excluding the main cities. Their reports, available on line, provide information about the actual water and sanitation situation in the surveyed communities.
[42] WaSH MP 2005: 50-1, 45-7, 43-4; WaSH MP 2004
[43] Preliminary calculation from MAS 2009c (draft).
[44] USAID/EHP/Save the Children Report – Village Water and Sanitation Program Phase II, June 2003.
[45] Source: World Bank 2007a:A.11

62. *There is a high incidence of water related diseases.* Water-borne disease is a major problem for Palestinians, creating substantial costs and losses. Epidemiological data is uneven, but there are many anecdotal stories of water related disease. In Nablus, for example, PWA explains: "We have a project to rehabilitate the waste water treatment plant. It is sorely needed. Yesterday 65 cases of diarrhoea were treated in the hospital there."[46] At Burin near Nablus, there were recently 450 cases of Hepatitis A. Students in school were infected. The health impacts on smaller communities unconnected to the network, and for people living in Area C are particularly harsh (see Boxes 9 and 10).

Box 9: Outside the main towns, water and sanitation-related infections are common

In 2003/4, WaSH MP found:

- 41% of communities reported infections related to poor water and sanitation services
- 14% of communities reported dysentery
- 22% reported amoebic infections

In the communities reporting amoeba:

- 39% did not have access to water treatment
- 84% did not have household chlorination
- 52% did not have community chlorination
- 93% do not have wastewater networks

Source: WaSH MP 2004: 64

Box 10: Closures drive up the cost of water – and one fifth of the community falls sick

In November 2002, the community of Jurish in Nablus district were using about 30 lpcd of poor quality tanker water. The cost was high at 15 NIS/m3, a cost driven up by the impact of checkpoints and curfew during the trip of about 3 km from the well. In the community of 1,500, there were 300 cases of amoeba infection at the time, due to the poor quality source and sewage flow and cess pits near to their cisterns.

Source: WaSH MP 2004: 63

63. *The health impacts can be gauged by the high incidence of diarrhoea amongst infants, and the health costs of poor water and sanitation services have been estimated at 0.4% of GDP.* The 2006 PAPFAM survey found that 12% of children under 5 had suffered from diarrhoea in the two weeks preceding the survey. Diarrheal conditions are strongly associated with water quality, hygiene and sanitation. Some 54% of these cases had necessitated a medical consultation. Extrapolating from the nature and cost of the medical treatments involved and without accounting for the losses of adult productivity, it has been estimated that the annual cost of the health impacts of poor water and sanitation on children 5-year old or less, is $20 million, equivalent to 0.37% of GDP.[47]

[46] Fieldwork interview, November 26, 2008
[47] Source: MAS 2009

5. The situation of water for agriculture

Key messages

- Irrigated agriculture contributes about 12% to GDP and employs 117,000 people
- Potential exists to expand the irrigated area fourfold
- However, the economic downturn, M&A restrictions on movement and export of goods, and dwindling water availability are sapping the sector
- The cost to the economy of foregone opportunity in irrigated agriculture could be as much as 10%

64. *Irrigated agriculture is an important economic sector.* Irrigated agriculture, which covers about 12% of cultivated land, uses about two thirds of Palestinian water resources and contributes gross output of about $500 million annually, equivalent to 12% of GDP. Overall, agriculture contributes 25% of exports, and the sector is the third largest employer: formal employment in the sector in 2005 was estimated at 117,000 people.

65. *Agriculture inevitably plays a key economic, social and political role in all plans for rebuilding the Palestinian economy.* Agriculture can create incomes and jobs, can provide independent food security, and contribute to poverty reduction, particularly rural poverty. The sector can create "psychological hope related to the retention of Palestinian land"[48], and can play a role in avoiding a rush to the cities and in maintaining Palestinian physical presence in rural areas (a key consideration given the history of the Israeli occupation and settlement). These effects can be seen already: despite the constraints, the Intifada and closures have brought many of the unemployed back to the farming.

66. *However, the decline in the economy, closures, the Separation Barrier and the M&A restrictions have a particularly depressing effect on Palestinian agriculture.* The general constraints faced by the economy have eroded incentives and reduced potential in agriculture: produce markets are restricted to WBG, purchasing power in that market is very low, and prices of inputs are high in relation to border prices. Palestinian farmers are paying (high) market prices for water. In addition, most agricultural land is in Area C and so is subject to extensive closure, particularly in the Jordan Valley. The Separation Barrier occupied considerable Palestinian land and has cut off productive agricultural areas and wells from the farmers who owned them (see Box 11). The M&A restrictions make movement of produce difficult and expensive.

Box 11a - Agriculture, the Separation Barrier, and "Closed Areas": information from Jayyous and Falamiya

Ten percent of West Bank land now sits in the area located east of the Green Line and west of the Wall. Ten thousand Palestinian people live in this "closed area", and thousands more own land.

Farmers who live east of the Separation Barrier have to obtain permits from the Civil Administration. In the 2008 olive season 452 eligible farmers from Jayyous area applied, but just 110 (24%) were granted permits. One farmer had been to a conference in Europe to talk about how the closure has impacted his livelihood and his family. When he got back, his application for permit renewal was denied. Some lose their crops: "I had 3 dunums of cucumbers. My permit expired, and I lost my entire crop because I could

[48] Source: Agricultural Strategy

not get there to harvest in time."

Permit carriers, when they cross the barrier, are confined to the "closed area", and only between the hours of 6:30 a.m. and 5:30 p.m. Operating times are reportedly arbitrary. Often the gate does not open for days at a time. Equipment and materials have to be taken through and back each day. One farmer was denied access to his damaged plastic house for four critical days and he lost all his seedlings. Israeli settlers are reported to have attacked Palestinian farms, destroying a French-funded irrigation system. The IDF failed to provide protection.

Produce from this fertile region had previously been sold across Israel and West Bank, but is now increasingly marketed only in the West Bank. Nablus, the biggest market, is difficult and costly to access because of the closure regime. Costs have soared and wholesale prices are down 50%.

The mayor of Jayyous says: "Unemployment here is 75% because of the Separation Barrier. People cannot get to their land and cannot get permits to do their work. Half of the population of Jayyous now lives below the poverty line – in an area of the West Bank that, before the restrictions, was relatively wealthy because of its agricultural productivity."

Source: Fieldwork interviews and focus groups, Jayyous and Falamiya November 23, 2008

67. *The sector nonetheless has potential - but is constrained by lack of water and by the absence of knowledge sharing on the more advanced and efficient Israeli practices*. There is a very high interest in expanding irrigation, particularly for protected agriculture, which even under present conditions is profitable. However, all agricultural wells date from before 1967, wells and springs have been progressively drying up, and no new agricultural wells have been licensed (see Chapter 17 below). Current agricultural water use (West Bank and Gaza together) is estimated at about 150 MCM, roughly 10% of agricultural water use in Israel. Per head of the population, agricultural water availability for Palestinians is less than 40 m3, in Israel five times as much (200 m3).[49] Water for agriculture is likely to decrease further because, as demand rises, there are incentives to transfer water out of agriculture to domestic use. In 2007, about 3 MCM was supplied to M&I uses from agricultural wells, and there are active local water markets.[50]

68. *Water shortage has driven up costs.* In Jenin, farmers are paying up to NIS 12/m3 for water to irrigate plastic houses – and some are mining the aquifer in competition with each other - in order to earn a basic living. The causes of these high prices are the dwindling availability of agricultural water and the high transaction costs for water transport.[51] These prices are considerably higher than those paid by (competing) Israeli farmers, who pay less than 1 NIS/m3 (0.818 NIS/m3).

69. *The current costs to the Palestinian economy of foregone opportunities in irrigated agriculture could be a significant percentage of GDP.* Background analysis conducted as part of this assessment [52] estimated the annual losses to the Palestinian economy of three components of the M&A and occupation constraints: (1) land closures affecting 60,000 dunums in the Jordan Valley; (2) 8,920 dunums of irrigated land destroyed to build the Separation Barrier; and (3) irrigated land isolated by the Separation Barrier. A preliminary assessment also attempted to calculate the cost of the lost opportunity in irrigated agriculture due to the fact that out of the total irrigable land of 708,000 dunums only 247,000 dunums are actually irrigated. A simple

[49] Based on 1,400 MCM for 7 million people
[50] Source: PWA 2008
[51] Source: Fieldwork interviews and focus groups, Jenin, November 2008
[52] Effects of Movement and Access Controls on Water for the Palestinian Agriculture Sector, preliminary assessment by MAS 2009 (draft).

extrapolation of employment and productivity data available in the Palestinian irrigated sector, assuming that access to the requisite irrigation water were available for Palestinian farmers, suggests that irrigation underdevelopment in WBG carries a substantial opportunity cost.[53] In aggregate, the foregone gross margin carries an upper bound of $480 million annually (equivalent to about 10% of GDP) and the lost employment opportunity has an upper bound of 110,000 jobs as shown in Table 5.1. This assessment is only indicative but is useful to illustrate foregone opportunities associated with declining water access.

Table 5.1: Upper bound of costs to the Palestinian economy of foregone opportunity in irrigated agriculture

	Loss of gross margin ($m)	Agricultural jobs foregone
Land closures in the Jordan Valley	58.9	12,500
Loss of land to the construction of the Separation Barrier	7.9	1,850
Loss of land beyond the Separation Barrier	2.4	530
Loss due to non-development of irrigated agriculture	410.7	96,000
Total	**$479.9 million**	**110,800 jobs**

Source: MAS 2009

B. Gaza

6. The water resource situation in Gaza

Key messages

- In Gaza, heavy over drafting has led to groundwater level decline and quality deterioration, including from seawater intrusion
- Only 5-10% of the aquifer now meets drinking water quality source standards

70. *The resource is overdrawn and needs to be returned to sustainable levels of extraction.* The sole fresh water resource of Gaza is the coastal aquifer, which also runs beneath the coast of Israel. In contrast to the West Bank situation, Palestinian Gaza is "downstream" of the portion of the aquifer that underlies Israel, with flows coming from Israel into the Gaza portion of the aquifer. With normal flows, the current sustainable yield of the aquifer segment underlying Gaza is estimated at about 57 MCM, around 15% of the total yield of the shared aquifer, which is estimated at 360-420 MCM. Abstractions in recent years have been running well above any estimate of sustainable yield. The overdraft is currently (2008) estimated at 100 MCM, almost 200%. As a result, there has been a continual decline in the static water level, water quality has been deteriorating, and there is an increase of seawater intrusion. Now 5-10% of the portion of the aquifer underlying Gaza is drinkable, with more than 90% of all 150 municipal wells having salt and nitrate levels above WHO standards and so unfit for human consumption.[54]

71. *No new sources have been developed.* Oslo designated 5 MCM of potable water to meet "immediate needs", to be supplied by Mekorot. Following the Coastal Aquifer Management Plan (2001), it was concluded that Gaza cannot supply itself but must find new or alternative sources

[53] Estimates in Table 5.1 assume unconstrained water availability. Opportunity costs would be higher if the Israeli productivity levels were assumed.

[54] Source: PWA Gaza database, CMWU database; communications from Ahmed al Yaqoub and Rebhy Sheik, PWA, February 2009; Messerschmid: "Wassernotstand im Gazastreifen" in: INAMO (informationssstelle naher & mittlerer osten) No. 53, Fruehjahr 2008 (Jahrgang 14) p.46-51 www.inamo.de)

of water, which could be derived from bulk importation, desalination, and waste water reuse. Both a pipeline from Israel to supply the 5 MCM annually agreed upon in Article 40, and a large Gaza desalination plant have been envisaged, but to date neither has been implemented.

72. *The population has responded with a rapid expansion of private well drilling for domestic supply purposes.* Lacking secure access to water, the population has drilled a very large number of unlicensed wells. This has contributed to the long standing degradation of the aquifer through depletion leading to salinization. In addition, lack of wastewater treatment facilities has led to widespread discharge of sewage into the wadis, and to local pollution through inadequate cess pits. As a result, water quality is very poor, with consequent problems for the environment and health.

7. The water supply situation in Gaza

Key messages

- In Gaza, network coverage rates are high but closures and conflict have led to the near collapse of water supply reliability
- The private sector and households are coping through unlicensed wells and small scale desalination
- The utility revenue base has collapsed and the collection rate has fallen to 20%

73. *Water supply coverage is, in principle, better than in the West Bank.* The rate of connections is high, now covering all communities and 98% of the population (Table 7.1). Per capita supply is in principle higher than in the West Bank, and had been going up (average supply of 152 lpcd in 2005, compared with 97 lpcd in the West Bank). Average consumption is, however, only 60% of supply levels, due to network losses. Total M&I supply increased from 52 MCM in 2000 to about 76 MCM in 2005. Actual availability, after losses, increased from 35 MCM to 45 MCM over the same period. Almost all the supply comes from Palestinian controlled sources, with dependency on Mekorot for just 4%.

Table 7.1: Gaza -Population and communities served with network water supply 2005

	2005	%
Total population	1,390,000	
Population served	1,362,000	98%
Total communities	40	
Communities served	40	100%

Source: World Bank 2007a.38

74. *Water quality is very poor and small scale desalination – largely private – has emerged as a stop-gap solution.* A major problem is water quality, with high concentrations of salts and nitrates, compounds that are difficult and costly to remove from drinking water supplies. Between 5% and 10% of water supplied through the network meets potable standards. The poor quality is linked to aquifer overdraft, and to pollution from wastewater seepage and infiltration of agricultural fertilizers. As a coping strategy, the Gaza market has responded by providing private desalination. There are at least 40 private desalination plants selling both wholesale by tanker and retail by jerry can, producing about 2,000 m3 a day.[55] There are also estimated to be more

[55] PWA Gaza commented: "About 20 of these plants are licensed by PWA although there is no capacity to monitor the distribution system of such small scale plants. Hundreds of trucks are transporting and distributing this desalinated water and thousands of small tanks exist at the small shops and supermarkets. Importantly, this water lacks the basic minerals since the majority of minerals are removed by the reverse osmosis process. Unfortunately, this approach of reducing minerals became the competitive criterion among the private sector desalination plants."

than 20,000 home desalination plants. The feedstock is brackish water from wells. Prices are high: NIS 50/m3, but there is no choice. Private production supplements the four public desalination plants run by CMWU (the regional water utility) that produce 1,000 m3/day.[56] Now almost everyone who can, depends on brackish water desalination for drinking[57].

75. *Recently, problems in Gaza water supply and sanitation have reached crisis levels, largely connected to the deteriorating economic, political and security situation.* The closures led to dramatic deterioration in service provision, and the utility has been living from hand to mouth. In November 2008, the CMWU was short of fuel, not only because of closures but also because since August 2008, funds have not been transferred from the PA, due to the inability of PWA to perform its monitoring function (see below, Chapter 25). UNRWA and Save the Children were obliged to step in to provide funds for fuel. The desalination plant at Khan Younis has a capacity of 90 m3/hr, but due to shortage of spares and chemicals it was producing 30 m3 in November 2008.

76. *The closures were having a major impact on water supply.* In November 2008, most water wells had stopped because of lack of spares, others were working at half capacity.[58] Electricity cuts, and lack of diesel for generators, had affected water distribution and pumping up to household reservoirs. The utility had run out of chlorine, indispensable chemical to ensure water disinfection. There was also lack of related chemicals such as anti scalants and spares. Small items such as membranes and dosing pumps were available "through the tunnels" – at twice the price. As a result, at the time, more than 50% of households did not have access to network water, and some households had not had water for more than 10 days.

77. *With the crisis, utility efficiency has dropped and all conditions have subsequently worsened.*. Compared to the West Bank, tariffs were already very low, but in November 2008 cost recovery was more or less in abeyance. The collection rate up to 2001-2 is reported to have been 75%, but was estimated in late 2008 at about 20%. Essentially, the revenue base for commercial utility operations has disappeared, the utility is providing a very poor service, and normal accountability both within the utility and in the customer base has collapsed. The December 2008/January 2009 military offensive caused severe damage to the networks, creating yet worse supply conditions and requiring substantial rehabilitation efforts. In late February 2009, 150,000 people were still cut off from network supply, and in three areas (Sheja'yaa, Zaitoun, and Tal Elhawa) damaged infrastructure had led to contamination of drinking water supply by sewage.[59] The continued closure, now preventing the import of pipes and other materials needed to rehabilitate destroyed water supply and sanitation systems, is therefore worsening negative impacts on Gaza's population and water institutions. It is noted that materials requested to repair damages due to the recent military offensive on Gaza are of the same type as needed for more than 18 months which have not been cleared by Israel.

[56] Source: PWA and CMWU databases
[57] See also Gaza Private Water Supply Case Study Annex 11
[58] Source: Fieldwork, Gaza City and Khan Younis, November 24-25, 2008
[59] Communication from World Bank staff based in Gaza, February 19, 2009

8. The sanitation situation in Gaza

Key messages

- Gaza's wastewater treatment infrastructure is inadequate and plants are functioning intermittently
- Most sewage is returned raw to lagoons, wadis and the sea

78. *Sanitation services in Gaza are also in crisis.* Currently, about 60% of Gaza households are connected to a sewerage network, and there has been some investment in upgrading and extending treatment plants, although the proposed new plants have not been constructed. The system is currently encountering massive problems in both operations and in planned upgrading. The three existing wastewater treatment plants function intermittently, so little sewage is being treated and most is returned raw to lagoons, wadis and the sea. The Gaza City treatment plant has been overloaded way beyond capacity, and it is reported that it has "not been functioning for more than a year".[60]

79. *Unconnected households use cess pits and in the current economic climate they are not being properly emptied.* At Khan Younis, for example, cess pits have been releasing foul water into the aquifer, and also flooding on the roads. Typically, most emptying is by municipal trucks, and there are some discharge points. However, in the current impoverished situation, emptying by truck is too expensive for most households (NIS 20-30 each time). In any case, the treatment plants are not capable of dealing with the extra load. At Khan Younis, a new wastewater treatment plant is planned, but is far from complete and all sewage collected is dumped in storm water drains and into the lagoon. In Beit Lahyia the North Gaza Emergency Sewage Treatment (NGEST) project is under construction to achieve secondary treatment and ultimately aquifer recharge from partially treated effluent now stored in the notorious Beit Lahyia "sewage lake", whose emergency lagoon embankment failed in 2007 causing a deadly sewage flood. One of the two temporary lagoons built after the 2007 accident also collapsed in March 2009.

9. Health and environmental impacts in Gaza

Key messages

- Water-related health impacts on the Gaza population, including the potentially fatal blue baby syndrome, are severe
- The environment is choked with untreated sewage, threatening Palestinian health and life, as well as water resources and the environment.

80. *With such poor water supply and sanitation conditions, health impacts are predictably severe.* It is reported that "26% of disease in Gaza is water related" - WHO reports that from the samples they collect from wells, "the proportion of contaminants is growing fast".[61] A WHO study found a high concentration of nitrates in the water supply from wells in different localities within the Gaza Strip, and this nitrate contamination was found to be the cause of the incidence of "blue-baby syndrome" among infants in the Gaza Strip. Whilst this disease primarily affects

[60] Source: Fieldwork interviews, PWA and CMWU, Gaza City, November 24-25, 2008
[61] Source: Fieldwork interview, WHO, Gaza City, November 24, 2008

young children, nitrate contamination can also affect pregnant women and might increase the risk of certain types of cancer.[62]

81. *The impact on the environment is dramatic.* Wadi Gaza is choked with sewage. Along the Gaza strip, 16 sewage outfalls go direct to the sea, releasing daily about 70-80,000 m3 of waste water (more than 50% of total wastewater) untreated into the sea. Faecal coliform bacteria cluster around the outfalls. Fish are infected, and the coastline is contaminated, impacting the quality of life of Gazan citizens, and the livelihoods of those who depend on marine resources for their income. Due to coastal zone mixing and currents, Gaza's raw or partially treated sewage discharges can affect water quality at the intake of the Israeli desalination plant at Ashkelon. At Khan Younis, storm drains and collecting ponds were constructed. "People could not afford to empty their septic tanks or cess pits, so they connected to the storm water drain. The lagoon has filled up with sewage, polluting the aquifer which is nearing imminent collapse."[63]

82. *The current situation is threatening not just to well-being but to lives as well.* Gaza residents and the international community are fully aware that "water projects are life-saving projects" especially after the Beit Lahyia "lake" of partially treated sewage burst its banks and drowned five people. However, whilst the first phase of the NGEST project is now underway to mitigate the Beit Lahyia risk, the situation in Khan Younis remains unchanged."[64]

10. The situation of water for agriculture in Gaza

Key messages

- Gaza has a potentially very profitable agricultural sector
- Incursions and closures have reduced activity to low levels

83. *Although Gaza is urbanized, it has a vital and potentially profitable irrigated agriculture sector.* In fact, amongst the 80% of residents who are refugees from what is now Israel or their descendants, many were displaced farming families Agriculture is almost entirely irrigated, using about 80 MCM of water annually. The irrigated area is about 82,000 dunums, and the main crops are citrus and vegetables. There is some irrigation with brackish water. Efficiency is high, with average water use of 400-500m3/dunum, low for such a warm climate and intensive production system. Protected agriculture is the norm. If markets are available, agriculture is very profitable.

Table 10.1: Area under crops (in dunums)

Crop	Gaza Strip
Vegetables	40,030
Citrus	39,960
Field crops	2,350
Total	**82,340**

Source: MoA 2004a: 60

[62] Sources: Centre on Housing Rights and Evictions Position Paper (2008) "Hostage to Politics: The impact of sanctions and the blockade on the human right to water and sanitation in Gaza"; and Abu Naser, A, et al. "Relation of nitrate contamination of groundwater with methaemoglobin level among infants in Gaza", Eastern Mediterranean Health Journal, Volume 13 No.5, (September-October 2007), http://www.emro.who.int

[63] Source: Fieldwork interview, Khan Younis Municipality, November 25, 2008

[64] Source: Fieldwork interviews, PWA, CMWU and PMU, Gaza City, November 24-25, 2008; Bank supervision reports for the on-going North Gaza Emergency Sewage Treatment Project

84. *The main problems are water quality and – above all – Israeli interventions and the access controls and closures that impede access to markets.* As discussed above, water quality in Gaza is rapidly deteriorating, and this can have an impact on agricultural yields. But the main constraints are those stemming directly from the political situation, which have resulted in destruction of physical assets and infrastructure, including wells, and restricted access to markets (see Box 11).

Box 11b: A desert of greenhouses

During the Second Intifada, about 370 agricultural wells were destroyed by the IDF. Up to 2008, about 100 had been rehabilitated. But with the withdrawal of the settlers, hope for Gaza's irrigated agriculture sector briefly returned. In September 2005, control of some 4,000 dunums of land where greenhouses formerly operated by settlers once operated were transferred, with international support, to PADICO, a Palestinian company established and owned by the PA. During the first season (2006) the greenhouses were rebuilt and operations were successfully launched, but closures impeded markets, and in 2007 losses were reaching $600,000 a day. The operation had to close, and now the area makes a dramatically sad sight, gaunt steel frames stretching as far as the eye can see, all glass shattered, plastic flapping in the wind.

Source: Fieldwork, Khan Younis, November 25, 2008

Part II. Principal causes of the current situation

85. *Part I of this Report showed how water resource availability and water-related services thirteen years after Oslo II have fallen well short of expectations*. In the West Bank, per capita water availability has declined, and is one quarter of that of Israel. Per capita M&I supply has edged up but marginally, and actual household use probably averages no more than 50 lpcd. Some 10% of the population is still not connected to any network, and is paying very high prices for poor quality tanker water. Lack of waste water treatment is leading to high environmental and social costs. There are significant opportunity costs in terms of lost revenue and employment in the agricultural sector. In Gaza, chronic problems of limited water resources and poor quality have been exacerbated by the political and security situations and their economic and conflict repercussions, so that water and sanitation services are at an extremely low level, and environmental disaster looms over an already acute humanitarian crisis.

86. *Part II of the Report discusses two principal causes of the impacts described in Part I.* First, Level I constraints (failings in water resources development and management) that have contributed to the low and declining per capita water resource availability are analysed. The analysis covers: the difficulty of integrated management of the resource within the current governance framework; inadequate development of new water resources; and sub-optimal management of developed water sources.

87. Second, there is an analysis of the concomitant Level II and Level III constraints (ineffective and impaired investment rates and weak management of water services) that have led to the poor access, high costs and negative health and environmental impacts described in Part I. This analysis covers: underinvestment in water supply and sanitation infrastructure; the poor quality of investment; and sub-optimal management of service provision.

88. Part III will then trace the components that have contributed to these two failings.

A. Failings in water resources development and management

11. The difficulty of integrated management of the resource in the West Bank within the current governance framework

Key messages

- The governance system established by Article 40 requires decisions by consensus between two parties with unequal power. In effect, the way it has been implemented, gives Israel predominance in the allocation and management of West Bank water resources
- The Civil Administration's control over Area C (60% of the West Bank) consolidates Israeli predominance
- At best, the PA role is reduced to improving water and sanitation services to Palestinian communities within the constraints laid down

89. *Israel has de-facto maintained predominance over the allocation and management of West Bank water resources.* Under Article 40 water governance was to be managed jointly based on consensus. However, a number of factors give Israel a preponderant say in the management of West Bank water resources:

- Israel is the residual downstream beneficiary of the water resources in the three shared West Bank aquifers and can extract downstream the quantity it chooses without consultation. Article 40 thus allows Israeli authorities to limit the quantum extracted by the Palestinians in the West Bank, but does not conversely grant the PA the right to limit Israeli withdrawals in Israel, nor, effectively, in the West Bank. .
- Article 40 indicated possible extra allocations for the Palestinians in the Eastern Aquifer and other agreed sources – but the PA has been unable to develop the resource to the degree expected, and still require Israel's permission to do so. Furthermore the PWA is not consulted on decisions by the Israeli authorities or settlers to extract from that aquifer, despite the governance rules under Article 40.
- Israeli authorities have an effective veto over all PA water resource extraction and infrastructure projects (but not vice versa), and take action by force when they choose.
- Israel retains control over most supply lines and the deep wells drilled by Mekorot since 1967.
- Some sixty per cent of the West Bank ("Area C") is under Israeli military law and Civil Administration control, and the PA has de facto no control over Israeli acts within this part of the Palestinian territory. As most water infrastructure has a footprint within Area C, Israel can impose further regulation on Palestinian infrastructure, but not vice versa.
- Even in Area A or B, Palestinian projects require coordination with Israeli authorities to get through the Israeli-imposed import and M&A restrictions.
- Israeli authorities have continual access to water resources data in the West Bank, which the PA has not.

90. *Essentially, Article 40 and the operation of the JWC gives the Israeli authorities ultimate control over the Palestinian water resource, whilst in practice PWA responsibility is reduced to providing water supply and sanitation services to Palestinian communities.* As shown above, the water governance arrangements laid down by Article 40 entail that Israeli authorities remain effectively in control of all West Bank water resources. It is clear that under these circumstances effective integrated water resource management is not possible for the PA. At best, PWA can hope to improve water supply and sanitation services to Palestinian communities within the constraints laid down.

91. *As an illustration, the Israel Water Authority has used its role as regulator to prevent Palestinian drilling in the Western Aquifer, despite growing demand from Palestinian towns.* Although recharge is almost all in the West Bank, Israel exploits the very productive Western Aquifer from within Israel, and has denied PA requests to allow more wells to meet growing urban demand or potential irrigation and industrial demands in the West Bank. Instead, Israel offers to "sell back" water it has tapped from the Western Aquifer (see Box 12). Some of this water originates within the West Bank. Whether this is a more expensive solution for Palestinians – and whether it could make technical and economic sense to exploit more of the aquifer within the West Bank - is a matter to study. That it further increases Palestinian water dependence on Israel is a certainty.

Box 12: Israel is keeping the Palestinians' share of the Western Aquifer to a low level

About 85% of the recharge of the Western Aquifer is in the West Bank, but Israel does not have to drill in the West Bank mountains or to have wells on Palestinian land in order to exploit the aquifer. It is easier and more secure and economical for Israel if it extracts water from the Israeli-side foothills. Thus, 94% of the Western Aquifer yields are pumped from west of the Green Line. In order to keep control of the resource, all Israel has to do is prevent Palestinians from drilling in the West Bank, which it is effectively doing, as demonstrated by its application of Article 40. Israel supplies extra Palestinian needs from Mekorot. The Western Aquifer is at the same time being over-pumped by Israel (see Chapter 1 above).

Source: Field interviews, Tel Aviv, November 21 and 22, 2008

12. Inadequate development of new West Bank water resources

Key messages

- Despite ambitious plans, little more than half of the Oslo II "immediate needs" for the West Bank has been developed
- Only three wells under "future needs" have been developed, and none is operating

92. *Some eight "master plans" have all been based on the assumption that Palestinians will get the water allocations agreed at Oslo II – but actual outcomes have fallen far short of expectations.* Since Oslo, very many development plans have been produced for the Palestinian water sector, including eight variants of a "master plan". These plans set ambitious goals, many of them based on the assumption that the PA will develop all new resources agreed at Oslo, and in addition get increased access to shared aquifer water. The most ambitious and comprehensive is the Water Strategy of 2000, summarized in the *Palestinian Water Strategic Planning Study* (PECDAR 2001) which draws on an exhaustive 10 volume study. The plan is summarized in Box 13. It will be apparent from Chapter 1 above that actual development of water resources has been well below expectations: in 2007, resources drawn by the PA from their own groundwater resources amounted to no more than 113 MCM, an immeasurable distance short of the planning target of 846 MCM by 2020.[65]

Box 13: Palestinian Water Strategic Planning Study – summary of key objectives

- In the short term (up to 2000) to develop all resources agreed under Oslo
- In the medium term (up to 2020), to develop further "developable water resources" within Palestinian territory, including up to 504 MCM from the Mountain Aquifer and 100 MCM from the Jordan River, together with wastewater reuse and conservation gains.
- To expand water supply infrastructure to all domestic consumers, reaching an average supply of 150 lpcd by 2020.
- To expand wastewater treatment and reuse facilities

Source: PECDAR 2001

[65] Source: PWA 6:13

93. *The new resources accorded under Oslo have not been fully developed.* Wells developed to increase Palestinian supply to date[66] are little more than half of the "immediate needs" agreed at Oslo for the five year interim period. Of the 20.5 MCM wells planned to be developed by the PA in the West Bank (see Introduction), 12.9 MCM have so far been delivered (see Table 12.1 and Chart "Status of Implementation"). Wells for the remaining 7.6 MCM are at various stages of preparation or tendering.[67]

Table 12.1: West Bank: "Immediate needs", development and delivery of the "extra 23.6 MCM" under Article 40 1995-2008 (MCM)

	Article 40 "Immediate needs" 1995			**Wells developed and water delivered 2008**		
	Wells	**Mekorot Supply**	**Total**	**Wells developed**	**Water delivered by Mekorot**	**Total**
Israeli responsibility						
- Hebron and Bethlehem		1.0			9.0	
-Ramallah		0.5			9.0	
- Salfit area		0.6			4.3	
- Nablus area		1.0				
- Jenin area	1.4			1.4		
Subtotal Israel	*1.4*	*3.1*	*4.5*	*1.4*	*22.3*	
Palestinian responsibility						
- Nablus area	2.1			2.0		
- Hebron, Bethlehem, Ramallah	17.0			9.5		
Subtotal Palestine	*19.1*		*19.1*	*11.5*		
Total	**20.5**	**3.1**	**23.6**	**12.9**	**22.3**	**35.2**

Sources: Article 40, table "Status of Implementation".
Table "Water Agreement – Obligation vs. Implementation" provided by the Israel Water Authority

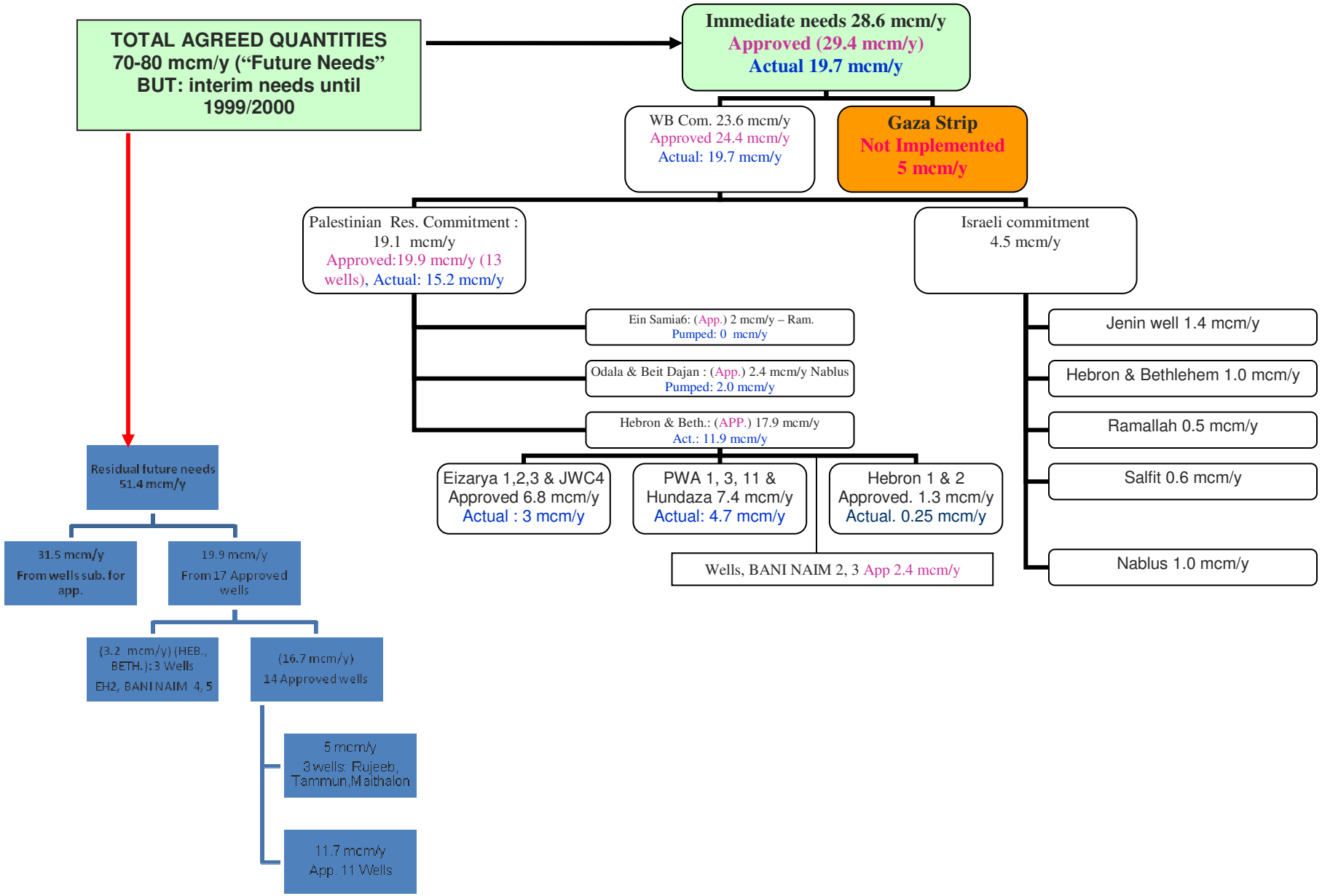
94. *Regarding the "future needs" extra quantum, some development has taken place but it has brought little extra water.* Of the 70-80 MCM "future needs" (see Introduction), the Palestinians have received licenses for 17 wells for 16.7 MCM, and have lodged an application for a further 82 wells for 31.5 MCM. Development of the 17 wells began in 1996 but proved problematic, as sites had to be moved to comply with security requirements, movement of rigs and materials was impeded by M&A restrictions, and technical difficulties were encountered with drilling in the complex geology. To date, only three of these wells have been developed, with a capacity of about 3.2 MCM in total. However, these wells have never operated due to the lack of funds available to install the necessary electromechanical works, and –in the case of one well - the lack of network connection.[68]

[66] Approximately 14 years after Oslo and nine years beyond the originally intended close of the Interim Period

[67] The Israeli Water Authority says that actual well permits issued for the Palestinians by the JWC total 50 MCM from 59 wells, much above the 19.1 MCM foreseen in Article 40. PWA states that the 50 MCM is an overestimation – actual pumping is 19.7 MCM - and that the 59 wells reflects replacement wells and monitoring wells as well as new wells.

[68] Source: PWA West Bank database. Commenting on a draft of this Report, the PWA expressed doubt about whether further resources could be economically developed in the Eastern Aquifer.

Status of Implementation of the Agreed upon Additional Water Quantities (According to Article 40)



95. *Causes of these sub-optimal results include governance and occupation-related constraints, institutional weaknesses, lack of finance, and technical problems with developing the groundwater resource.* The causes of this failure to develop the resources allocated under Article 40 include constraints stemming from the governance system and the Israeli occupation (see Chapters 17 and 18 below); the weakness of Palestinian planning and technical services (see Chapters 19-22 below); and lack of donor support or poorly articulated donor coordination (see Chapter 23 below). Some technical factors have also played a role. In particular, the Eastern Aquifer has proved more difficult to exploit than expected because of the complex geology of the region and the unfavourable sites assigned.

13. Sub-optimal yield of developed resources and dependence on Mekorot

Key messages

- Palestinian abstractions in the West Bank have dropped below the basic level recognized in Oslo II
- Part of this is due to a drop in the water table, and part to poor Palestinian O&M of wells
- The supply shortfall is made up by Mekorot, increasing Palestinian dependency

96. *Palestinian abstractions from West Bank aquifers have dropped below even the base levels recognized in Oslo.* As discussed above (Chapter 1) they are estimated at 113 MCM in 2007 against 118 MCM in Oslo.

97. *The main shortfall is in the North East Aquifer.* The main shortfall for the PA in using the Article 40 allocations is in the North East Aquifer, where 27 MCM was abstracted in 2007, compared to the allocation of 42 MCM (17 MCM from wells and 25 MCM from springs – see Table 1.3 above). The explanation for this offered by the PWA is that most of the Palestinian wells and springs are in the shallow aquifer which is most affected by a drop in the water table, whereas Israeli wells are in the deeper aquifer.

98. *In addition to the dwindling of the resource, there are issues of well management, particularly of the deep wells which require careful operation and maintenance by trained technical staff.* The chronic problems encountered in managing the deep well at Jenin developed by the Israeli authorities under Oslo and handed over to PA management underline the problem (Box 14).

Box 14: At Jenin, there are currently big problems in supplying bulk water, despite development of new resources under Oslo

To relieve the longstanding supply problems of Jenin town, a well agreed as part of Oslo and financed by USAID, was drilled in the deep aquifer, capacity 4,800 m3/day, and handed over to the PA in 2000. However, operation has always been problematic, with frequent breakdowns. German Cooperation set out to help with pump replacement, but problems were encountered due to pump standards incompatibilities. To this day, the Jenin wells are often out of order and produce well below capacity.

The Israeli authorities say they warned the Jenin operators of the need for preventive maintenance of the well before the drought summer of 2008. However, the pump still broke down frequently, and Jenin was without water for 15 days in July 2008. At present, total supply to Jenin town is about 5,500m3 a day, half what is needed to maintain 24 hour service.

Supply gaps for the town are met from a Mekorot filling point for tankers, financed by USAID and completed in 2003. Capacity is 1,000m3 a day, but actual off take is 600-700 m3 from the filling point each day "because of the high cost".

Source: Field interviews, Jenin, November 19-20, 2008

99. *The supply shortfall is being made up by Mekorot, increasing West Bank dependency.* The failure to develop new water resources has led to chronic supply shortages – in Hebron and Bethlehem for example. Mekorot water has become an increasingly important substitute for Palestinian controlled water resources. In 2008, Mekorot supplied an additional 22.3 MCM, 19.2 MCM more than the Article 40 commitment of 3.1 MCM (see Table 12.1). Total incremental water availability in the West Bank in 2008 was thus 35.2 MCM, 50% more than the Article 40 interim figure of 23.6 MCM – but with a rebalancing between the share provided from Palestinian-owned wells and the share provided from Mekorot. In the event, the dependence of the West Bank on Mekorot has increased significantly – exactly the opposite of the Palestinian aspiration for more water autonomy and self-sufficiency. However, the extra allocation from Mekorot is at least a de facto recognition that the West Bank needs increasing supplies of water, and that the promised wells are not supplying it.

100. *Water resources are not currently efficiently used in the West Bank and scarce resources are being wasted*. High rates of physical losses in conveyance and network supply systems reduce by one third the water resources available in M&I uses, and wastewater reuse in agriculture is currently limited to a small pilot scale. There are considerable economic losses caused by these inefficiencies. In addition, advances in water practices in Israel have not been widely adopted by the Palestinians. Israel has made notable strides in water conservation, such as reducing water use in agriculture from 8700 m3 per hectare in 1975 to 5500 m3 per hectare in 2002, while the value of agricultural output increased twelve fold. Other advances in the field of wastewater reuse, desalination and pricing of environmental services are also not currently practiced by the Palestinian neighbors.[69]

B. Low investment and weak management of West Bank water services

14. Underinvestment in West Bank water supply and sanitation infrastructure

Key messages

- Current investment in the West Bank water sector is one tenth of planned levels
- Few major investments are going ahead and more is being invested in small emergency projects than in large infrastructure
- Waste water treatment investments have been blocked for a decade
- Sector investment is inefficient due to fragmented contingency planning. the high risks of delay, the political and security problems and the resulting costs
- In the deteriorating political and economic climate, investment alone is not enough to improve service delivery

101. *The investment program and disbursements have been well below expectations – and have plummeted recently, with emergency projects "becoming the norm".* Total investment needs for the water sector were calculated in the *Palestinian Water Strategic Planning Study* (PECDAR 2001) at around $260 million a year. Actual investment, however, averaged $90 million annually 1997-2004. Subsequently investment declined further, to an average of $47 million 2005-7. In 2008, the PRDP budget for water was $138 million over three years - but according to PWA, only $20 million was disbursed in 2008. Hardly any major projects are currently going ahead, and as much money is being invested in small emergency projects ($26.2 million in 2008) as in major infrastructure.[70] "In current circumstances," OCHA

[69] See Steven Plant: "Water Policy in Israel", Policy Studies, Vol 47, July 2000. Jerusalem: Institute for Advanced Strategic and Political Studies, and Nir Kedmi; Discussion Paper "Integrated Water Resources Management", Economics and Standard Division. Ministry of the Environment. (undated)
[70] See Chapter 24 below.

commented, "*emergency is now the norm.*"[71] Stakeholders recognize the inefficiency and high costs of such fragmented and contingency infrastructure development– but see no alternative.

102. *Sanitation projects have been subject to extraordinary delays and constraints, and only one of the seven planned new plants is operational.* In the planning phase immediately after Oslo (1995-9), seven large treatment plants were identified. These plants were incorporated in the ambitious wastewater treatment and reuse plans in the *Palestinian Water Strategic Planning Study* (PECDAR 2001, see Box 15). However, after more than a decade of effort, al Bireh is the only functional wastewater treatment plant that has been established since Oslo. Two further plants are now in principle approved (Nablus and Hebron), but work has not yet started. Little has been done to connect more households to the sewage network.

Box 15: The plan for wastewater treatment and reuse

- Rehabilitation of all existing plants as a priority
- All future programs should integrate reuse wherever possible
- All main towns should be covered by networks by 2020
- Existing plants will be extended and improved, and 15 additional plants will be constructed
- By 2005, the large urban municipalities will be served by 11 operational central treatment plants
- By 2020, there will be another 16 central treatment plants, and extensions to the original 11.
- Treatment plants will be located close to agricultural lands
- Receiving stations will be set up and wastewater tankered there from communities under 10,000 population
- Treatment standards will be:

	Recharge	**Reuse**
Suspended solids	30 mg/l	15 mg/l
BOD	20 mg/l	10 mg/l
Nitrate	30 mg/l	10 mg/l
Faecal coliform	1000/100 ml	200/100 ml

- An institutional structure will manage wastewater reuse strategy
- Programs will provide support to farmers for reuse

Source: PECDAR 87ff

Investment efficiency

103. *Investing in water and sanitation in the West Bank is inherently risky and high cost.* Many factors discussed in this Report combine to make investment a risky and high cost business. They include: the governance arrangements for investment approval by JWC and the Civil Administration; institutional weaknesses in planning and implementation; the inefficiencies inherent in donor aid; and the more or less permanent political and security emergency.[72]

104. *Many investments never even get off the drawing board.* A small sample of three flagship investments from the sanitation master plan will illustrate the problems:

- The proposal for the Euro 5 million Salfeet wastewater treatment plant was submitted to the JWC on November 28th, 1996. Approval was given by the JWC but the Civil Administration refused permission on security grounds, and a new site had to be

[71] Fieldwork interview, Jerusalem, November 17, 2008
[72] See Part III for a full discussion of these issues.

designated. After representation of the project, the Civil Administration then required that the plant treat also the wastewater of Ariel settlement. PWA rejected any act recognizing a settlement. The project is now frozen and the donor has withdrawn.

- The proposal for the Euro 26.5 million Nablus West wastewater treatment plant was submitted to the JWC on August 8th, 1997 and approved by both JWC and the Civil Administration. However, security requirements in Area C during and after the Second Intifada have made access to the site and the transport of equipment and materials impossible and the project has not gone ahead.

- The proposal for the Euro 45 million Hebron wastewater treatment plant was submitted to the JWC in 1999 and approved. The Civil Administration required a series of modifications, including increase of effluent quality to "10:10" standards, entailing a 60% cost escalation to Euros 75 million. PWA and the donor have been unable to proceed with a project that has such a high capital cost and the risk that subsequent O&M will be unaffordable.

105. *Even well-managed investments encounter multiple problems and higher costs.* Even in the best managed utility, problems are encountered in implementing projects (see Box 16).

Box 16: The Jerusalem Water Undertaking is well-managed but still encounters difficulties and higher costs in project implementation

The Jerusalem Water Undertaking (JWU) is a Palestinian utility serving Ramallah-El Bireh, and other communities east of Jerusalem. JWU is widely considered as well managed and enjoys good relations with the Israeli authorities, but still encounters difficulties. According to a JWU representative, if there is a problem with operating the six wells, "we call Shahal (an Israeli company)". There can be problems getting equipment or goods in. "We call KfW and they help, or we call an Israeli fixer – or we speak to the Civil Administration direct. We discuss the goods – whether it's pipes etc." But despite these arrangements, JWU can have major problems: in 2008, water meters arrived from the UK, and stayed at the docks for six months. JWU explains: "We had to pay NIS 400,000 in customs and demurrage. They did this to force us to buy meters from them. So usually, we must get our spares from Israeli companies."

These restrictions add to costs. The JWU reckons the extra cost is 10-12% above what prices would be under competition. "And the checkpoints make business harder generally."

Getting JWC and Civil Administration permits to drill a new well is hard. Water resources are getting short, so about ten months ago (in early 2008), JWU applied for permission to drill a new well. Permission was granted by JWC for a well at Hezmah. But because it is in Area C, the well requires Beit Il (i.e. Civil Administration) clearance: According to JWU, "they keep saying move it 50 meters, 60 meters… Then there is the hassle of getting approval for the pump. And so on."

Source: Fieldwork interview, Ramallah, December 1, 2008

106. *Investment alone is not adequate to improve services.* In the deteriorating political and economic climate, investment alone is not enough to improve service delivery. Often, too, PA management of investments has been inadequate. The Jenin case (see Box 17) shows how even after an investment program, a utility may be unable to improve service delivery.

Box 17: The Jenin case shows how even after an investment program, a utility may be unable to improve service delivery

Rehabilitation and improvement of water supply for Jenin Municipality was a priority under the PWA strategy. Extra water resources were allocated at Oslo, and KfW agreed to support a Euros 4 million program for rehabilitation of the network, and for institutional development, building up the water department as an autonomous entity, separate from the municipality. The project started in 1999/2000. However, then came the Intifada. KfW maintain that the "despite Israel incursions and a big battle in the camp, we finished the project in a proper way, there were accompanying measures, including training." Unfortunately, little of the project gains have been sustained, and the Jenin utility (see Box 19 in Chapter 15) has very poor performance.

Source: Fieldwork interviews, November 19-20, 2008

15. Sub-optimal management of service provision in the West Bank

Key messages

- Utility performance is very poor, with unaccounted for water averaging 34% and collection rates averaging 50%
- JWU shows the conditions for success
- However, for most utilities lack of institutional autonomy and capacity, water scarcity, run down infrastructure, security problems and an impoverished and resentful customer base form a vicious circle of deterioration

107. *Part of the problem of water supply is the poor performance of the agencies responsible for supply.* An assessment of this performance is beyond the scope of this report, but two headline indicators will show the situation. First, across the West Bank, unaccounted for water averages 34% (2007 figures), amongst the highest in the region. This indicates poor management, inadequate operations and underinvestment in maintenance.[73] Second, bill collection rates average 50%, indicating a widespread breakdown in business management, and customer dissatisfaction linked to the poor and deteriorating quality of service.

108. *…..and yet under certain conditions good performance is possible, as in the case of JWU.* The case of JWU (see Box 18) essentially shows that where a utility has a certain scale, an assured source of water, investment finance and technical support for capacity building, a business-like approach and a relatively prosperous and satisfied customer base, it can be run as efficiently in the West Bank as anywhere else.

109. *By contrast, the Jenin case (see Box 19) illustrates almost the opposite*, that where there is no institutional autonomy, water is scarce, relations with Israeli sector counterparts are poor, and the customer base is impoverished and resentful, the services get into a decline which cannot be reversed even by committed staff and external aid.

[73] A further possible reason raised in Palestinian comments on a draft of this Report is that there are numerous unauthorized connections "located in Area C which is not controlled by the PA".

Box 18: Jerusalem Water Undertaking (JWU) case study

JWU is one of two water suppliers in the West Bank to have legal status as an autonomous utility. JWU operates 6 wells, pumping from a depth of 1,500 metres, but most of JWU's water, about 80%, comes from Mekorot. JWU comments: "We suffer from water shortages every summer. Mekorot does not give us enough water. Until 2008, Mekorot used to deliver 32,000m3 a day, but now Mekorot has decreased the amount to 26,500m3."

JWU is efficiently serving a third of a million people, with good supply standards, although shortages mean that full service cannot be maintained in the summer. The utility aims to achieve business self-sufficiency. Tariffs are set for full cost recovery levels and are regulated by PWA. JWU has a relatively prosperous customer base and upholds good financial management discipline. In 2007, net cash flow was positive (NIS 0.5 million). JWU even has the financial viability that enables it to secure its own investment loans, albeit on very soft terms. However, unaccounted-for water (UFW) is relatively high at 25-30%, a marked deterioration from 2002 when the rate was 21%.

Source: Fieldwork interview, Ramallah, December 1, 2008

110. *Both cases illustrate the dependence of the water supply utilities on Israel and their consequent vulnerability.* Both cases underline the need for adequate water supplies and easing of the problems caused by the Israeli occupation. They also show the risks of dependence on Israel in terms of vulnerability to Israeli decisions and interventions in a conflict context, the impossibility of planning rationally when the PWA controls neither the land nor the water, and the higher financial cost and commercial risk of having to work always with Israeli partners. The cases also show the risk that "paying" for bulk water and for wastewater treatment services by "deduction from tax (VAT) revenues" could create permanent perverse incentives for increased dependence on Israeli bulk water supplies and thus encourage the underdevelopment of Palestinian resources.

111. *The Jenin case also illustrates the need for integrated planning, including at the local level.* Also clear from the Jenin case study is that there is little integrated planning involving PWA at the decentralized level. Planning is critical to ensure adequate water supplies and also to avoid the emerging conflict between domestic and agricultural uses in very water short areas.

Box 19: Jenin Urban Water Supply

The Jenin utility has a semi-autonomous status and serves 43,000 people through 7,000 water connections. Sewerage coverage is "40-45%", with about 4,000 connections. Performance is very poor, and there are signs of a utility close to meltdown, unless action is taken soon. Water is supplied very intermittently, and some areas have not received water for four months. The tariff schedule would not cover O&M, and the collection rate, which according to the manager, "was 75% before the Intifada", is currently 32%. Arrears currently amount to NIS 16 million. The negative cash flow is covered by the fact that the Municipality does not actually pay Mekorot for water – it is offset from tax revenue. Following the KfW project, unaccounted for water (UfW) is down from 50%, but still stands at 36%.

Human resources are well developed thanks to the project – but staff are completely demotivated. The director says: "Most staff would leave if they could find another job. Because we have a headache all the time. There is nothing on the ground that makes you hope." He continues: "Why spend my life here for nothing?" In fact, he and his Deputy are alone in the office – the other staff are all on strike, because they have not been paid for three months.

Source: Fieldwork interviews, Jenin, November 20, 2008

C. Underinvestment in Gaza

16. Planning and investment for water supply and sanitation in Gaza

Key messages

- Less than 2% of Gaza's investment plan has been implemented
- Even small relief projects have had to be abandoned across the board
- No international contractor is prepared to work in Gaza
- Fundamental change in the political and security situation is needed to create an environment for renewed investment

Master Plan for water supply and sanitation

112. *The Gaza Master Plan provided for an integrated production and conveyance system*, based on increased supply from local aquifers together with desalination as the two supply sources, construction of a water carrier from the West Bank, and the creation of a regional utility and an integrated bulk water system within Gaza.

113. *For sanitation, the Master Plan proposed a very large expansion of wastewater treatment capacity, including three new plants.* The Master Plan proposed ambitious plans for Gaza sanitation and waste water treatment, including rehabilitation and extension of the three existing plants at Gaza, Beit Lahia and Rafah, and construction of three new regional treatment plants by 2005, to serve the northern, Gaza City and southern areas.

Plan implementation

114. *It has proved impossible to implement the plan under emergency closure conditions.* The Master Plan should have been completed four years ago, but implementation has been frustrated by the effect of the continual closures and incursions. PWA and CMWU staff say: "We tried with emergency funds to implement the main investments: (1) the main carrier; (2) replacement of 95% of the network and (3) brackish water desalination plants. But since 2002, there have been only "band–aids".[74]

115. *With the deterioration in the political and security situation, only emergency projects were being implemented in November 2008.* Records of 54 water and sanitation projects for Gaza show how implementation was being affected in November 2008 by delayed approvals and closures. Of the 13 planned projects of value over $1 million (see Table 16.1), three had been completed, for a value of $4.4 million out of a total book value of the projects of $386.9 million. Two of the completed projects – emergency works at Beit Lahia and Khan Younis wastewater plants - are stop-gap humanitarian projects in response to life-threatening wastewater problems. Other emergency works at Beit Lahia under the North Gaza Emergency Sewage Treatment Project (NGEST) have also made progress, due to the emergency nature of the problem and to high level political intervention and intensive managerial effort (see the case study of Beit Lahiya and Khan Younis at Annex 5). Other projects are either not started or held up because of lack of materials or other constraints related to the closures.

[74] Source: Fieldwork interviews, PWA, CMWU, Gaza City, November 24-25, 2008.

Table 16.1: Progress on projects over $1 million in Gaza

Project	Donor	Value $ mns	Intended or actual start date	Situation
Gaza Emergency Water Project	IDA	25.0	2005	Delays
Network improvement	CARE	3.1	2007	Completed 2008
Water supply for North and Rafah Governorates	UNDP	5.5	2004	Design ready but implementation "postponed due to closure"
Rehabilitation of networks	UNDP-PAP	5.0	2007	"Frozen because of lack of materials"
Emergency works at NWWTP	UNICEF, ICRC			"Response to catastrophe, completed"
NGEST WWTP Part A	IDA, AFD SIDA,EC	7.8	2004	Under construction
Expansion of GWWTP	KfW	5.0	2007	"Suspended due to closure"
Pump station	ICRC	2.0	2009	Proposal approved
Upgrade of Khan Younis WW	ICRC	1.3	2007	Completed
Gaza sewer networks	CAP	2.7	2005	Delayed due to closures
Brackish water desalination	Unicef	1.1	2008	30% completed
Rafah WWTP	IDB, KfW	12.0	2009	Preliminary approval
Eastern Gaza WWTP	KfW	110.0	2003	"Closures and political situation"
North-South carrier phase 1.	USAID	70.0	2004	"Deleted"
Desalination plant	USAID	214.2	2004	"Deleted"
Value of projects > $ 1 mn		**464.7**		
Value completed		***4.4***		

Source: Gaza water project monitoring (compilation of CMWU and authors)

116. *UN agencies reported in November 2008 that even work on smaller "relief" projects was impossible.* UN agencies have a very large number of smaller "relief" projects suspended; in November 2008, contracts were being cancelled and engineers laid off (see Box 20). Only one or two projects were going ahead, where the agencies were prepared to take the risk of paying the contractor extra to get material into Gaza.

Box 20: Delayed projects of the UN system

UNICEF report: "we have hundreds of examples of suspended and cancelled projects".

UNDP report that they had to fire 50 engineers, as no projects were going forward. A water project was started in Rafah ($5 million). After one year, UNDP had to terminate the contract, which was less than 10% completed, and to pay the contractor 10% compensation. There are "17 cases of contract termination currently…three contracts have been launched but are pending…the UN Special Representative is trying negotiations with Israel…but so far to no avail.."

UNRWA report 50 contracts currently suspended or terminated. They have fired 130 engineers. The projects going ahead are two water wells in al Aml at Khan Younis needed to supply a health centre and three schools. UNRWA report that they "paid $50,000 extra to complete the wells". They suspect that the extra cost was for "materials smuggled through the tunnels".

UNICEF is "only doing emergency projects". They say: "political divisions are undermining the effort…and what can you do when there has been no electricity for 3 weeks?". These agencies work together in the "WATSAN Group", but they say these are "good intentions" at the moment.

Source: Fieldwork interviews, Gaza City, November 24-25, 2008

117. *Pipes had become a virtual impossibility to obtain, and many projects have been left incomplete.* In the past, contractors had to buy the pipes from Israeli factories, which sent them to the border. But by the time of the fieldwork, November 24-25, 2008, it had become virtually impossible to import pipes at all due to Israeli M&A restrictions and security concerns that pipes could be used to make rockets. Even PVC pipes were somehow suspect: Representatives of Khan Younis municipality explain: "Through UNRWA, we tried to replace 12-inch PVC pipes with 24-inch…but this was refused". At Khan Younis, work started in February 2007 to implement the sewage line. Italian financing paid the whole contract sum, but 2,800 metres are left incomplete. They continue: "There is no cement either…construction materials for three plants have been denied…"[75]

118. *Purchasing materials for water programs is difficult at the best of times.* Because everything has to come through Israel, it takes time and costs are high. A private company in Gaza wishing to purchase materials must apply through the PA in Ramallah, then arrange to purchase from an Israeli middleman, then meet the middleman at the border to clear and receive the goods.

119. *…and international companies are now unwilling to work in Gaza.* The tender issued in 2007 for the North Gaza wastewater treatment plant was cancelled when no interest from international contractors was found.

Reasons for the failure to implement

120. *The problems are related to the political and security situation – and donor reactions.* The main reason for the failure to implement the plan is related to the political and security situation. But in addition each donor has their own approach, and their own reaction to the political agenda, including the reassessment or postponement of project financing. Currently, there are plans to bring in more regional donors, for example it is now proposed that the carrier and desalination plant (formerly to be financed by USAID) should be to be financed by IDB and Qatar. However, it appears unlikely that this proposal – or indeed any other – would help without radical change in the political and closure situation.

121. *All conditions worsened with the December 2008/January 2009 military offensive*, with few of the materials needed for emergency maintenance being cleared by the Israeli military, and photographic evidence of installation of one consignment being required before a further consignment is authorized. Fundamental change in the political and security situation is needed to create an environment for renewed investment.

[75] Similar experiences have been reported in ongoing World Bank-funded projects in West Bank and Gaza. Fieldwork interviews, Khan Younis, November 24, 2008

III. Constraints to improved investment and management

122. The expectation of Oslo was that it would provide a governance structure which could augment Palestinian access to water resources, provide a stable framework for investment in water infrastructure, and improve water and sanitation services. As described in Part I of this Report, the actual outcome has been the opposite: Palestinians remain very short of water resources and water and sanitation services are poor and in many areas deteriorating. Part II of the Report examined the nature of failings in water resources development and management, and assessed the low levels of investment and the weak management of water and sanitation services. Part III of the Report now analyses the multiple inter-related constraints that have resulted in these poor outcomes.

A. Constraints stemming from Oslo, the occupation and the M&A restrictions

123. In addition to the restrictions common to all sectors on movement and access (M&A) of people and goods, restrictions for the water sector include – among other issues - resource management and permitting processes administered by the JWC, and the rules of the Civil Administration.

17. The workings of the Joint Water Committee (JWC)

Key messages

- JWC has not fulfilled its role of providing a supportive governance framework for joint resource management and investment
- Politics and policy issues have limited the number of project approvals
- Fundamental asymmetries – of power, of capacity, of information – put into question the role of JWC as a "joint" institution
- Israel takes unilateral water-related actions outside the JWC
- Only one third (by value) of projects presented to the JWC 2001-8 have been implemented

The JWC has not been an effective mechanism for facilitating sector investment

124. *The JWC was established under Article 40 to implement the Oslo Interim Agreement on Water.* Set up under the second phase of the Oslo Agreement (1995) as one of 26 joint committees, the JWC is one of just two survivors.[76] The purpose of the JWC is to implement Article 40, to oversee management of the shared aquifers and to ensure that WBG receives the extra water accorded under Article 40. The first meeting was in November 1995, and the committee has met approximately 60 times over the past 12 years. The initial rhythm of meetings up to the time of the Intifada was intensive – up to ten times a year. At one stage the US took a third party role to facilitate discussions (Box 21). Since 2002, the frequency of JWC meetings has dropped to three times a year, with just one meeting in 2008.[77]

[76] The other is the Joint Economic Committee.

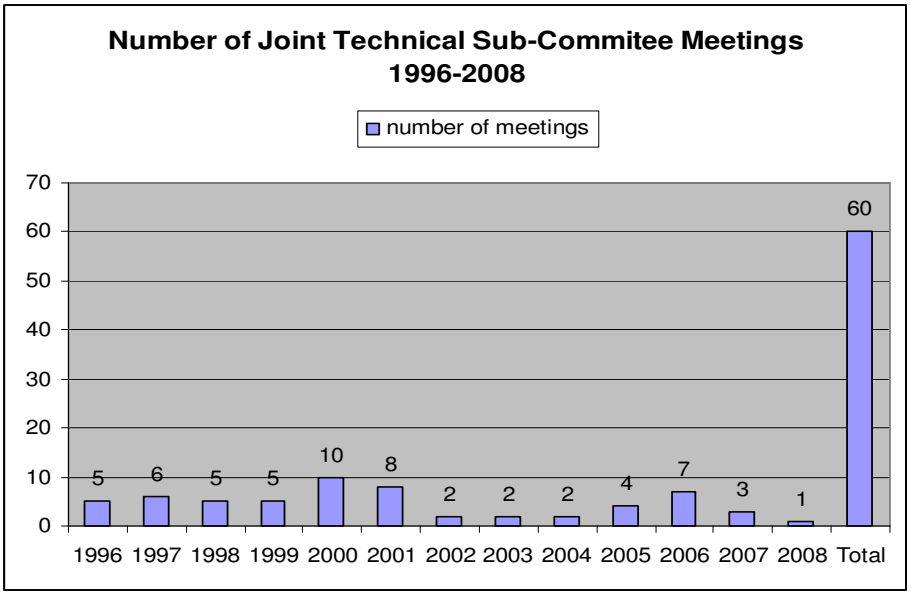
[77] The PWA commented as follows: "Since the signing of the Oslo Agreement, the parties have not been able to establish formal protocols on process and interaction, making the mechanism susceptible to political events and individual interpretation. Further, the accurate number of meetings of the Joint Water Committee, the Joint Technical Committee, and the Subcommittees is difficult to determine because of the number of informal meetings or undocumented meetings between the parties. Even if the frequency of these meetings had continued since 2001 at relatively the same pace as prior to the intifada, the resulting outcome had little positive impact for Palestinians. Additional meetings have not led to improved development of the Palestinian water sector; in fact, since 2001 there has been a marked decrease in Israel's approval of projects and in the ability to implement projects that received

Box 21: After a high point in 2000-1, JWC activity fell away

One PA representative said: "When relations were warm, in the early years, the JWC worked well, issuing permits to construct wells for more than the 18.6 MCM allowed under Oslo, although with big delays. But about 1998, there was complete deadlock –the JWC survived because the US joined in. USAID said: "We were partners to Oslo – we demand to be present in the JWC!" After that, 11 wells were approved from Nablus to Hebron. But then things died down again…."

One question is whether the rhythm of meetings and decisions may be affected by the political climate. The PA claims that JWC meetings are irregular, at the behest of the Israeli representatives and depending on the political situation. Although it was agreed at the beginning that JWC meetings would be every two months, that has happened only in 1997, 2000 and 2001. At the start of the Second Intifada, the rhythm of meetings slowed. Then it "became more complicated when the Hamas government was established. Between 2000 and 2005, the JWC rarely met, except informally, without minutes. When the main committee resumed in 2007, the PA had more than 150 projects piled up with the JWC. Israeli counterparts said *Bring the most important projects, those with funding!* Since 2007 they approved about 40 projects."

Source: Fieldwork interviews, September 19, 2008, and November 30, 2008



Source: Authors' compilation from WBWD records

125. *A high proportion of PA proposed projects has been rejected or long delayed in the JWC.* From examination of JWC records regarding Palestinian projects (see Table 17.1), it can be concluded that:

- Of the 417 projects overall presented to the JWC 1996-2008, 57% were eventually approved.
- Of the 202 well drilling projects submitted, 65 (32%) were approved by the JWC. Of those, only 38 (19%) were implemented, after receiving the additional approval of the Civil Administration.

JWA approval as a result of the additional administrative harassment in the form of Civil Administration processing."

- ❖ Amongst the well drilling projects not approved by JWC or still pending JWC or CA approval, were 82 well drilling projects which were presented by the PWA as part of the agreed quantum under Article 40.
- ❖ Of the sixteen Palestinian waste water projects presented to the JWC, one has been implemented (two more were approved recently)
- ❖ Of the 97 projects submitted since January 2005, 28 have been approved (29%), with delays from the time from submission to approval varying between 2 months (one case) to 18 months. Seventeen projects took a year or more to get approval. During this same period, all Israeli project submissions were approved.
- ❖ JWC approval has been withheld for agricultural water projects.

126. The above facts show that:(1) the process is in general slow; (2) the rate of rejection of PA projects is high; (3) the PWA has almost never sought to reject Israeli projects (only one has not been approved); and (4) well drilling projects and – until very recently - wastewater projects have had very low rates of approval.

Table 17.1: Status of Palestinian projects submitted to JWC

Status	Number of projects	% of total
Approved	236	57%
Not Approved	22	5%
Pending	143	34%
Approved by JWC/ not approved by C.A	7	2%
Approved /no possibility for execution	7	2%
Withdrawn by Palestinian side	3	1%
Total Submitted	417	100%

127. Records presented by the PWA show 106 pending Palestinian water projects, some of them dating from 1999 (Table 17.2). The records show that these 106 projects would have brought network connections or improved water supply to 1,090,000 beneficiaries, half of the West Bank population. PWA also provided lists of 12 large scale wastewater projects that had been presented to the JWC, most of them in the 1990s, which had either not been approved by the JWC or had been subsequently refused by the Civil Administration. These projects would have created or improved sanitation services for 790,000 people, one third of the West Bank population (see Annex 12 for a complete list of pending projects).

Table 17.2: Water supply projects pending in the JWC

Project type	Number	%
Small scale domestic water supply (largely network construction and rehabilitation)	85	80%
Wells for small scale domestic networks	7	7%
Agricultural wells (largely rehabilitation and substitution)	12	11%
Small scale domestic sewerage	1	1%
Industrial projects	1	1%
	106	100%

128. *As a result, out of the $121 million of Palestinian projects presented to JWC 2001-8, only 50% by value ($60.4 million) have been approved. There are a number of possible reasons for this shortfall in investment approvals.* The most common reasons cited by Israeli authorities are that Palestinian projects are poorly prepared, that they breach Israeli understanding of Article 40, or that they do not meet some other policy criterion on the Israeli side (such as connecting settlements or meeting some effluent standard). In addition, the Palestinians allege that projects may not meet declared or undeclared Israeli criteria related to

its policies towards the Occupied Territories.[78] Particular problems affect well drilling, water supply and wastewater:

Well drilling projects have a very low rate of approval in the JWC. The official Israeli position is that whatever is within Article 40 allocations is accepted – and that Israel has gone far beyond the 28.6 MCM of "immediate needs" (see paragraph 26 above) and has in fact approved licences for 55 MCM. The Palestinian position is that not even the "immediate needs" under Article 40 have been delivered by the JWC, and the further service needs to meet growing populations that have arisen in the 13 years since Oslo have made the development of extra resources an imperative.

Water supply projects are held up in the JWC because they are dependent on approval of water sources.

Wastewater projects suffer from the lowest rate of approval and the longest delays in the JWC. There are five key issues that have been holding up wastewater projects:

- Israeli authorities have often insisted on connecting settlements
- Israeli authorities have required an extremely high effluent quality standard (10:10), considerably above the internationally recommended WHO norms, and well beyond the capacity of the PA and Palestinian people to afford.
- The high cost of wastewater treatment plants makes the PA dependent on a handful of donors, and hence on the politics of bilateral aid
- Given the need to locate plants away from cities, and to reuse effluent further downstream, there are almost inevitably investments to be made in Area C, which triggers the whole set of Civil Administration issues.
- In the very water scarce environment, ownership of the effluent has become an issue

Indications are that there could possibly now be a window of shared interest to move forward on wastewater projects (see Box 22).

Agricultural water applications, whether linked to drilling of new or replacement wells or mobilization of surface water streams, have not been approved, including requests for renewal or deepening of existing wells.

[78] For example, the Palestinians allege that settlement councils may have a say in decisions on projects, either at JWC level or at Civil Administration level.

Box 22: After years of delay and disagreement, there may now be an opportunity of shared interest to move forward on wastewater projects

Within Israel, there has been concern at the lack of effective wastewater treatment, both amongst those concerned about the environment and health, and also at the political level. One top politician had raised the notion that there was a "sewage intifada". Following criticism within Israel because of the sewage flowing into the country, two further plants - Hebron and Nablus West - have been approved by the JWC and the Civil Administration.

Recently, the Israeli Government wrote to the PWA listing seven wastewater treatment projects and putting the onus on the Palestinian side in each case - either to present applications to the JWC or to the Civil Administration, or to proceed to implementation where permissions had been given.

Israeli positions are, however, met with scepticism by the PA, and donor and NGO experience with the JWC and Civil Administration on wastewater treatment shows how problems crop up in practice. An involved donor commented: "On sanitation, our discussion was on Wadi Nar. The discussion was pending for a long time. It was about politics, including issues of whether it should be a joint project including settlements, and a plant to be in Area C and run by an Israeli company." The most recent case (see Box 24 below) suggests that the issues on wastewater may not all be solved.

Source: Fieldwork interviews, Jerusalem, November 2008; Tel Aviv, December 1, 2009

The JWC does not function as a "joint" water resource management institution because of fundamental asymmetries

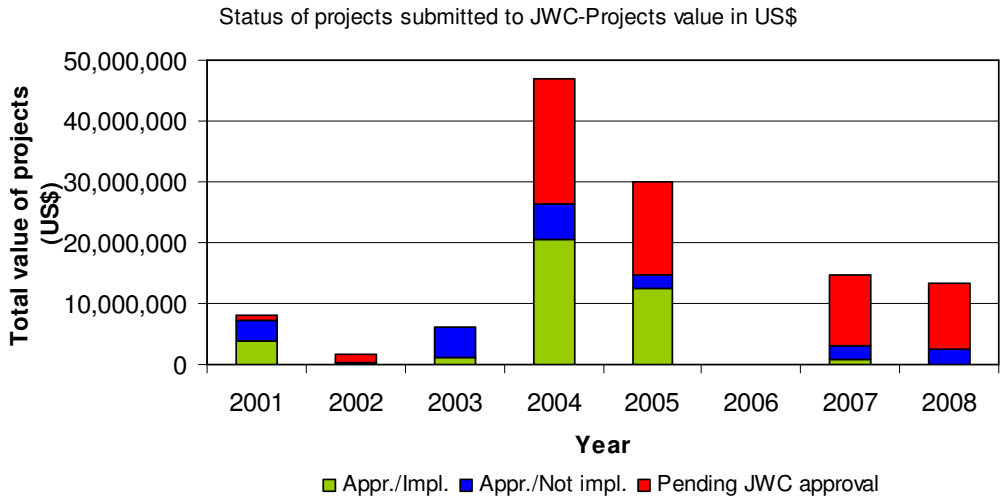
129. *A major underlying problem is the asymmetry of information available to the parties.* Under Oslo, Joint Supervision and Enforcement Teams (JSETs) were set up to monitor water extraction, but Palestinian teams no longer take part, as they were unable to fully execute their role due to the M&A restrictions (see Box 23). Clearly this disadvantages the PA, as it leaves them reliant on the Israeli authorities for data. In addition, it is hard for the Palestinian teams to know what the use of water in the settlements is – and what is its source. The result is asymmetry of information between the partners at the JWC, putting the PWA in a disadvantaged position for sector planning and management.

130. *This fundamental asymmetry – of power, of capacity, of information, of interest – in the JWC puts in question its status as a genuinely "joint" institution.* The JWC role is to implement Article 40, including water allocation and project appraisal - but only in the West Bank. Essentially the Israeli Water Authority has veto power, and in order to solicit approvals on vital emergency water needs, the PA is forced into positions that compromise its basic policy principles. Such an asymmetrical power balance (one party, Israel, has virtually all the power and is not driven by emergencies), together with the observed track record of the JWC, have contributed to a loss of trust and confidence and to very poor outcomes (for Palestinians) that undermine the rationale for the committee as a de facto "joint" approach to water sector management. One positive product of JWC cooperation might have been the *Joint Declaration for Keeping Water Infrastructure out of the Cycle of Violence*, agreed by the JWC on January 31, 2001, at the time of the Second Intifada. This Declaration appears, however, to have had little or no impact on subsequent events. Confidence has been further weakened by the way in which informal or undisclosed practices substitute for the apparently objective formal rules of the JWC.[79]

[79] See Annex 1 for a visual illustration of JWC and Civil Administration decision-making, where informal practices undermine formal rules.

There is a gap between what is approved by the JWC and what is implemented.

131. *Of the 236 projects overall approved by the JWC 1996-2008, 151 (64%) have been implemented.* Out of the 236 projects, seven were rejected outright by the Civil Administration, and 78 projects have not been implemented either because of lack of Civil Administration approval, lack of finance, or implementation problems. By value, of the $60.4 million worth of investments approved 2001-8, 65% ($39.1 million) have so far been implemented (see Chart below). This compares with target sector investments (Water Strategy 2000) of about $180 million per year.[80] In the most recent period, 2001-8, only one third (by value) of projects presented to the JWC have actually been implemented.



Source: Author's compilation

Box 23: The failure of joint monitoring

Joint Supervision and Enforcement Teams (JSET) were set up to monitor water extraction on the ground. Two jeeps were provided - one for Palestinian and one for Israeli teams. JSETs were even supposed to enter settlements although in practice private guards refused the Palestinian teams entry. In 2001, after the start of the 2nd Intifada, the Palestinian teams abandoned their participation. With no access to settlements and with limited freedom to enter Area C, where most wells were, the Palestinian teams were excluded from most JSET activities. Israeli JWC counterparts allege another motive: that the Palestinian teams were not willing to continue as they were seen as "collaborators".

At Udalla well on the outskirts of Nablus, the municipality built a wall to protect the well. During the Intifada, the IDF imposed a 24 hour curfew. The guard could not get to the well, so the Israeli teams could not read the meter – "so they broke the wall with a tank!", a PWA representative explained. PWA states that the Israeli teams still inspect wells in Areas A and B.

Source: Fieldwork interviews, Ramallah, November 30, 2008, Tel Aviv December 1, 2008

A further Palestinian concern is that some water-related actions and decisions are taken unilaterally by Israel, without consultation in the JWC

132. *Where sewage runs untreated towards Israel, Israeli authorities have taken to treating it and charging the PA.* From 1996-2008, NIS 170 million was deducted by Israel

[80] This covers all projects submitted to JWC, including projects approved but not implemented; projects approved and implemented; and projects pending JWC approval.

from Palestinian tax revenues for construction and O&M of plants treating Palestinian sewage. There is no formal billing, but the Palestinian MoF is simply informed of the decision and respective charges.

133. *A recent unilateral action is the proposal to extend the sewage treatment for Tul Karem.* On Nov 13, 2008 Moshe Garazi of Israel's Ministry of National Infrastructure wrote to PWA to inform them that the Yad Hannah Treatment Plant, which serves Tul Karem, "has to be expanded to deal with higher flows, and to be upgraded to deal with the low quality of effluent, particularly during the olive season. The cost of upgrading is NIS 50 million ($13 million|) and this will be charged to the PA by deduction from tax revenues."

134. *This is seen by PWA as an unjustified unilateral decision, that is made necessary by the decisions which the Israeli Water Authority takes in the JWC.* Already in 2002, the PA was charged NIS 18.5 million for upgrading at Yad Hannah. PWA states: "We didn't see the investments in advance, they just deducted the money". PWA has, in fact, visited the plant, at least to see the problem of the olive discharges. But the basic point remains: "They charge for capital and O+M costs that are not approved by PWA. And they take the waste water at zero value – 5 MCM a year." According to PWA, "since 1996, they have postponed all our wastewater projects, so the problem is their fault!"[81]

135. The next chapter (Chapter 18) discusses the constraint of the Civil Administration. Subsequent chapters then analyse the other constraints to project financing and implementation that stem from institutional weaknesses in the PA and the role of development partners.

18. The Civil Administration[82] and Movement and Access (M&A) restrictions

Key messages

- The formal rules applied by the Civil Administration in Area C of the West Bank are similar to regular physical planning applications in Israel
- When combined with security, M&A restrictions and other Israeli concerns in the West Bank, the application of the rules has presented a formidable, often insuperable, constraint to getting projects implemented
- Civil Administration requirements on effluent quality and connection of settlements have prevented all but one wastewater treatment plant from going ahead
- The result is sub-optimal development and loss of donor funds

Civil Administration rules place additional constraints on planning and investment

136. *Current project approval rules require a second approval by the Civil Administration if projects touch on Area C*, which is the case for almost all wells, water conveyance and wastewater treatment and reuse infrastructure. A number of projects have been approved by the JWC, for which detailed planning permission has then not been granted by the Civil Administration.

137. *The rules that the Civil Administration applies to Palestinian water infrastructure development and management are in some ways similar to regular physical planning*

[81] Source: Fieldwork interviews, November 17, 2008,

[82] The Department of Civil Administration (DCA) is a department of the Israeli Army, which was established to manage local governance issues and security operations in the Occupied Territories (West Bank and Gaza). Following the Oslo process, the DCA maintains this role in Area C.

applications in Israel itself. However, the planning approval is done by the Civil Administration in Area C without public participation or representation by Palestinians, using outdated regional plans, and as though the land and water resources were the property of the Israeli state[83]. Experience of the process is that it is slow. In addition, for wastewater treatment plants, the Civil Administration has typically required consideration of connection of adjacent settlements, as in the recent case of the Ramallah/Betunia plant and the settlement Beit Horon (see Box 24).

Box 24: Ramallah/Betunia Wastewater Plant

On June 24, 2008, after receiving JWC approval, the PWA requested approval from the Civil Administration for this project. The Civil Administration responded that:

- Detailed plans must be submitted for approval
- A full environmental assessment report must be submitted
- The project must not impinge on three archaeological sites
- "The plans should take into account the possibility of connecting the community of Beit Horon to the plant"

Source: Letter of October 2008 from Head of the Civil Administration to PWA

138. *The Civil Administration is seen by donors as a major constraint.* One donor commented: "First thing we request is a letter from PWA approving the project. Then we go to the JWC. But then we have to go to the Civil Administration – and there delays of 2-3 years are normal. In fact, we have no positive outcomes for Area C. For example, the Jiflik project was approved by PWA and then by the JWC, then we pushed it - only to fall foul of the archaeology Catch 22….."[84]. Often the restrictions imposed in Area C are seen by project staff and donors as arbitrary (see Box 25).

139. *One problem is that projects are often presented in a fragmented way.* With the involvement of many donors and NGOs, there is no focus or coordination. There is no one institution empowered to deal with the Israeli authorities.

Box 25: Often the restrictions in Area C seem arbitrary

Comments from project staff and donors who have tried to implement in Area C:

- "In Area C we are not allowed to build any field structure such as ponds, we cannot bury a conveyance system…"
- "Household cisterns are destroyed even though you don't need a licence. They say this is because in Area C water is considered "property of the Israeli state""
- "Even the smallest rehabilitation project needs a licence in Area C. You need a licence to rehabilitate a well in Area C. But it is very difficult to get *any* licence in Area C – even for reducing unaccounted for water."
- "In Tulkarem, the water connection was damaged, the Civil Administration would not give approval to repair it. Water had to be trucked in……"
- "Refusal to allow the connection of wells to electricity reduces efficiency and increases costs. This applies to most wells in Salfit, Qalqilya, Tulkarem."

Source: Several fieldwork interviews, Ramallah and Jerusalem, September and November 2008

140. *An additional problem is that Palestinian water infrastructure is taken by the Israeli military as a security risk.* Using the powers of the 1967 Military Order that requires permits for all water structures, Israel monitors and intervenes to control all water related activities in

[83] World Bank, 2008 *Economic Effects of Restricted Access to Land in the West Bank*
[84] Source: Fieldwork interview, Jerusalem, November 27, 2008

Area C. There has also been use of military control in Area C to enforce Israeli authority over water resources (see the case of the village well at Arrabona in Box 3 above). Even rainwater harvesting cisterns have been destroyed by the IDF.[85]

141. *It is not clear whether the Civil Administration is now to pursue a more open policy.* The Israeli Water Authority has recently proposed a joint meeting with the Civil Administration – according to an authority representative - "to examine claims concerning the delay in issuing permits for projects already approved by the JWC".[86]

142. *Overall, the result to date has been very low levels of development and loss of donor funds.* It is said that donors and NGOs avoid Area C because "you can't get a permit". Or long and costly delays are incurred. For example, if changes are required by the Civil Administration, perhaps that a pipeline be relocated from Area C to Area B, the request has to go back to the JWC. Rational water planning also becomes impossible. One Palestinian official said: "When we asked about a long distance water carrier route, the answer came: 'You cannot have a line from Bethlehem to Hebron because in 2020 there will be an Eastern Wall'. They just show maps indicating future settlements – this was the reason why the National Carrier Project was frustrated."[87] Beyond that, too, the uncertainty about the final status and the future of the settlements makes large scale planning very hard. A Palestinian official states: "We have a fear of building white elephants – it is hard to plan when you have 400,000 settlers who have to leave…"[88]

Physical access restrictions and closures further constrain investment and management

143. *As has been well documented, physical access restrictions and closures have a large impact on both economic activity and quality of life.* Physical access restrictions and unpredictable closures impede all water sector development, but are hard to factor into any planning, as closure is a military action, usually decided locally. One water-using sector is particularly affected – irrigated agriculture – as it depends for its viability on efficient transport to ready markets.

144. *Trade in high value irrigated products is constrained.* After the Oslo process, the West Bank developed considerable exports of high value irrigated produce to Israel. With such high dependency on Israel, irrigated farmers suffered particularly from the shrinking and closing of that market, following the beginning of the second Intifada in September 2000.

145. *The constraints are physical as well as economic and institutional.* The erection of the Separation Barrier, the so-called "Wall", has cut off the West Bank farmers from their markets in Israel, and physical access restrictions and closures further limit markets within the West Bank and increase transaction costs. As produce moves with great difficulty through the 640 checkpoints that control movement from one district to another, costs are then passed on to the consumers. At Baka al Sharqiyeh (West Bank), where fresh produce was traded with Israel before the construction of the Separation Barrier, the market place has since been destroyed. As a result, there has been a dramatic downturn in the local economy. As one donor commented: "Decisions about closure are decentralized. The officer at Bardala may decide suddenly to close the agricultural gate, so that farmers have at a moment's notice to go an extra 70 km round to the next gate."[89]

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[85] As in the South Hebron hills and Massafer Yatta in 2006/7.

[86] PWA commented as follows: "It should be noted that the Head of Water Administration for the West Bank and Gaza, Israeli Civil Administration, is also the Co-Chair of the Joint Technical Committee under the Joint Water Committee."

[87] Source: Fieldwork interview, Ramallah, November 17, 2008

[88] Source: Fieldwork interview, Ramallah, November 16, 2008

[89] Source: Fieldwork interview, Jerusalem, November, 18, 2008

146. *Taken together, the operation of JWC, Civil Administration rules, the physical M&A restrictions, the institutional weaknesses in the PA and the shortfalls in aid effectiveness have reduced the development of water resources and services for the Palestinian population well below levels expected at the time of Oslo*. However, there are examples of global practice that show how consensual management of transboundary aquifers can work in the interests of both riparians. The case of the Genevese Aquifer Agreement is described in Box 26.

Box 26 : Global experience in managing transboundary water: the Genevese Aquifer Agreement

The Genevese Aquifer is used for drinking water by both France and Switzerland. Between 1960 and 1980, the aquifer was overpumped, reducing the total groundwater storage to about one-third. In 1977, the Canton of Geneva in Switzerland and the Prefect of Haute-Savoie in France signed an "arrangement" on the protection, utilization, and recharge of the Franco-Swiss Genevese aquifer.

A general limitation on water extraction was included until the aquifer was restored to an acceptable level. Monitoring of extractions is to be done by metering. Authorized users are granted permits by their national authorities, and annual plans are agreed by a joint supervisory commission. Pollution evaluations are regularly conducted on each side of the aquifer based on standard criteria. A jointly financed groundwater recharge installation was constructed.

The Franco-Genevese aquifer agreement is in line with other aquifer agreements, the purpose of which is to manage groundwater extractions in the interest of both parties and to ensure resource sustainability.

Source: Excerpt from: Louka, Elli. International Environmental Law: Fairness, Effectiveness, and World Order. Cambridge: Cambridge University Press, 2006.

B. Constraints stemming from Palestinian institutional weaknesses

19. The Palestinian Water Law and water sector organization

Key message

- The institutional architecture proposed for the sector has been implemented very partially
- Sector governance concerns require continued technical assistance and capacity building support from the donor community

147. *The Water Law provides for sector governance, including separation of resource management and regulation from resource use.* The overall framework of water sector governance is set out in the Water Law, which provides for separation between water resources management and regulation (to be conducted by the PWA), and water supplying and using institutions. Under the Law, the National Water Council is the supreme decision making body, the PWA is responsible for water resources management and regulation, and a bulk water supplier distributes water to four regional utilities, which are responsible for retail distribution.

148. *However, this vision is not reflected in the present organisational arrangements.* There is a major difference between the governance structure envisaged under the Law and the current set up. The NWC has met once and has never functioned as intended. The PWA is not only a regulator but also an implementer, with both the WBWD (bulk water and water projects) and the PMU (water projects) reporting to it. Of the regional utilities, only one has

been set up,[90] and water supply remains in the hands of several hundred municipal water departments and local councils. Sector governance concerns require continued technical assistance and capacity building support from the donor community.

20. PWA: Powers, performance, capacity and constraints

Key messages

- PWA is not performing up to expectations, and has lost capacity
- One yardstick of institutional capability is to assess PWA's ability to negotiate effectively in the JWC.
- Priorities are to: (1) revise and update the water strategy and investment program; (2) re-launch implementation of major investments; (3) rebuild internal capacity for key functions, particularly planning, strategy and investment programming; (4) strengthen relationships and planning at the decentralized level, with the municipalities and the JSCs; (5) work to integrate donors and NGOs fully within planning and investment programming; ; (6) revise human resource policies to attract and reward qualified managers and staff; and (7) adopt a more participatory approach with stakeholders and staff.

149. *After a promising start, PWA lost momentum, which needs to be restored.* The PWA was founded in the time of optimism after Oslo. The young organization received very extensive capacity building from a panel of donors led by Norway, and there is consensus that substantial capacity was indeed built. However, some of that capacity has eroded. [91] New management has now been appointed, and there are prospects that the PWA will recover some of its strengths. However there are some key issues that need to be addressed:

150. *PWA structure, management and procedures need to be overhauled.* The PWA organigram (see Annex 1) suggests that the organization is spread too thinly, and is over-centralized. There is considerable internal criticism within the PWA, faulting management and strategic focus. Staff agree there is a need to prioritize, and to improve internal communications. All observers are agreed that a change of management style and more strategic focus are needed. The recent management change creates a window of opportunity.

151. *There is consensus that PWA needs to revise and update the water strategy.* As will be clear from the discussion in previous chapters, the Palestinian water strategy is in need of updating, and the PWA has already started on some building blocks of this exercise (the "Audit" and the "Governorates Report"). Ideally, this would be driven by PWA staff, through a strategic planning unit, with consultant support. The process needs to be participatory at both decentralized and central levels, and to fully engage the donors.

152. *In parallel, PWA needs to update the sector investment program and to ensure integration with the PRDP.* At present, PWA does not have a credible strategy that will win financing. Few large investments are underway, many of the wells approved by the JWC have not been drilled, and sector investment has become fragmented between numerous small and emergency projects. The new PRDP could constrain water sector investment, and PWA needs to work more closely with MoP on planning. In the past, PWA had a good project planning system, and there is a need for PWA to revive and improve this capability.

[90] PWA Gaza commented: "In the opinion of the PWA, none of the regional utilities has been setup according to the water law. CMWU formation has been managed by the PMU of the Second Gaza Emergency Water Project since 2005. Neither the structure nor the financial system have been put in place, and most importantly the bylaws, which have to meet the water law requirements, have not been issued."

[91] One particular factor in the erosion of capacity and management skills has been the restriction on travel to the outside world, to conferences and training. This has been a particular handicap for PWA Gaza staff.

153. *Project implementation and disbursements are at an all time low, and action is needed to improve performance.* The low disbursements in 2008 - $20 million against a PRDP 3-year water budget of $138 million – underline the impasse in water sector investment that has been documented throughout this report. The disconnect between PWA plans, budget allocation and actual disbursements needs attention to diagnose the problems and to re-launch the investment program.

154. *Institutional capacity needs to be rebuilt.* As mentioned, the PWA originally recruited good staff and received intensive capacity building. However, problems of management and motivation occurred and external capacity building programs have decreased significantly. An over-centralized management style with little delegation has been a problem. Data gathering and publication, a core function, has faltered. Data exists, but much of it is out of date and there is little public reporting. Certain skill sets are particularly lacking amongst staff: sanitation, data bank skills, economics, tariff setting. Certain key departments are very understaffed: regulation, hydrology, water quality. PWA has recently commissioned a study on capacity building, which will be a key building block.

155. *One yardstick of capacity is PWA's ability to negotiate effectively in the JWC.* There is a need to strengthen PWA capacity to negotiate in the JWC. Box 27 gives some indication of the skills and resources that may be needed.

Box 27: The Israel Water Authority:

One representative of the Israel Water Authority described his organization: "We have 200 people, including 50-60 just for studies. They cover economics, legal, planning, water resources…. And we do a lot of outsourcing – we have some excellent big consulting firms, world class. Water is a big business!"

Source: Fieldwork interview, Jerusalem, November 26, 2008

156. *In considering reform of the PWA, there is a need to be realistic about the huge challenges.* All are agreed that the PWA needs reform. The challenge is to agree on a doable reform program. There are already signs that reform is afoot, and an immediate reform program is emerging:

- strengthening PWA planning, strategy and investment programming
- establishing a new bulk water department
- strengthening relationships at the decentralized level, with the municipalities and the JSCs
- integrating donors and NGOs fully within the planning and investment programming processes
- working towards PWA ending up as a regulator
- focusing on sewage, including strengthening the PWA wastewater department

157. *Prioritization and integration will be key.* To avoid the best being the enemy of the good, it will be essential to identify a progressive and feasible agenda in "bite sized pieces". It will also be essential to ensure that all donors and NGOs align on PWA priorities, and that institutional development and capacity building are provided in a harmonized way, and long term.

158. *Finally, there is a need for more presence, more transparency more empowering water dialogue.* New management in PWA has got off to a good start with several consultative and participatory processes. An NSU representative said: "The best hope is for PWA to have more presence – PWA has to stand up and say what they can do." A key donor

said: "The PWA needs to go out, encourage people to talk – perhaps get people to discuss about unlicensed wells or unfair distribution – give people some power, get some transparency…." [92]

21. Water resource access within the West Bank

Key messages

- Fragmented water resource access make water management difficult
- Measures are needed to improve equity of access

159. *Water resource access in the West Bank is fragmented, and largely not in PWA hands.* Water in the West Bank is not generally under the direct control of PWA. In Areas A and B water resources are largely under the control of municipalities or utilities. In Area C, it is largely Israeli institutions (Civil Administration, Mekorot) that have formal control over the water resources. The wells drilled after Oslo technically "belong" to PWA, but they are operated by WBWD and the effective water right has been taken over by the cities being supplied. This fragmentation and the de facto ownership by the municipalities creates problems when water has to be shared with other communities (see Box 28). It also complicates PWA's task of planning and regulating.

Box 28: Communities are loathe to share water once they have got it

The Nablus municipality has drilled successful wells, benefiting from Oslo. Unfortunately water was not shared with nearby villages, which got nothing. In 1997, the villagers marched to the well. Eventually – through the mediation of PWA - they obtained some share from a new well.

In the Hebron area, Dura municipality has a well – but nearby Yatta is not connected, even though they pay part of the costs. There was an agreement to build a filling point for the Bedouin pastoralists, but despite the agreement between Dura and the WBWD to deliver water to them, none has been delivered.

Source: Fieldwork interviews, Ramallah, July 3, 2008, and September 24, 2008

160. *There is inequity in availability and water needs to be managed for the benefit of all.* There are disparities in access: "citizens in Ramallah can get 150 lpcd and are washing their cars, whilst people at Beit Hanan 3 km away have no water." Some households in Hebron are getting only 10 lpcd. In Jenin, parts of the city have not received water for four months. A key donor summed up: "when we are talking about the resource, we cannot leave it to the municipality." A donor commented: "It is hard to get them to share – Hebron has its own water company, and there is no joint approach with Dura, Yatta, Bethlehem…it is all about local governance…." [93]

161. *There are measures that could improve the equity of water access.* The current pattern of imbalance of water access is a result both of history and of the difficulty of planning for water under resource scarcity and the institutional constraints of the present situation. Steps to improve the situation could include strengthening of the PWA role as regulator and increasing PWA authority over water resources, progressively merging utilities into more economic units, and developing an interconnected water infrastructure. Plainly these are major institutional challenges, but they are in line with PWA policy, and PWA should prepare itself to move along these lines in anticipation of an eventual water agreement bringing new resources.

[92] Source: Fieldwork interviews, Ramallah, November 17, 2008; Jerusalem November 27, 2008.
[93] Source: Fieldwork interviews, Jerusalem November 27, 2008.

22. Water supply institutions

Key messages

- The institutional model for water supply has proved problematic and could be rethought
- For smaller communities, the JSC model looks more viable

The preferred institutional model for water supply and sanitation has proved very hard to roll out

162. *The key institutional constraint in water supply remains the "jungle of providers".* The basic institutional constraint to improving water supply services has long been identified – the plethora of several hundred organizations, large and small, lacking economy of scale and sourcing water haphazardly. To counter these problems, stakeholders agreed on a new institutional architecture (see also Chapter 19 above) with: (1) PWA as regulator and resource manager; (2) a bulk water supplier (and single interface with Mekorot); and (3) four regional utilities grouping the current suppliers together both institutionally and physically (via bulk connections).

163. *Stakeholders have been working on this architecture for a decade.* The most advanced regional utility is the CWMU in Gaza (see below). In the West Bank, progress has been made with a first phase, of bringing some water service providers and services into "clusters" under Joint Service Councils. Already, some clusters exist in the north and south. Two existing utilities (JWU, and to a lesser extent the Bethlehem utility) provide the nucleus for regional utilities in their areas. JWU is already providing water to 200 villages. In a second phase, the idea is that the regional utilities will be formed.

164. *At present, JWU is the only provider in the West Bank really working like a utility* (see Chapter 15 above). With strong German support, it functions on a business basis and is financially viable. It has its own board, and works with PWA as its regulator.

165. *Multiple problems and tensions are holding up the realization of this institutional vision*:

- The physical infrastructure for a Palestinian integrated bulk and retail supply - on the model of the national water carrier in Israel - does not exist, and is unlikely to be approved by the JWC and the Civil Administration.
- A large and increasing share of supplies come from Mekorot, and the future of this source and of all the Israeli-owned and operated water infrastructure in the West Bank is not yet determined.
- Municipal finances are in very poor shape, and many municipalities are using water revenues for general budget purposes.
- Since the Intifada, payment discipline has eroded to the point that utilities are recovering a small percentage of their costs, so that the utilities could not be financially viable.
- Water access is fragmented, divided between hundreds of municipalities

166. *Essentially, to create the regional utilities at least under the circumstances of today poses a massive investment and institutional challenge, and would require major political capital to achieve.* In general, stakeholders see the need for a thorough institutional review – especially in the West Bank – linked to revision of the water resources strategy and the investment program.

The Joint Service Council may provide a simpler model for small town and rural supply

167. *At the level of smaller towns and villages, the Joint Service Council idea seems to be making good progress.* Stakeholders in general believe that the more decentralized model of the Joint Service Councils (JSC) can be the vehicle for common action on water supply and sanitation for smaller towns and villages. One donor reported: "We supported a JSC created between 6 villages in Jenin Governorate, putting in infrastructure and technical assistance. This model could be extended to more villages, as a first level of management…"[94] The case study of North East Jenin carried out for this Report (see Annex 7) confirms the need for institutional development and investment at the local level – but institutional development and investment need to be based on technical and economic assessment of options. In the case of North East Jenin, there was no clarity on which option to follow: individual village wells and supply, or a single well for a group of villages, or connection to a carrier….

168. *However, the mechanisms to link JSCs to the broader water planning and investment procedures are scarcely in place.* The Jenin case study shows the virtue of cooperation within a JSC in attempts to get a coherent response to village water supply, but the study also shows the challenges:

- Lack of local level water planning, and absence of PWA from the local level
- Weakness of the JSCs in accessing decision making and financing
- Weakness of the PWA in delivering investment approvals and finance
- Local level conflicts between competing water uses

C. Constraints related to development partners

23. Donor constraints in investment and implementation

Key messages

- Donors have been frustrated with lack of development effectiveness
- A lead from PWA is required to bring donors back within a framework for more coordinated and strategic investment

The donors' quandary

169. *The global and regional political situation influences donor behaviour.* Since the Intifada and the elections, it is clear that bilateral donors are influenced by larger political perspectives beyond the water sector, and there has been reduced involvement of several key donors in investment financing and facilitation. [95]

170. *Donors have become more risk averse – they want to disburse, and to see results on the ground.* One source said frankly: "Donors want to finance projects as peace promoting activities, but they won't engage with the broader issues. They have completely stopped pushing for anything in groundwater – they say to PWA "Bring us the permit"." Donor reticence is linked also to the lack of progress on the ground. After Oslo, donors were keen to finance investments, as this was seen as a key area for both development and poverty reduction. Donor funding was not a constraint. However, after years of delays and cost escalations, poor disbursement and wasted time and money, there is a certain "donor

[94] Source: Fieldwork interviews, Jerusalem, November 27, 2008.
[95] Source: Fieldwork interviews, Ramallah, November 18, 2008.

fatigue"[96]. Donors want to comply with Palestinian requests and needs, but sometimes they feel caught in dilemmas over which they have no control (see Box 29). PWA is concerned that donors may be less willing to commit funds to the sector.

Box 29: A three way dilemma (PA – Israel – donor) over wastewater projects

One donor waited years to finance wastewater projects. The PWA says "We don't touch projects that involve settlements, which are illegal, or Jerusalem – and we can afford only primary treatment". The Israeli authorities say, "Technically and economically, settlements should be included, and the effluent has to meet our standards." The donor response "We do what our Palestinian partners request. But for every donor there are limits of cost and common sense."

Source: Several fieldwork interviews, Ramallah, Tel Aviv, Jerusalem, November 2008

171. *Donors prefer development – but can get stuck in emergency mode.* One key donor said: "Although donors prefer development, the bureaucratic constraints and the corruption may have led to a donor preference for emergency interventions because these projects go straight to the people. Under these conditions, it is hard for the PWA to guide funding to a structured development programme."[97] There is a real risk of donor fatigue and a consequent acceptance of a permanent ad hoc approach. At the political level, this can lead to disillusion with any prospect for a "water settlement", and at the investment level to acceptance of sub-optimal plans and projects.[98]

172. *In addition to the specific problems outlined, PWA runs the risk of "donor-driven development".* Donors may bring their own technical standards – and certainly have their own ideas. On the Jenin "Oslo well", for example, there has been a problem with different international standards between donors. More broadly, the involvement of different donors complicates things – different approaches to technical assistance, to strategic planning etc. The existence of eight master plans is testament to this. The result may be donor-driven development. A senior PWA official said: "We are dependent, we cannot say no. If they come with technical assistance or an emergency project we say yes – although we try to give it a development focus."[99]

Integrating donors to the development effort

173. *Donors are vital stakeholders but coordination is generally held to be quite weak.* One key donor with long experience in water believes the water sector is poorly coordinated: "The water sector is in a mess – the worst sector in WBG, because the donors don't coordinate. The NGOs do all the work, but it's not coordinated and it's sub-standard… We need a stronger PWA in charge, stronger coordination." Another major donor agrees: "We have the impression that there are several parallel initiatives, with weak coordination."[100]

174. *There is a Water Sector Working Group (WSWG) that brings major donors together, but it is currently seen as not fulfilling the basic purposes of agreeing on strategy and programs.* A senior PWA official commented: "We need to develop a better basis for coordination. The WSWG is not effective. Not all donors are there, and donors do not talk to each other[101]". A major donor argued: "Until now, the Sector Working Group is not working, because it's a difficult sector, and the institutional set up is complex - PWA, WBWD, PMU,

[96] Source: Fieldwork interview, Ramallah, November 20, 2008.
[97] Source: Fieldwork interview, Jerusalem, November 27, 2008.
[98] Zeitoun 82.
[99] Source: Fieldwork interview, Ramallah, November 17, 2008.
[100] Source: Fieldwork interviews, Ramallah, November 27, 2008.
[101] Source: Fieldwork interview, Ramallah, November 17, 2008.

the forest of small utilities. We feel that the institutional vision – the utility model - is not working, but there is no lead from PWA for a new vision…"[102]

175. *A recent donor initiative for a short strategy note is seen as just a start.* The WSWG has been preparing a statement from the donors, to initiate the dialogue with PWA. This Note is seen as a first step in a dialogue that needs to be led by PWA and to be fully participatory.

176. *Despite the challenges, some donors see the scope for moving towards a more harmonized approach.* One key donor discussed the need for a progressive move towards a much more coordinated and integrated donor involvement. But donors see many preliminary steps, beginning with institutional reform, and the emergence of PWA as a genuine regulator, the revision of the water strategy and master plans, the development of a revised and prioritized investment program, following a programme approach. However, while there is much PWA can do to improve development effectiveness in the sector, winning donor confidence for a revised national strategy will be hard, given the lack of control over resources and infrastructure. Implementing such strategy would require a more development-minded approach from the JWC and the Civil Administration.

24. NGOs and EWASH

Key message

- NGOs and small projects have come to play an important role
- PWA and the NGOs have worked out a scheme of cooperation

177. *NGO-implemented projects form an important part of the investment effort, which has brought challenges of planning and coordination.* In the light of the difficulty of implementing major projects, the reasonable response has been short term emergency projects, often small projects with NGOs, and these smaller projects have become a very large part of water sector development. In fact, the Consolidated Appeal for Palestine (CAP), which brings together all NGO and UN projects, programmed $26.2 million for water and sanitation in 2008, more than was actually disbursed from the larger donors in that year (estimated at $20 million). CAP has provided excellent responses to emergency humanitarian situations. However, the multiplicity of small donors and multiple projects are more difficult to fit within a planning framework.

178. *NGOs have a comparative advantage in being nimble – but are small scale and short term.* NGOs have the advantage of grass roots field presence and a certain demand-driven character. But they have the disadvantage of the small scale and short term nature of much of their interventions (see Box 30).

[102] Source: Fieldwork interviews, Ramallah, November 27, 2008.

Box 30: NGOs may end up with second rate solutions

ECHO, which works through NGOs, said: "We have projects suffering huge delays – we got just three projects through the JWC, but all of them are now stuck again:

- Jiflik in the Jordan Valley is the only one that has gone forward – but this is now stuck on the archaeology question
- Water wells for irrigation and household use at Tul Karem and Qalqilya
- Brackish water desalination in Gaza

"These three projects have been pending for three years – but our time frame is one year". The result is poor quality investment outcomes. ECHO funding lapses because of late approval. "A lot of the 140 pending projects have been held up since the start of the PWA – you end up getting second rate projects being pushed through."

Source: Fieldwork interview, Jerusalem, November 27, 2008

179. *Recently PWA and the NGOs have worked out a scheme of cooperation in EWASH.* It appears that in EWASH, the PWA and the NGOs have now set up a working coordination mechanism, with interface. All NGOs now have to sign an MoU with PWA. Senior PWA staff are impressed by EWASH: "They all talk to each other. We need the same thing for the big donors." The Chairman of the PWA counts EWASH as a success: "We have a good system of dealing with the NGOs"[103]. This looks like a potentially fruitful partnership – especially as they have a big budget. EWASH acts not only in coordination but also as a vocal advocacy group. In this role, EWASH clearly has a lot of energy, and can say and do things that PWA cannot.

D. Gaza

25. PWA in Gaza

Key messages

- ❖ PWA operations – and water resource management - in Gaza are effectively suspended

180. *PWA developed a relatively strong presence in Gaza, which is now effectively suspended.* PWA established a strong branch in Gaza, and had developed good capacity. However, with the takeover of PWA offices in June 2008, PWA operations were effectively suspended. PWA has ceased licensing activity (see below), and staff are no longer empowered to carry out the inspection of the utilities that was required by the PA in order to allow payment of the diesel bills. As the PWA cannot guarantee that the diesel is not being misused, the Palestinian MoF has cut off the financing of diesel. Progress on the investment side, despite the energetic efforts of the PWA and the PMU, has been strongly limited by the constraints imposed under the Israeli occupation and subsequently.

181. *PWA's regulatory function is in abeyance and unlicensed wells are proliferating.* Until recently PWA was progressively implementing a regulatory program for Gaza wells. Over a 3-4 year period, the PWA fixed 700-800 meters to wells, reading them annually. However, since mid-2008, with the takeover of the PWA offices, there has been a renewed

[103] Source: Fieldwork interviews, Ramallah, November 16, 2008.

mushrooming of unlicensed wells. Essentially, with the crisis, households are anxious to secure their own water supply.

182. *The political situation has reduced the effective linkages with Ramallah.* Despite enormous effort within PWA to maintain linkages, the water sector in Gaza has become detached from PA preoccupations. Gaza PA staff cite the "development plan submitted to the Paris Conference", in which they say Gaza was ignored[104]. Given the political cleavages and international positions, a major problem has been the legitimacy of aid partners. A practical example is the investment program proposed by a UN agency. UNICEF are obliged to work through the PA. PWA must sign the Annual Work Plan, otherwise they will not be empowered to operate. Since the December 2008/January 2009 violent escalation, the problem of legitimacy of aid channels has become more pressing.

26. The CMWU

Key messages

- Gaza's CWMU is the most advanced of the regional utilities and some benefits have been won
- The model is vulnerable to the political and security situation and remains essentially under test

183. *Since 1996, work has been going on to create the CWMU.* It is in Gaza that the regional utility model is the most advanced (but see PWA's caveat in the footnote to paragraph 147 above). The CWMU has been set up and staffed, and is working with the existing 25 municipal entities. A path has been traced out by which the entities will receive technical support services from the CWMU, and will progressively transfer their staff and assets to CWMU. The CWMU will take responsibility for service delivery, both bulk and retail, and will invest in new water sources (the desalination plant) and a bulk carrier throughout the Strip. The path has not been easy: an international operator was brought in to help develop capacity and procedures. However, the situation in Gaza deterred the contractor: According to CMWU, "they never brought the required staff, and lasted six months."[105] Despite these setbacks, the CWMU is progressing.

184. *However, in recent months there has been some reticence.* In the current turbulent circumstances, some municipalities are retreating from their commitments. Some object to losing control e.g. Gaza Municipality. Many municipalities want to keep the cash generated by the water supply operation. In some municipalities, there are politically appointed mayors, who are not acceptable to the donors.

185. *CWMU management say there is still determination that the model will work.* CWMU believe that the model can still work and wish to keep to the plan. The next steps are to integrate the units, and to integrate payments within CWMU. However, staff admit that the latest conflict has sapped confidence. CWMU is going along with the current hesitations, but is applying pressure by sending a strategic letter giving a deadline for municipalities to confirm their engagement. According to the CMWU, "those municipalities that remain outside will still receive chemicals and any emergency interventions, but will not benefit from investment support."[106]

186. *Stakeholder views on the CWMU remain cautiously positive.* One stakeholder said: "The CMWU is very well prepared, and has a good understanding. It should act as service

[104] Source: Fieldwork interviews, Gaza City, November 24, 2008.
[105] Source: Fieldwork interview, Gaza City, November 25, 2008.
[106] Ibid.

provider. However, at present they are slipping back….." A key donor commented more cautiously: "It is hard to build a utility. Even in Gaza where density is highest, the utility concept is not working so well….." [107]

187. *There are already some gains from the CWMU model……* In place of 25 fragmented utilities, there is a single structure, with its own business plan. Economies of scale have been demonstrated. For example, when there is malfunction or need for leak repair, there is a very quick response, brining benefit to customers. The integrated entity has more resources and is better staffed. It is able to undertake integrated planning, bulk procurement, project execution etc.

188. *…but the CWMU itself considers that it is still immature as an organization.* CWMU officers explained that there was still a long itinerary to follow. At present: (1) the operators are not really integrated, they are still instructed by their parent municipalities; (2) staff are still paid by the municipalities; and (3) there are not yet any integrated development plans or service plans.

…and currently the CWMU has run into political problems and cannot function properly under closures – so the model remains essentially still under test. The CWMU gave a list of activities that are held up by the current closures. For example, they cannot drill wells, and they cannot stand as conduit and guarantor for the donors. The takeover of the PWA has also created problems. For example, the contract for desalination was to be monitored by PWA – but which PWA? They say, "The CWMU cannot support an illegal PWA…". In addition, since the December 2008-January 2009 military offensive, the continued closure is preventing the import of pipes and all materials needed to rehabilitate destroyed water supply and sanitation systems.

[107] Source: Fieldwork interviews, Jerusalem, November 27, 2008.

IV. Conclusion: Towards an Agenda

189. It might have been hoped that Oslo would bring water resources for a viable state under PA control, that enhanced water and sanitation services would improve the living standards of the Palestinian population, particularly the poor, and that water for agriculture would underpin growth. These hopes have been only very partially realized.

190. The causes identified in this report are failings in water resources development and management, a low and declining investment rate, and weak management of water services.

191. The problems that underlie these failings are clear.

- A joint governance system, with asymmetries of power and capacity, that does not facilitate rational planning and development of Palestinian water resources and infrastructure.

- An investment environment that creates huge costs and delays.

- Implementation constraints that make the movement of even one pipe a logistical and administrative challenge.

- Weak institutional capacity of the PA for planning, implementation and management.

- Development partnerships that move uneasily between the political context and the development challenge and are often stuck in emergency rather than strategic mode.

192. Essentially, integrated resource management is impossible under current conditions, and the development effort has dwindled to a series of stop gap coping strategies that preclude rational development of the resource and the provision of quality water services to the Palestinian population.

193. There is also need to work collaboratively to resolve current unsustainable water practices, particularly aquifer over pumping and lack of pollution control, that – together with predictions of decreasing rainfall in coming decades – could compromise the economic welfare of future generations in this part of the world.

194. The resolution of such a mass of problems requires movement on the political front. Reforming the way in which the JWC and Civil Administration address Palestinian development needs is a priority until such time that the political issues are resolved in final status. Short of that, the PA has a narrow margin for improvement, and there is a strong need to prioritize, especially given limited institutional capacity. What then could be priority agenda items for action in the nearer term?

195. **One key area** is strategic planning and reformulation of the investment program. A start has been made on this, with PWA's recent publication of an *Audit of Operations and Projects*, together with the *Governorates Report*. These building blocks could form the basis for a participatory planning process involving all stakeholders, including decentralized actors, donors and NGOs.

196. A **second key area** is water supply and sanitation investment implementation, where focus could be on high priority projects that bring real benefits to the Palestinian population, particularly the poor, and notably the rural poor. Development of new sources will be a priority, and reduction of unaccounted-for water could also increase supply considerably.

Wastewater projects, too, could be a priority because of their high social and environmental benefit.

197. **A third area** of focus could be on irrigated agriculture, a key sector for the revival of the Palestinian economy. Despite the major impediments described in the Report, there are steps that could be taken in the nearer term, including the technology transfer agenda and the development of plans for wastewater reuse in tandem with investment in treatment (see Annex 4 for some discussion of the issues).

198. A **fourth area** of focus could be institutional reform, to redefine sector architecture in the light of today's reality and to equip and build capacity in the agencies that have to carry the agenda forward. The challenge is not just at the top, with the PWA, but throughout the system, from the villages leagued in Joint Service Councils and on up through all the small and large service providers.

199. Work on these four areas could go forward whilst the larger questions of water for a viable Palestinian state are negotiated.

WEST BANK AND GAZA

ASSESSMENT OF RESTRICTIONS ON PALESTINIAN WATER SECTOR DEVELOPMENT

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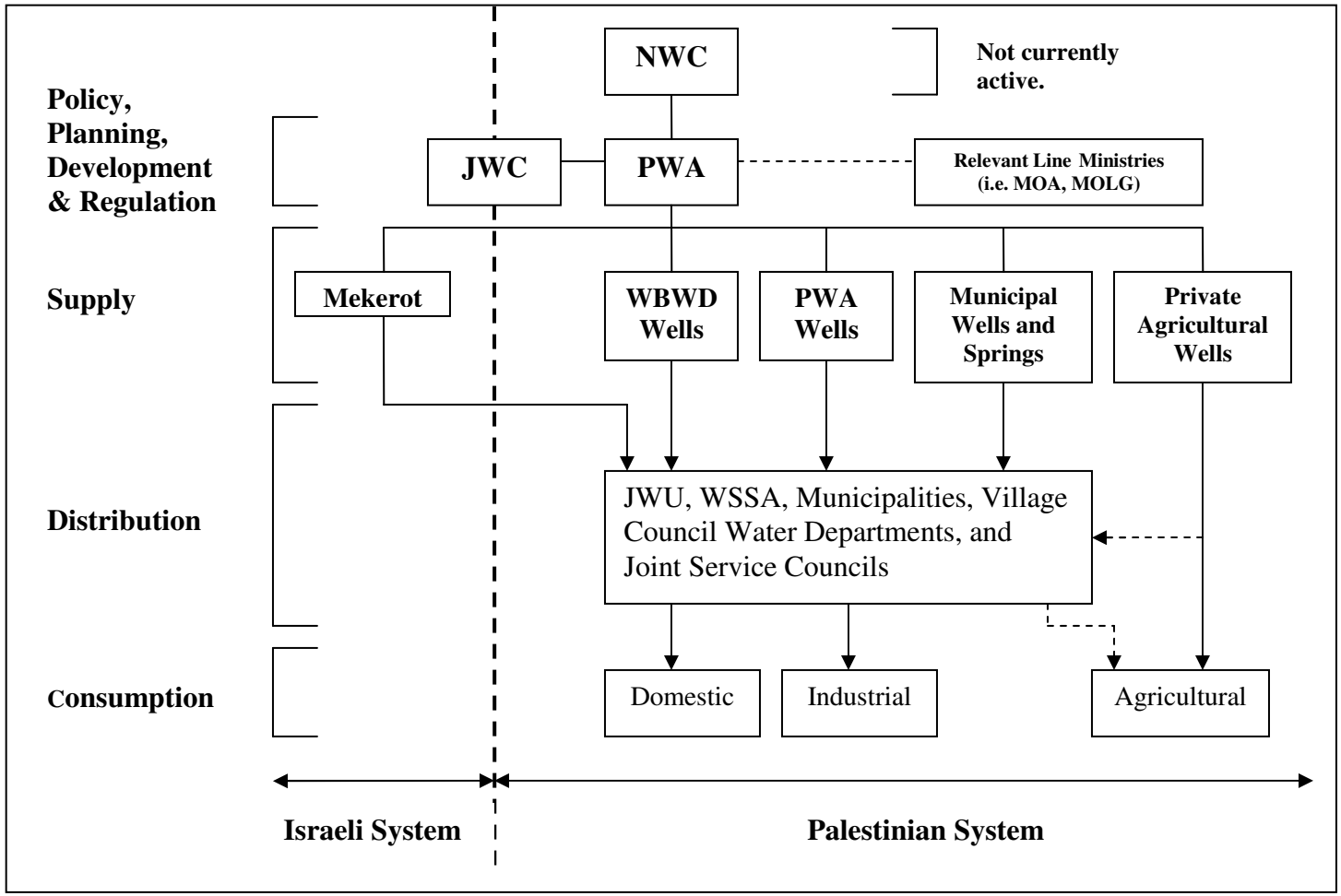
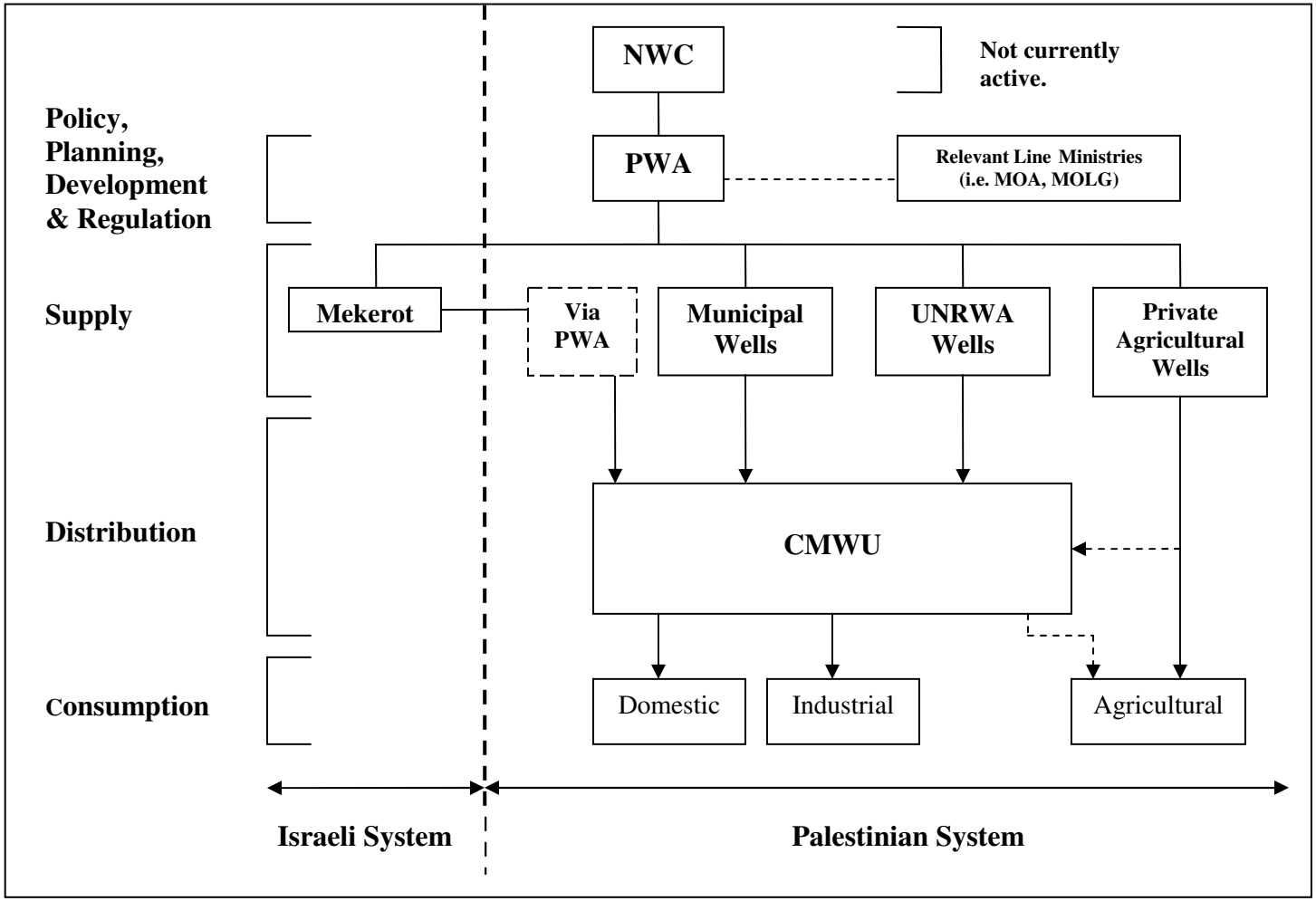
Annex 1a: Institutional Organogram of West Bank and Gaza Water Sector

Existing Institutional Arrangement of Water Sector in the West Bank



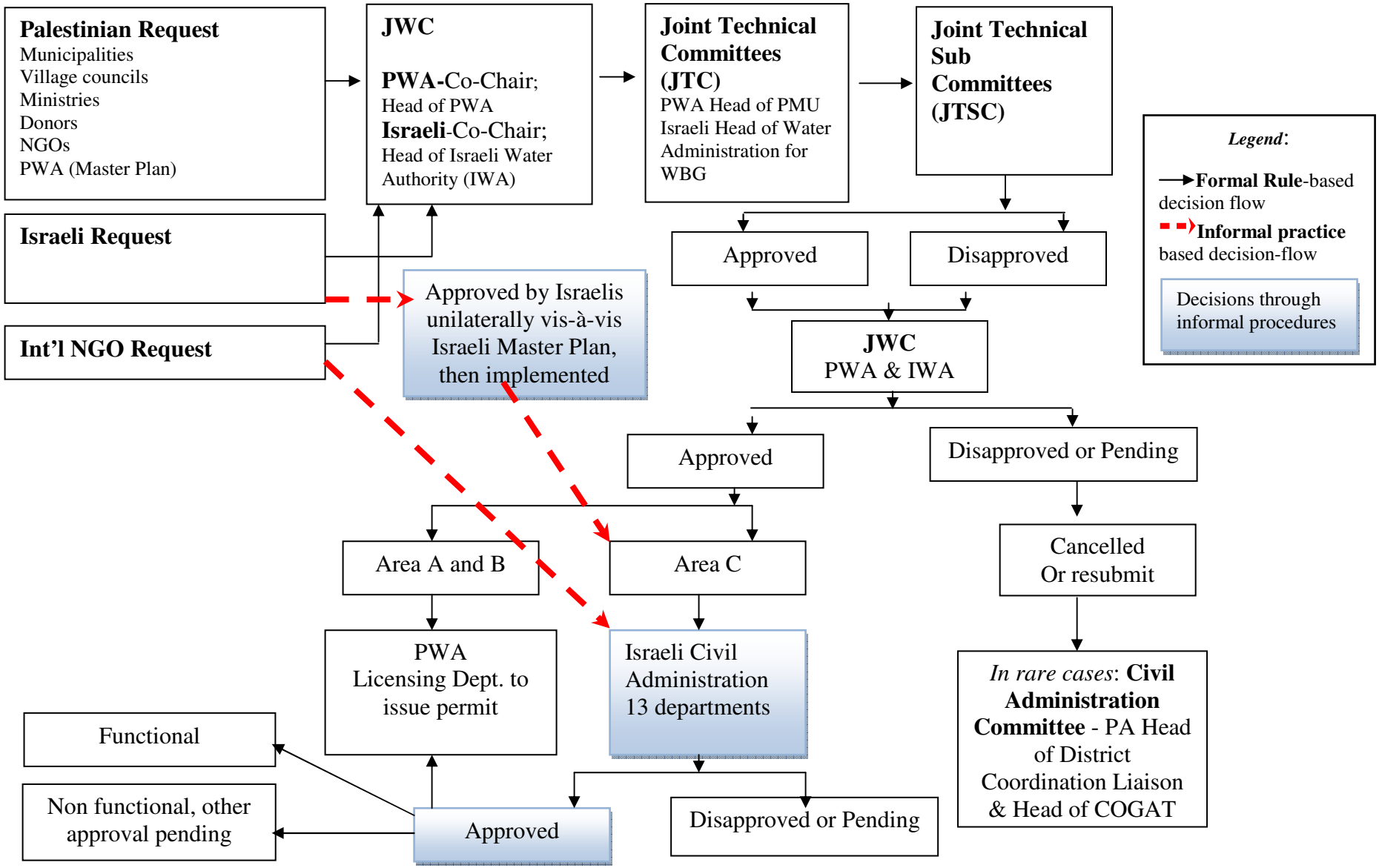
Source: Figure adapted from the 'Water and Wastewater Sector Update Report' (World Bank, 2007) and 'Water Governance Programme: Building the Capacity for Institutional Reform of the Water Sector' (PWA, 2008). Ramallah, Report prepared by the PWA (final approval pending) with support from the United Nations Development Programme, 15 March 2009

Existing Institutional Arrangement of Water Sector in Gaza

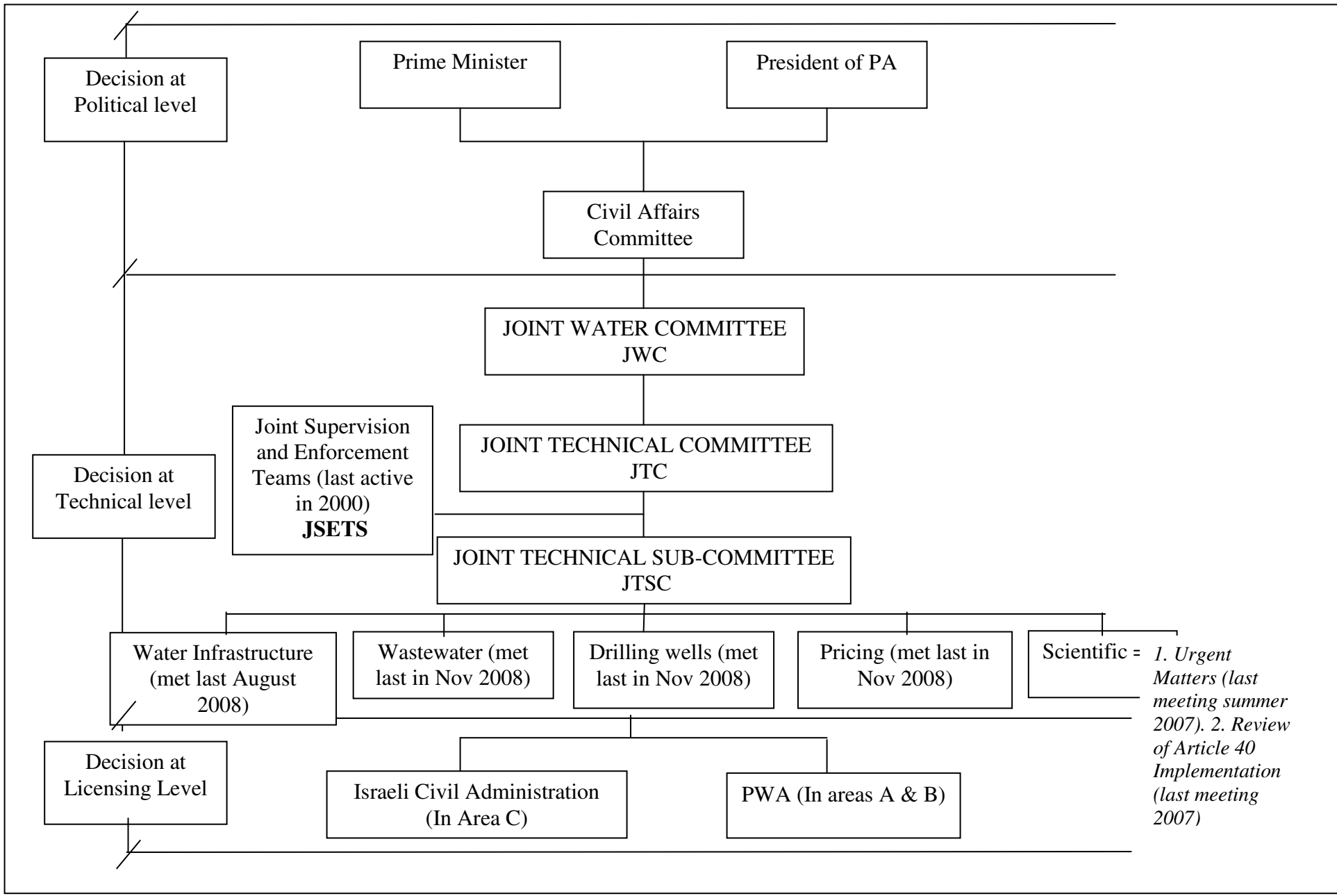


Source: Figure adapted from the 'Water and Wastewater Sector Update Report' (World Bank, 2007) and 'Water Governance Programme: Building the Capacity for Institutional Reform of the Water Sector' (PWA, 2008). Ramallah, Report prepared by the PWA (final approval pending) with support from the United Nations Development Programme, 15 March 2009..

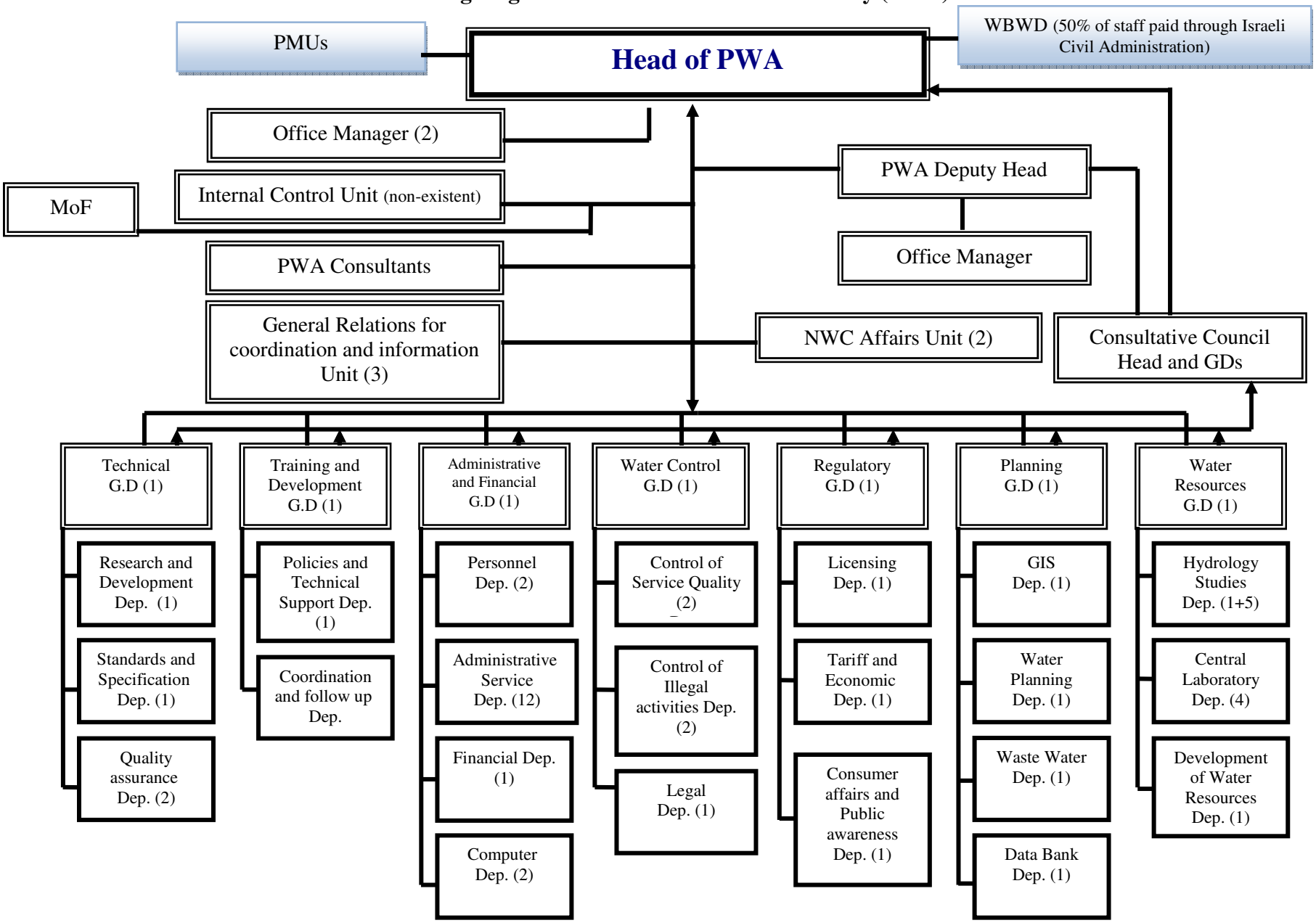
Annex 1b: Flow of Information and Decision making for Joint Water Committee (JWC) ***(According to Palestinian stakeholders), illustrating the asymmetry of power, and informal practices undermining formal rules***



Annex 1c: Structure of the Joint Water Committee (JWC), according to Palestinian Stakeholders

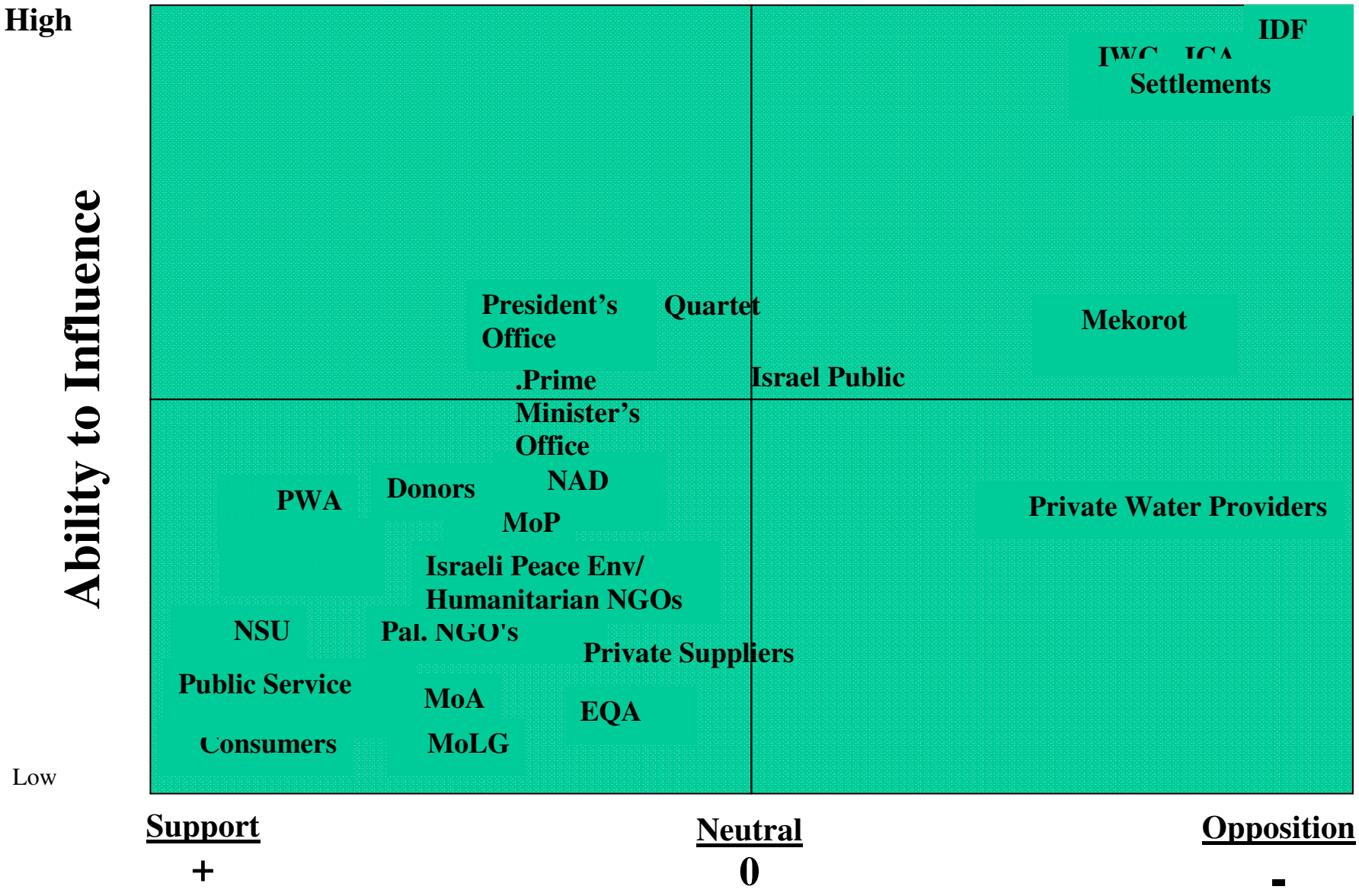


Annex 1d: Organogram of Palestinian Water Authority (PWA)



Annex 1e: Reform of Water Project Approval Process (Palestinian view)

ICA: Israeli Civil Administrati
IWA: Israeli Water Commissio
INGO's: Israeli NGO's



Annex 2

Global Experience in Managing Transboundary Groundwater Resources

In considering the way forward for Israel and Palestine with regard to groundwater management, it is useful to consider the lessons from a few select cases in other regions of the world.

Franco-Swiss Genevese Aquifer Agreement

The Genevese Aquifer is exploited for drinking water by Swiss and French localities – the Canton of Geneva and the Prefect of Haute-Savoie. Between 1904 and 1960, water extractions from the Genevese aquifer were very close to the average natural recharge. The groundwater level was slowly lowering but without serious effects. Between 1960 and 1980, the aquifer was over-pumped, with extractions reaching up to fourteen million cubic meters in 1971, almost twice its potential yield. This over-pumping lowered the water table, reducing the total groundwater storage to about one-third.

In 1977, the Canton of Geneva in Switzerland and the Prefect of Haute-Savoie in France signed an "arrangement" on the protection, utilization, and recharge of the Franco-Swiss Genevese aquifer. The "arrangement" is an honest effort to resolve conflicts and follows a pragmatic approach based on a yearly technical water extraction and recharge program aimed at rational management of the resources. The arrangement makes no reference to the fact that recharge arises only in France. But, in indirect fashion, the arrangement acknowledges France's contribution by allowing France to extract free water, equal to the amount of its current consumption (two million cubic meters), and making the Canton of Geneva solely responsible for the construction and operation of the artificial recharge installation.

Considering the state of the aquifer at the time when the arrangement was negotiated, a general limitation on water extraction was included until the aquifer was restored to an acceptable level. Monitoring of extractions is to be done by metering – regular readings are performed and recorded jointly in two originals, one for the Swiss authorities and the other for the French authorities. Authorized users are granted permits by their national authorities. Every year, each group of users is to present the commission, established under the agreement, with a forecast of the volume of water it plans to extract in the next twelve months. Regarding water quality, pollution abatement evaluations are to be regularly conducted on each side of the aquifer based on standard criteria. Because a groundwater recharge installation was constructed, the arrangement deals with the apportionment of costs between the Swiss locality and the French locality.

The arrangement established a commission composed of the three Swiss and three French members, two of which are to be specialists in water matters. The commission's role is only consultative. The mandate of the commission is the proposal a yearly management program for the Genevese aquifer after taking into account the needs of various users. In this context, the commission can take measures to ensure the protection of waters in the aquifer and remedy possible causes of pollution.

The Franco-Genevese aquifer agreement is in line with other aquifer agreements the purpose of which is to limit groundwater extractions so as to reduce the possibility of groundwater salinization.

Excerpt from: Louka, Elli. *International Environmental Law: Fairness, Effectiveness, and World Order*. Cambridge: Cambridge University Press, 2006.

US-Mexico Shared Aquifers

The border region between the United States and Mexico has seen its share of surface-water conflict, and has also been held as a model for peaceful water resource conflict resolution - most notably *vis a vis* the International Boundary and Water Commission (IBWC), the supra-legal body established to manage shared water resources as a consequence of the 1944 US-Mexico Water Treaty.

Though the 1944 treaty mentions the importance of resolving the allocations of groundwater between the two states, shared surface-water resources were the focus of the IBWC until the early 1960s, when a U.S. irrigation district began draining saline groundwater into the Colorado River and deducting the quantity of saline water from Mexico's share of freshwater. In response, Mexico began a "crash program" of groundwater development in the border region to make up the losses. Along the 3,300 kilometers of shared boundary between the US and Mexico there are now 23 aquifer sites in contention in six different hydrogeologic regions.

Ten years of negotiations resulted in a 1973 addendum to the 1944 Treaty-Minute 242 of the IBWC, which limits groundwater withdrawals on both sides of the border, and commits each nation to consult the other regarding any future groundwater development. In all of the Minutes added to the 1944 Treaty since its inception, Minute 242 is still the only agreement between the two nations with regard to groundwater pumping. The measure has proven inadequate, and unsustainable extraction from the aquifer persists.

There are three main reasons why Minute 242 has had trouble advancing as the agreement originally intended. First, there has not been enough political support to carry it out. A rift between state and federal government over water rights and authority has been a key component of this. Second, Minute 242 refers specifically to monitoring salinity, rather than water quality in general. Subsequently, governments have avoided the execution of appropriate monitoring studies. Third, the terms of reference of both Minute 242 and the 1944 Treaty are considered unclear. Ambiguous wording in the agreements means a lack of support for decisive acts, causing gridlock.

Two more lessons emerge from the US-Mexico transboundary aquifer management experience. First, *even if conditions for agreement are good, this does not guarantee that disputes will be resolved.* It is testimony to the complexity of international groundwater regimes that despite the presence of an active authority for cooperative management, and despite relatively warm political relations and few riparians, negotiations have continued since 1973 without resolution. Second, *difference of opinion of federal and state governments can impede cooperation.* After Minute 242 was agreed upon by both Mexico and the United States, differences in governance between the two parties have contributed to a lack of cooperation along the border zone.

While the 1944 treaty includes mechanism to modify its scope and terms, essentially allowing for adaptive management without renegotiating the entire treaty, even after three decades of problems with Minute 242 and groundwater issues there does not appear to be movement towards a new arrangement with regard to the United States-Mexican shared aquifers.

Adapted from: Newton, Joshua and Aaron T. Wolf. "Case Study of Transboundary Dispute Resolution: U.S./Mexico shared aquifers." Case Studies. Program in Water Conflict Management and Cooperation. Oregon State University. 12 February 2009. http://www.transboundarywaters.orst.edu/research/case_studies/US_Mexico_Aquifer_New.htm.

Annex 3

Agriculture, the Wall, and "Closed Areas": Jayyous and Falamiya[108]

Following a wave of devastating suicide bombings carried out by West Bank residents, the Israeli government in 2002 began building a security barrier to separate the West Bank from Israel proper, and to protect Israelis from attacks. The Palestinian Authority subsequently accused Israel of using security as a pretext for both a massive land grab and continuing human rights abuses.

The route of the barrier significantly deviates from the official 1949 Armistice "Green Line". Ten percent of West Bank land (first declared a "closed military zone" by the Israeli Army in 2002) now sits in legal limbo in the area east of the Green Line and west of the wall route. Approximately ten thousand Palestinian residents live in this "closed area", and thousands more own land in this area, but cannot access it without a permit because they live east of the wall. This closed area includes some of the most productive agricultural land in the region. A site visit to Jayyous and Falamiya demonstrates the range of access problems, and economic consequences that persist as a result of this system of closure:

- **Access to land.** Farmers who live east of the wall are required to obtain permits from the IDF Department of Civil Administration (DCA). The length of permits granted varies on a case-by-case basis – from a few days, to a few months. Permits need to be regularly renewed, and farmers are unable to obtain permits for labor or service providers to assist them in maintaining their farms or making repairs or installations. The mayor of Jayyous explains that in the 2008 olive season 452 eligible applicants (according to Israeli eligibility criteria) requested permits to harvest in the closed area. Of those, 24% (110 people) were granted permits. Some citizens who have spoken out against Israeli closure policy report that their permit applications have subsequently been denied without explanation. One landowner reports that an NGO invited him to Europe to speak at a conference about how the closure has impacted his livelihood and his family. Shortly after his return his application for permit renewal was denied. Others who report being denied permit renewal also report losing their crops. One man says: "I had 3 dunums of cucumbers. My permit expired, and I lost my entire crop because I could not get there to harvest in time."

  Permit carriers, when they cross the barrier are confined to the "closed area", and only between the hours of 6:30 a.m. and 5:30 p.m. There are official opening times for the crossing gate in the village (6:30-7:30 a.m.; 11:30 a.m.-12:30 p.m.; 4:30-5:30 p.m.), though villagers report these hours are not regularly observed. Operating times are reportedly arbitrary. Often the gate does not open for days at a time. A "humanitarian hotline" number, operated by the DCA, is posted on the barrier crossing gate "in case of an emergency". "Why would I call the Civil Administration for help?" says one Palestinian farmer. "They would never help me." These permit and gate closure policies seem to make all aspects of farming difficult, from planting to tending and harvesting.

  Palestinians from other parts of the West Bank purchased plots of this valuable and fertile land as an investment in the 1990s, but now find access impossible. "We cannot get permits. People who live in villages next to the wall are the only ones who can get permits." The mayor of Jayyous states that according to his understanding, the Israeli permitting policy requires proof that the land has been the property of the applicant's family for a minimum of three generations[109], and the property share of the individual must be a

[108] Source: Fieldwork interviews and focus groups, November 23, 2008

[109] This refers to registered titles which exist for land that has been in a family for 3 generations since systematic land registration ceased under Israeli rule

minimum of 1 dunum. With large plots of land being divided within large families over several generations of inheritance, families that can prove three generations of ownership are now losing the right to permits as the land rights of individuals get smaller and smaller over time.

- **Access to equipment and infrastructure**. Farmers who live east of the wall report difficulties in moving spare parts for plastic houses, fertilizer, and other farming equipment. Because farmers are not permitted to store any goods west of the wall, Palestinians are required to move items, some of which require permits, through the wall gate each day that they are needed. Problems moving goods through the gate has caused reported loss of crops. For example, one local farmer describes that he could not access one of his damaged plastic houses for repairs for 4 days, and as a consequence he lost all of his seedlings. Agricultural roads connecting Palestinian fields are unpaved, and can be washed out by rain and free-flowing sewage from the nearby Israeli settlement. Israeli settlers are also allegedly accused by Palestinian farmers of purposely damaging Palestinian assets. Because these communities are located in Area C, law and order is under the jurisdiction of the Israeli Army. Due to poor relationship between Palestinian civilians and Israeli soldiers, Palestinians report that they often do not officially report these crimes to the Israeli authorities, and thus feel they have no recourse.
- **Access to safe and economic water sources.** Five agricultural wells are located in the closed area. These wells are monitored by Mekarot, and withdrawal from the wells is strictly controlled. Yield from these wells is not enough to irrigate the surrounding 8,000 dunums. Farmers turn to a less economic source of water; and pay higher fees to pump water from the Azzun well 3 km away. The water quality from the more distant well is very poor, local farmers report, because of its proximity to a garbage dump. Engineering plans have been prepared for constructing an improved transmission line from the well to the village of Jayyous, and PWA has confirmed $1.2 million in funding has been allocated to works in the area, however Israeli approval of this plan is still pending. The villagers are concerned that the funding – and the opportunity to build the line – will be lost in time.
- **Access to markets.** Produce from this fertile region had previously been sold across Israel and West Bank. Now, produce grown in Palestinian areas on both sides of the wall is marketed primarily in the West Bank. Historically, the largest and most profitable urban market in the North is Nablus, but because of the unique closure regime that is maintained around the city by the Israeli Army, selling in Nablus is now associated with high operating costs. The restrictions around Nablus are reportedly being somewhat eased of late, but it remains to be seen if this will be sufficient to improve market access. As operating costs and opportunity costs increase, wholesale prices are reportedly decreasing. One prominent land-owner and farmer reports an overall 50% drop in wholesale prices for the areas' agricultural products.
- **Access to opportunities.** The mayor of Jayyous states: "The unemployment rate here has reached 75% because of the wall, because people cannot access the land and cannot get permits to do their work." He reports that approximately 50% of the population of Jayyous now lives below the poverty line – in an area of the West Bank that, before the restrictions, was relatively wealthy because of its agricultural productivity. Because of increasing poverty rates, he says local schools report a rising number of drop-outs, as youth are required to enter the job market earlier in order to help support their families financially. The mayor of Jayyous reports a 75% drop-out rate among boys before finishing their high school education.

An Israeli human rights lawyer is now pursuing in Israel's Supreme Court the case of this "closed area" land. Until the Court reaches a decision on the legal status of this land and the rights of the villagers who own it, their situation remains in limbo.

Annex 4

Waste water treatment and reuse

Wastewater reuse can be an invaluable supplementary source in WBG, as it is in Israel. Israeli agriculture has been using wastewater for many years. The theoretical advantages of waste water are several: It is available for 365 days a year, it comes in reliable and predictable quantities, quantities are not normally reduced during a drought, and the price is negotiable - it can be made available cheaply. In the case of the West Bank and Gaza, an added advantage is that it would be additional to existing allocations outlined in Article 40. There is potential – up to half the quantity of M&I supply could theoretically be reused (up to 40-50 MCM). In Israel agriculture now uses more wastewater (500 MCM) than fresh water (400 MCM). However, although it is Palestinian policy to promote reuse, attempts so far have not been conclusive (see Box).

Palestine is encouraging study on reuse of treated wastewater for demonstration effect, but the first attempts at wastewater reuse at Al Bireh have not been conclusive

As part of the Al Bireh project, ANERA prepared a wastewater reuse pilot program. This has had some success ("excellent results have so far been obtained"), but some observers are skeptical. One local authority on the topic says: "ANERA did something for Al Bireh, but it was not effective. They were using a sprinkler on vegetables! There was also a problem of okra growing too fast. It fizzled out – just a report – whereas getting farmers to use wastewater needs a whole process of confidence building." "The problem is that the people of Deir Debwan were not consulted, nor were they connected to the plant. In fact they were insulted. There is a need to go in phases: economic feasibility, public awareness, and training. The capital cost may be high for Palestinian farmers, too."

There is an economic loss to this failure. Currently the effluent from Al Bireh flows in the valley, and it is not reused in agriculture.

Source: Fieldwork interviews, November 2008

Plainly a step by step program has to be carried out. To introduce wastewater reuse to farmers, there needs to be cooperation between MoA (demonstrations, cropping patterns, restricted reuse), farmers and civil society, PWA (for monitoring) etc. There is also a problem of markets and profitability: "the extra cost, and the check points make it unprofitable", one observer said. Current research suggests that lower cost technology may be available (see Box). The reuse of poorly treated wastewater could also worsen the present salination of groundwater and soils. But there is potential for wastewater trade - agreeing standards for effluent could be a part of a future water agreement to enable a transboundary market for recycled treated wastewater for farming.

There may be some lower cost treatment and reuse technology to be investigated

Currently FoEME is doing demonstrations on wetlands, small scale, low cost technology. The problem is that low cost technologies requires a lot of land.

There is also experience with local treatment: a small local plant of 20m3/day works well with almonds and alfalfa: at 'Atil in Tulkarem, and at Sir village in Qalqilia.

In addition, household level systems may produce reusable water for the home garden.

Source: Fieldwork interviews, Tel Aviv, November 23, 2008 and Bethlehem, November 28, 2008

Cultural attitudes have been said to be an impediment – but that seems surmountable. Asked about solutions to the Palestinian water problem, the head of the Israel Water Authority said:

"The main problem is the non-use of treated wastewater. The sewage poisons the groundwater – and it's a waste. They need to shift, but it is not allowed by religion. We overcame this in Israel." Palestinian observers tend to downplay this. One specialist said: "There is no problem in Islam. I presented a paper to IDRC on this." There is also said to be a *fatwa* from a Saudi cleric which is positive.

There are fears that domestic and export markets may be reticent, but that too is surmountable. One reason for setting high standards in wastewater treatment is the fear that export markets may be closed. For exports outside Israel the problem may be solved as the WHO is currently working with the EU on the adoption of WHO Guidelines, which are less demanding than US standards. Palestinians also fear they may not be allowed to market in Israel, and this is plainly a subject for negotiation. In fact this is more of a political and consumer opinion issue than a real health hazard, as the risk of transmission of disease is negligible. Palestine could have standards for different crops and risks as they used to have in Israel.

The issue of effluent standards

An MoU sets out unnecessarily high standards for effluent quality. Although Palestine has developed its own standards for wastewater effluent, Israel has sought to impose its own higher standards through the JWC (see 4.4 in the main report). In December 2003, an MoU was signed between the parties on effluent standards. The MoU sets two levels of effluent: 20-30 for direct reuse, and 10-10 for discharge into watercourses or for artificial recharge. According to the Palestinians, the MoU was specific to the one case, but the high 10:10 standards is now reportedly required by Israeli authorities for all wastewater treatment projects. Leading Israeli and Palestinian experts believe that this requirement is unnecessarily high (see Box).

A leading Israeli specialist describes the standards as unreasonably demanding – and proposes a solution

A professor from Hebrew University and former chairman of the WHO Committee on Wastewater Treatment Standards, said: "Israel cannot impose such standards, it is not socially justifiable. These standards were developed in the US. To impose them on Palestine shows a lack of understanding of the Palestinian context."

"Israel itself started with oxidation ponds for 10 days, then 20 days…..we couldn't afford more. Jerusalem itself got its first treatment plant only five years ago. There are dozens of plants in Israel working to the 20:30 standard. Only one plant in Israel meets the 10:10 standard (in the Dan Region)."

"In wastewater, you need both a standard and the ability to meet the standard. By demanding the best, you end up with nothing. Why should we set a standard to expose ourselves to risk? Engineers have to realize that *standards progress over time*."

"In any case, the benefit is infinitesimal: for a city of 100,000 people, *the extra cost of tertiary treatment is $1 million a year, and the social benefit zero*. The two sides should get together to agree on standards. These could be based on the WHO standards. A conference sponsored by the WHO at the highest level could be mounted to set standards for Palestine, and cross border standards."

Source: Fieldwork interviews, Jerusalem, November 26, 2008

A step by step collaborative approach is required. Clearly, wastewater reuse has to become an increasing resource for Palestinian farmers, as it is in Israel. There needs to be cooperation between the Ministry of Agriculture, civil society, NGOs and the PWA.

Annex 5

Case studies of a sample of two deferred priority projects in Gaza

Beit Lahiya

Beit Lahiya "North Gaza Emergency Sewage Treatment" project (NGEST) has been implemented with extraordinary political, managerial and technical effort. Beit Lahiya is the first large scale infrastructure project to have gone ahead in Gaza in the last eight years. Special procedures were negotiated (see Box) and now, after a multi-level political, managerial and technical effort and expense, the project is almost complete. During the November 2008 fieldwork, Israeli, Palestinian and foreign interviewees reported that humanitarian protests that followed the sewage flood of a few years earlier was an important part of gathering the political will to ultimately implement the project, which until that time had seen delays. Also in November 2008, effluent level in the Beit Lahiya ponds was rising and local authorities reported there was not enough power to pump the sewage out of the lagoon. The facility developed under the project is still not operational, and public danger persists, as was underlined during the December 2008/January 2009 Israeli offensive in Gaza (see Box).

There are differing interpretations of the Beit Lahiya experience. According to one observer, "it took five deaths in a flood of sewage for the Israelis to relent. Tony Blair had to call Ehud Barak to get the last few truck loads of materials through." A member of the Israeli Water Authority commented: "We helped a lot with Beit Lahiya. The IDF said "No", but we persuaded them. And Palestinians did use the pipes for *qissam*! (steel rocket)" However, he would not pin too much faith on the Beit Lahiya approach: "My ability to help as long as they are shooting at civilians is small – the media will kill us. Chlorine is alright, they can claim it is an epidemic…." Another senior Israeli official saw progress on NGEST implementation as a demonstration of Israeli good faith – and Palestinian bad faith: "We helped them despite the security considerations. It shows that if they have a good reason, they can implement. But they don't want."

EXTRACT FROM WORLD BANK NEWS RELEASE, JANUARY 7, 2009, DISSEMINATED DURING THE ISRAELI OFFENSIVE ON GAZA.
BEIT LAHIYA SEWAGE LAKE

FINDINGS

- Lake structure requires constant and vigilant maintenance under normal conditions. Pumps transferring sewage from the lake to infiltration basins, critical to the relief of pressure on structure, are not in operation due to lack of electricity and fuel. The integrity of the lake structure is endangered by the potential impact of nearby explosions and sonic booms and possible heavy rain.
- Failure of the lake structure would put about 10,000 residents of the surrounding area in danger of drowning and spark a wider environmental and public health disaster.

RECOMMENDATION: GOI should immediately facilitate entry of and safe transport of fuel, spare parts and PWA maintenance staff to the lake site. In addition to refraining from deliberately targeting the structure itself, a wide no-fire zone should be secured around the lake.

The principal lesson is that, even with difficult security conditions in Gaza, it may be possible to implement a priority project – but many describe that to generalize the procedures used during NGEST implementation would require a major effort and institutional change. Lessons from Beit Lahiya suggest that implementation requires a leading donor with "convening power", considerable effort then has to be focused on a limited goal, and political support from all parties is required. It is expected that the same NGEST approach may be

tried for future large scale projects in Gaza. However, Palestinians and donors explain it would be difficult to generalize for all projects without adopting a much more centralized approach to procurement and implementation.

Implementation of the North Gaza Emergency Sewage Treatment Project (NGEST) Wastewater Treatment Plant near Beit Lahiya

The 2006 disaster, which saw the bursting of sewage pool embankments at Beit Lahiya, the flooding of dozens of homes, and the death of five people, cast the spotlight on the lack of progress with the IDA-financed NGEST project to expand capacity of the sewage treatment plant. The disaster was in large part attributed both by the spectrum of actors and media outlets to controls and closures which had held up implementation of the project.

The project was subsequently presented by the Quartet Special Representative, Mr. Tony Blair, as part of a package of priority investments to the Israelis and the PA. These projects are supported by Blair's team, and he himself has intervened on behalf of these projects, including NGEST, to ensure implementation. There was also considerable pressure from environmental and humanitarian lobbies in Israel and from the international community to implement the project.

As a result, the project, the first major infrastructure investment to be implemented in Gaza in 8 years, was treated as an "exception" by the Israeli Defense Forces (IDF). The IDF agreed to implementation provided that the Bank acted as an impartial third party to oversee logistics, particularly the movement of goods and parts. This included verifying that goods were the same as specified in the designs, and were stored and used properly.

Coordination between the parties involved regular meetings. Biweekly meetings were held between the Civil Administration, PWA, and the World Bank to review the movement of all goods, item by item. Every three months a larger group, including the Israeli Ministry of Defense, discussed higher-level issues, such as design issues and the movement of workers. On occasion USAID, because of its clout with the parties and in the sector, would participate.

World Bank staff report that despite all of these coordination processes, delays and challenges in implementation persisted. Each truck had to be individually cleared by the Israeli Ministry of Defense, the Civil Administration, Shin Bet (Israeli intelligence agency), and the IDF. In addition, border crossings into Gaza were frequently closed, causing additional delays. Delays were also experienced as design specifications had to be modified, changing steel pipes for PVC in some parts of the plan, where feasible.

Coordinating the movement of workers was difficult as the construction site is 200m from the security barrier around Gaza. Workers were required to get clearance from the IDF for their movements on a daily basis.

Despite their heaviness, these coordinating mechanisms did facilitate the implementation of the project. A similar approach may be used for the implementation of a forthcoming KfW project, the Central Gaza Wastewater Treatment Plant. "Without these procedures the project will probably not go forward," said one World Bank official.

Source: Interview with World Bank staff, based in the Jerusalem Office, November 2008

Khan Younis

By contrast, attempts to deal with sewage in Khan Younis have produced a sequence of risks. Since 2000, there have been plans for a sewage network and treatment plant at Khan Younis (see Box). However, politics and closures have reportedly prevented the project, and instead a series of ad hoc solutions have been implemented. These risk endangering human health and safety, and impacting terrestrial and marine environments. In the meantime, design is now starting on the treatment plant, though an implementation timeline is not yet clear.

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Local experts explain that the current political and security situation in Khan Younis is leading to poor project design and interim solutions that are detrimental to local livelihoods and the environment. Fragmented donor support and coordination on security measures makes harmonized design and implementation approaches more difficult to bring to fruition.

Failure to implement the sewage project at Khan Younis is endangering people and the environment

At Khan Younis there is no functional wastewater treatment. Funds were committed in 2000 by Japan for a sewage network, pumping station and treatment plant. However, local authorities report, the Japanese withdrew their support for the project during the second intifada. Subsequently, $13 million was provided by Italy for the network and pump station, but after Hamas was elected, the Italian contribution was frozen.

In the meantime, residents have by their own efforts connected their sewer outlet to the storm drainage system. Sewage now flows into a storm water lagoon at Hay al Aml.

At the time of the fieldwork visit, the storm water box culvert in the lagoon was blocked up and raw sewage was being pumped to four further temporary lagoons. Local authorities report that these lagoons are rapidly filling up, and soon the sewage will be pumped raw to the sea.

An experienced sanitary engineer commented: "These 'solutions' should not be implemented. Now they will pollute the sea, and Gaza's last clean beach."

The PMU commented: "all this - the lagoons and everything - are an emergency project, not part of the earlier plan".

Source: Fieldwork interviews, Khan Younis, November 24, 2008

Annex 6

Jerusalem Water Undertaking case study

A. The large utility sector in the West Bank

There are five large utilities in the West Bank: Hebron, Nablus, Jerusalem, Bethlehem and Qalqilya. Of these, only Jerusalem Water Undertaking and the Bethlehem Utility are set up as fully autonomous legal and financial entities.

The large utilities have a professional association with the objective of raising standards. All major utilities are members of the Palestine Union of Water Service Providers, which is a member of the regional Federation AQUA and is linked to DVA in Germany. These professional structures are being supported by Germany. The Palestine Union is currently planning a conference in Hebron, with sessions on leak detection, GIS and collection points.

B. The Jerusalem Water Undertaking (JWU)

Legal status and governance

JWU has legal status as an autonomous utility. JWU is registered as a not for profit utility under Law # 9 of 1966 of Jordan, and owned by the three municipalities it serves. [This status is confirmed under the Palestinian Water Law # 2. The JWU is governed by a Board composed of representatives of each of the three municipalities, together with the PWA]

Water sources

Most water is supplied by Israel. About 80% of JWU's water is purchased from Mekorot. In addition, JWU operates 6 wells, pumping from a depth of 1,500 meters. The Director General, comments: "We suffer from water shortages every summer." He explains that in previous years , Mekorot provided 32,000m3 a day, but that amount has more recently been decreased to 26,500m3.

Service area

JWU is efficiently serving a third of a million people. JWU serves the cities of Ramallah and Al Bireh, with a population of 130,000. Together with camps and villages, the total population of the service area is about 300,000. Of this, more than 98% are connected, with about 50,000 connections. Some 106 villages in the Ramallah and Al Bireh districts are served, of which about half have house connections directly supplied by JWU, and half have bulk water delivered by WBWD, with the distribution within the village organized by the village council.

The wall

Part of JWU's service area lies on the opposite side of the wall in part of East Jerusalem. JWU maintains an office on that side.

Service standards

JWU has good supply standards, but cannot offer full service in the summer. JWU says that it can meet demand for nine months of the year with continuous service. In the summer months

of June-August, consumption increases by 30%, and JWU supplies water in rotation according to a timetable, typically for two days each week.

Average consumption

Average consumption varies upwards from 35 lpd. The average domestic consumption across the entire JWU is 100 lpd.

Financial viability

JWU is run like a commercial business. JWU is a non-profit organization but it keeps its accounts on a business basis, i.e. an accruals basis with financial and depreciation reserves. In 2007, revenues were NIS 65 million, and expenses including depreciation and provision for bad debts were 64 million. Raw water costs were NIS 33 million, and the depreciation charge was NIS 4.5 million. Net cash flow was positive (NIS 0.5 million).

Bulk water tariffs

JWU pays NIS 2.6/m3 to WBWD, which facilitates payment to Mekorot for the supplies from the Carrier.

Retail tariffs

Tariffs are set at full cost recovery levels and are regulated by PWA. There is an annual tariff review. The schedule has to be adopted by the JWU Board and reviewed by the PWA, as regulator. For customers, the billing cycle is two months, and the following are the blocks for usage in two months. There is a minimum charge of NIS 42 a month, and an additional charge of NIS 10 for water meter rent.

Two monthly consumption block	**NIS per m3**
1-10m3	4.2
11-20m3	4.6
21-40m3	4.85
41-100m3	6.3
>100m3	6.85

Collection rate and arrears

JWU has a relatively prosperous customer base and good financial discipline. Dr. Ibrahim estimates the collection rate at "more than 80%". In 2007, sales were about NIS 60 million, and collections were about NIS 45 million. Arrears today stand at about NIS 70 million, of which: NIS 1 million is owed for clinics and clubs in the camps, and underwritten by UNRWA; NIS 11 million is owed by various PA ministries and bodies; and NIS 15 million is owed by individual households within the camps. The service is thus characterized by largely affluent middle class households and relatively prosperous businesses, official agencies, and a poor and vulnerable refugee camp population additionally affected by the Intifada. JWU operates a three stage collection policy: a letter, a fine and interest on overdues, and disconnection. Each year, JWU makes a 4% provision for bad debts.

Unaccounted for water (UfW):

UfW is relatively high, at 25-30%. This is a deterioration from 2002, when UfW was 21%.

Project finance and financing conditions

JWU has financial viability that enables it to borrow money for investment. Largely to reduce UfW, JWU has contracted with KfW for a new large-scale replacement project (Euros 11 million, 50% loan, 50% grant). The JWU contribution is 15% of the total project cost. The loan is soft, with a grace period of ten years, and interest at 0.25%. Dr. Ibrahim expects that in fact KfW will not exact repayment, but will allow JWU to keep the money as a

"reinvestment fund" for asset renewal. Although the financing terms are clearly highly concessional, this arrangement does nonetheless move JWU towards the status of a financially viable utility, including mobilization of 15% of the total investment on its own resources.

Project implementation

JWU has an Engineering Department, and a Projects Unit within that Department implements investment programs.

Investment projects, O&M and cooperation with the Israelis

JWU has good relations with Israeli counterparts, but still faces challenges. JWU is responsible for operating the six wells under its jurisdiction. If there is a technical problem, "we call Shahal (a big Israeli company)". The Director reports that JWC has faced problems acquiring and obtaining equipment and goods. "We call KfW and they help, or we call Zaki, an Israeli fixer, or I speak to the coordinating officer from the Civil Administration] in Beit Il. We discuss the goods – whether it's pipes, etc." According to the Director, in 2008, water meters ordered by JWU arrived from the UK, and stayed at the Israeli port of entry for six ninths. "We had to pay NIS 400,000 in customs and demurrage." The Director describes that this creates an incentive to purchase from Israeli manufacturers. Further, he explains: "Sometimes, if Israel is the only source, the price is high. For maintenance and spares – they are the only provider." The Director estimates the extra costs is 10-12% above what they would be if there was more competition from a global market. "The [military] checkpoints make business harder generally," he says, as they further restrict movement of goods and personnel providing services.

Getting permission for a new well is difficult. Water resources are increasingly inadequate while demand is increasing (see above). In response, approximately ten months ago JWU applied for permission to drill a new well. Permission was granted for a well at Hezmah, east of Jerusalem. Because it is in Area C, the well requires Civil Administration clearance. The well plans have not been implemented, the Director reports, as the CA continues to request technical changes to the plans. "They keep saying move it 50 meters, 60 meters. Then there is the hassle of getting approval for the pump. And so on."

Analysis

JWU seems, by contrast to other Palestinian utilities, to be an island of efficiency. In many ways, it resembles a "normal" utility, providing decent water service for a reasonable price, under regulation, and managing its affairs along business lines. The key lessons here for the Palestinian water sector are not born of problems but of comparative success.

In addition, the creation of the Union of Providers is one sign of professionalism and engagement that is encouraging for the future of the utilities in the West Bank.

Amongst the factors of success appear to be:

- *JWU has the legal status of an autonomous utility.* JWU can be managed on a business basis because it has the legal status of a business, and is not a department of a municipality.
- *Most water is supplied (by Israel) from a carrier, with predictable quality and quantity.* Even when quantities are short, JWU is able to provide a predictable service to a reasonable standard.

- *JWU has good management, both technical and financial, and so is able to keep to its business service standards.* JWU has the financial viability that enables it to borrow money for investment.
- *A long term partnership with donors for a package of integrated investment and institutional development support provides the continuity and stability needed for both physical and institutional development.* KfW and GTZ have provided extensive support both to the investment program and to management support and capacity building.
- *The tariffs are fair and recover full costs, including depreciation.* JWU is able, through good management, to keep its tariffs reasonable, and these tariffs are approved by the regulator on the basis of properly prepared financial forecasts. Tariffs are set at full cost recovery levels and are regulated by PWA.
- *JWU has a large and prosperous customer base and good financial discipline.*
- *JWU works hard to maintain good relations with Israeli counterparts.*
- *JWU is run as a business, not a charity, or an emergency humanitarian operation*. Despite problems, JWU has been able to keep this business approach and good financial discipline. The DG is a financial specialist and not an engineer.

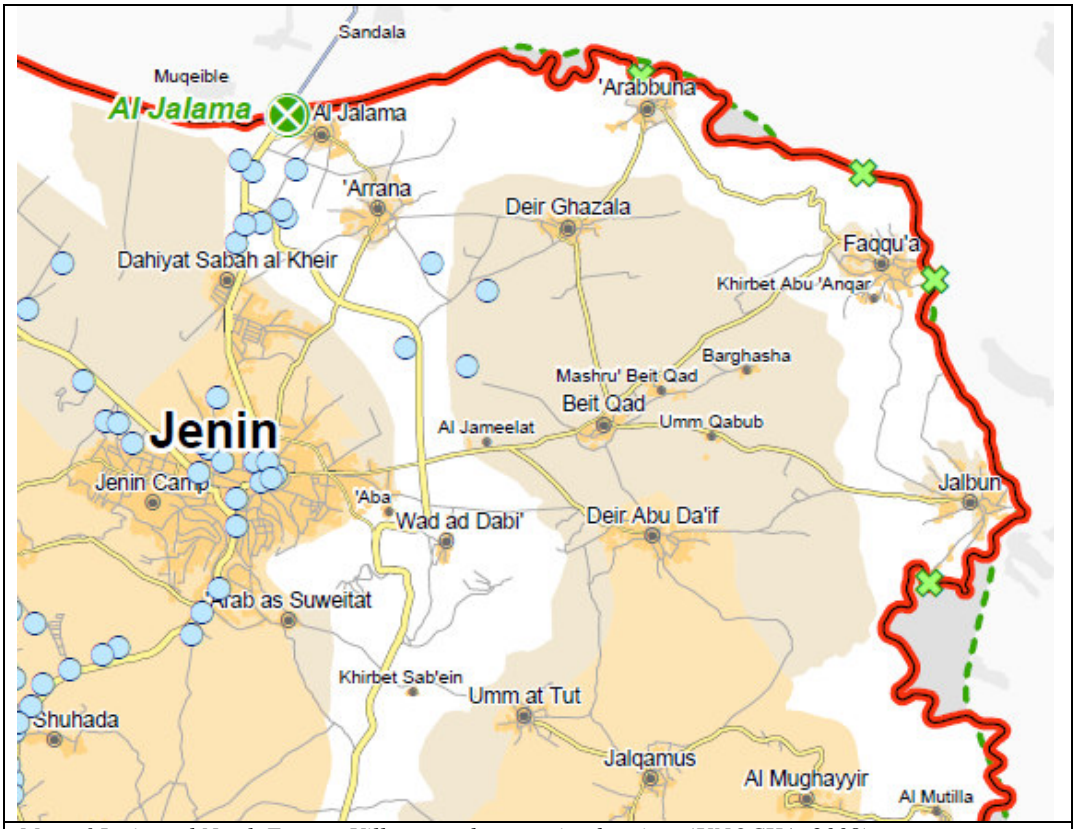
Amongst the <u>lessons from the challenges JWU has experienced</u>:

- *The higher cost of working through Israeli partners.* JWU maintains that it is faced with non-competitive process in the Israeli market, and also hindered from importing from international suppliers. This could raise costs by 10-12%, according to the DG.
- *Getting permission for a new well is hard.* Even when JWC has given the go-ahead, the Israeli Civil Administration represents a significant impediment, adding to delays and costs.
- *Exploiting water in the highlands is very expensive because of the pumping head.*
- *Despite the advantages of Mekorot supply, Mekorot may not be a reliable source, as supplies are subject to unilateral reduction by Israeli authorities.*

Annex 7

Three Jenin case studies[110]

Jenin Case Study 1: Jenin Villages Water Supply Case Study



Map of Jenin and North Eastern Villages and separation barrier. (UNOCHA, 2008)

Jenin Background

The governorate counts 256,000 people, in 86 urban and rural communities. The governorate is distinguished by the fact that the four Israeli settlements and three military bases that were formerly in the area have been removed. The Governor explains that Jenin is now the "biggest open space for Palestinians". Jenin suffers from social and economic problems common to many Palestinian communities. The economic base of the governorate – agriculture – has eroded, the governors office estimates unemployment at 58%, and per capita GDP at $700. This level of production is below the Palestinian average, and the Israeli average. The Governor describes the problems of a young generation that holds little hope for a financially and politically secure future: "We have our young people in coffee shops all day. There are social and mental problems, and drugs. When Hamas and Al Qaida pass by, they will follow. We need to get our kids involved in sustainable jobs."

JSC and the 10 villages

The ten villages of the Northeast Jenin JSC. Fieldwork was conducted for two days in the north east part of the governorate in order to understand the challenges faced by a coalition of

[110] Source: Fieldwork interviews and focus group discussions, Jenin Governorate, November 19-20, 2008

ten villages located along the border with Israel. These villages are trying to improve governance, community services and economy, and increase investment opportunity by leaguing in a Joint Services Council.

"Water is our number one problem." In a meeting with the JSC they say, as a first point of departure, "The main problem of our communities is water, the absence of a permanent water source, the high costs of our present supplies We don't have enough resources even for drinking – and we are an agricultural and pastoral area, reliant on water for our livelihood. Even when we pay 12 shekels a cubic meter ($4/m3) for drinking water, the quality is very poor. Water is our number one problem".

The collective spirit of these communities. The Governor says that these communities are special because of their sense of working together, their self-discipline and their constant search for solutions. He says, "Regardless of their poverty, they always pay the bill". Though the JSC remains hopeful and persistent, community members describe frustration with continuing social challenges. "Our women and children suffer from bad health problems, form lack of clean water."

The *solutions the JSC envisages* are several:

1. A *deep well, a local main, and networks* for the ten villages. The Governor explains that the Ten Year Plan for the Governorate includes drilling a deep groundwater well in the area, and a main and network supply for all the villages of NE Jenin. The villagers describe frustration with a plan that has been for a long time discussed, but remains unimplemented. One local resident says: "Yes, we were told about this by the West Bank Water Department ten years ago. But where is it? We think that, because of Israeli controls, we cannot do it." One JSC member describes a recent visit by the PWA: "The PWA told us we would have a big project in 2009. But we know it's not true, as there is no permit." This continuing frustration, voiced by local citizens, appears to be undermining local respect for national authority.

2. *Connection to a main carrier* from the Jenin well fields. This project plan is also featured in the recently published PWA "Governorates Study".

3. *Connection to the Mekorot carrier.* One of the villages is in fact connected to the Mekorot supply carrier. The majority of villagers are, however, against this as a general solution on political and "water security" grounds.

4. *Individual village projects, drawing on nearby shallow wells pumped to a local network.* Several villages already have this solution, and in the absence of a carrier connection, this is the citizens' preferred solution. Implementation still requires observation of all the permits and procedures of a major project, together with challenges of seeking donor support. Without an economic assessment it is difficult to know if such an approach is preferable to connecting to a main. Without an environmental assessment there remains an unquantifiable risk that the water resource in the shallow aquifer will run out, as locals report it has already for many other wells in the area.

5. *Rooftop rainwater harvesting*. In theory, this should be economical in this area of about 300mm rainfall (the economic cut off point is generally about 250mm). However, rainwater harvesting is a high capital cost solution that reputedly provides water for only a few months, at best, over the course of a year. In one village, Jalboun, several houses have tanks that can hold 40-50m3 harvested from the roof. One householder had constructed a 100m3 facility at a cost of $10,000, which according to the owner is enough for about 3-4 months. Another householder paid $5,000 for a 50m3 facility, which he explains is enough for about two months.

6. *The cistern solution*. The cistern can be used to hold tanker water. The villagers are against this solution, as it invests $1,500 per household ("the price to get a network", assert members of the JSC) in a stop gap solution dependent high cost tanker water. The villagers say that they do not like "NGO insistence on cisterns", although they accept if that is the only solution on offer. One village, Arrabona, refused a donation of cisterns, on the grounds that funds would be best spent on developing a supply network for the village.

7. The communal tank solution shared between several villages. With KfW support, the JSC erected a communal tank to distribute water by gravity to several of the villages. However, the local water sources available from shallow farm and domestic wells are dwindling, and the JSC asserts that there is insufficient water to pump up to the tank.

A rainwater harvesting scheme with pipe extending from the roof to a cistern, Jalboun

For sanitation, the only solution is cesspits, with emptying that is an environmental and health hazard. All households use cesspits, which are emptied every 2-3 months, at a cost of 100 Shekels ($30). There is no treatment plant in the governorate that can process the sewage, and typically, villagers report, the private operators simply dump sewage loads into a nearby wadi. At Arrabona, at the time of our visit, villages reported a recent sewage discharged into a nearby culvert.

The only water source in the area, apart from rainfall, is the shallow well. There are a some licensed wells (licensed before 1967), and a larger number of illegal wells. According to local residents, all wells are in the shallow aquifer and all suffer from rapid depletion, with many drying up. Drying-up of wells is associated with declining rainfall, low yield of the aquifer, and the absence of good transboundary management or regulation. As seen in countries such as Yemen, well owners are engaged in the classic "race to the bottom" as they compete against each other for the resource.

Despite all the problems, the community takes care of the very poor. In each village, care is taken of the very poor. At Arrabona, where there are about ten very poor families, even the tanker drivers will charge widows half price. Further, there are charities and private persons who will on occasion give water as a "loan".

The ten villages

	Village	Population	Current source	Proposed source
1	Deir Abu Daef	6,000	Tanker, rooftop	
2	Faqua	3,000	Tanker, rooftop	
3	Jalboun	2,700	Tanker, rooftop	
4	Jalama	2,600	Has a shallow well and network	
5	Arrana	2,500	Tanker, rooftop	
6	Deir Ghazala	1,200	Tanker, rooftop	
7	Arrabona	1,200	Has a shallow well and network	Has license for network
8	S. Beit Qad	1,200	Tanker, rooftop	
9	N. Beit Qad	500	Tanker, rooftop	
10	E. Aba	500	Tanker, rooftop	

1. Deir Abu Daef

This is the largest of the ten villages, represented in our talks by its former landlord, who has become a public spirited community organizer.

The village water source is tankers. Typically, the tankers bring water from the Mekorot filling point, but because of the high cost they often fill up instead at the 7-8 illegal wells in the area. Tanker water costs about 13-14 shekels/m3 ($4-5/m3).

Water quality from the illegal wells is very poor. One villager says: "There is a lot of diarrhea and vomiting, especially during the summer."

Agriculture is the only employer in the village. There are about 300 dunums with plastic houses. When the wells dry up, the farmers buy tanker water. They also collect rainwater from the roof of the plastic houses.

Workers are sometimes paid in water. At the end of the day, one local authority says in the forum, they may be paid in vegetables and the farmer will transport 2-4m3 of water to their house for them. In fact, some local residents report, the many tractors in the area are more used for water transport than for agriculture.

2. Faqua

Faqua sources its water largely from the Mekorot filling point, by tanker. Ali Abu Dukar, the local JSC member, says: "The Israeli water pipe is a few meters from our village, but we have to get our water by tanker. Typically you have to wait two weeks to get a tanker, as demand is so great, and in summer its worse. Our village council bought a tanker, but it's not enough."

He continues by saying: "For sanitation we all use cesspits, but with our permeable soils we know that the sewage is polluting the aquifer, and perhaps our cisterns too."

3. Jalboun

Water is a basic issue and currently quantity and quality are grossly inadequate. The head of the village council, considers "water as a key problem – it affects all social and economic issues. Disease is spreading due to contaminated water. Our problem is that sewage from

other areas is contaminating our water. The water we buy is from Abu Daef, and it is contaminated".

Water is extremely expensive. At present, the village council is organizing the tanker water supply. The village council reports that they have their own tanker and they buy private tankers to supply about 350 m3 a day to the village. This calculates to approximately 1 m3 per household, or 125 lpd. This covers human consumption, the animals, and a little bit for the home garden. The council buys the water at 12 shekels/m3, and sells it to households at 10 shekels/m3. The difference is subsidized out of the electricity income. The village is thus paying about $1,000 a day for water, plus the cost of pumping up to roof tanks. The monthly cost per household is thus about 350 shekels ($87) or about $1000 a year, one sixth of the typical household income.

There are no illegal wells in the village, and residents pay a higher price for water relative to nearby villages. The village council states: "We have no illegal wells in our village. We are against all illegal wells – I represent my people on this."

There is a license for a local well and network project, but funding is now needed. The village council explains: "Some years ago, a farmer obtained a license from the PWA to drill to 150m to extract water for agricultural purposes. He drilled, but found no water. The Village Council then negotiated with PWA over the course of a whole year and obtained a license to drill to 250m for village water supply." The project now needs half a million dollars. The village council says: "We got the license 4 months ago. We have bought the land using village council funds. Now we are looking for a donor. The estimated cost is about $490,000, including the tank and the network, which works out at about $1,500 for each of the 340 households. We applied to the PWA about two months ago, and we are also talking to the French and CARE."

4. Jalama

Being attached to the main line means villagers consume at a third of the cost. Jalama is the only village connected to the Mekorot line. They are paying much less for water: 3 shekels to WBWD, and 4 shekels at the household level. The monthly bill for a family of 6, with sheep and a small home garden is about NIS 120 ($30 for about 30 m3).

Mekorot line in Jalama.

5. Arrana

Arrana gets its water by tanker from a private well nearby. The well was approved by the JWC in 1997 and drilled to 150m. The village council applied for a license to build a conveyer and network to use all the water for village water supply. It took six months from application to obtaining a license. Now, for over a year the village has been seeking financing. One elderly villager remarked: "We might have had Mekorot water like Jalama. *But frankly, we don't want it*!"

Later we visit the well. The owner, Abdul Naim al Sa'adi. He says that when he applied for the license, he already agreed to share the water with the village. He spent 20,000 shekels on a good hydrogeolgical study and well design.

Currently, Abdul Naim uses about half his water for his own agriculture and sells half to tankers for both domestic and agricultural use – about 20-30 tankers a day in summer.

The problem is that the yield of the well has dropped (from 45m3/hour to 20m3/hour). He blames three bad years of rainfall. But he does not believe it is fatal, and he says there are no illegal wells within 2 km.

6. Deir Ghazala

Deir Ghazala is already hooked up to a private well, and has its own network. The well owner sells at the well head at 2 shekels/m3. The village pumps to a reservoir, and then by gravity to households, where the charge is 4 shekels/m3. The village council employs a part time water meter reader, a maintenance mechanic and an accountant.

Well house at Deir Ghazaleh

The problem is declining yield. According to local villagers, in 1963 the well produced 103m3/hour at 35 m depth; in 2008 it is producing 30m3/hour at 75-80m depth. The villagers say categorically "The illegal wells are to blame".

Later we visit the well, which is in a well-made pump house next to the house of the owner. The pump owner, blames lack of rain and also the illegal wells. He estimates there are 1,300-1,400 illegal wells in the governorate. At the start, the operation was all agricultural, but since 1979 he has had an agreement to also supply the village. He explains that before the second intifada agriculture was more profitable, but now with the closures agriculture is not very good business, and it is more profitable to sell water.

Many parties express concern that illegal drilling and drought are leading inexorably to the exhaustion of this village water supply well. The pump owner feels that PWA policies are inconsistent. He says he does not receive any help, even though he is in village water supply.

For example, he gets no assistance addressing donors, he pays for his own quality testing, and PWA is not controlling the unlicensed drilling that is undermining his livelihood. The nearest licensed well is 4 km away – but the nearest unlicensed well is only 600 meters away. Within one km radius he claims there are 17 unlicensed wells pumping from 150-190 m3. Experts from Mekorot have told him that his well will be dry by next year.

7. Arrabona

Arrabona lies right on the wall, and according to local officials 2000 dunums of land historically within the village boundaries are in fact on the other side of the wall. Although the village itself is in Area B, it is surrounded entirely by Area C. The village uses only cisterns and tanker water for domestic supply.

For years they tried to get a license to drill a well, but without success. A local authority representative says, they got no clear reply from the PWA, no written answer, only a verbal message that "the JWC has not met for a long time now." In early 2007, the villagers pooled their financial resources totalling NIS 90,000, and started to drill an illegal well for water supply. The study for the well was done by the PHG representative in Jenin. When they got to 100m they received a notice from the Israelis to stop. They continued drilling. They received a second notice, in Hebrew, from the Planning and Construction Department of Beit Il. Attached were notices that certain houses were to be demolished, as being "outside the zoning" of the village. They continued drilling and reached the requisite 274 meters (according to the study). A villager recalls: "The contractor was drilling day and night. But he was afraid. He left, and another came."

One morning soon after the well was completed, a villager explains, "40-50 military vehicles came with a bulldozer. The Israelis surrounded the village and called a curfew. They bulldozed two houses and filled in the well." Though it is unclear to what degree PWA is aware of illegal drilling, locals report that shortly after this incident PWA collected and confiscated all drilling equipment used for drilling deep wells.

8. Aba

Aba is a small village just east of Jenin city in Area C. The village sits next to two emptied Israeli settlements, which were once connected to the Israeli water supply network. This pipeline, which runs through Aba, is now used to service Jenin city and Aba village. The village successfully acquired a permit, from the West Bank Water Department and with permission of the Joint Service Council, to construct a filling point in the village using this line. This construction does not require permission from Israeli authorities. The filing point is now used to fill tankers and provide water to the village, and though there are hopes for one no network has been constructed yet (not clear why).

At the household level the concerns and the coping mechanisms are relatively common across the different villages, regardless of whether they use tanker water or are connected to a network. Virtually all interviewed women, who represent a cross-section from all of the villages, complain of poor water quality. They explain that many different wells are close to sewage sources, some as close as 12m. Whether they obtain water from tankers or from the tap, they all boil the water before using it. They explain that poor water quality is visible to the naked eye in most cases, especially in winter when it is cold. Concern about the quality of tanker water is particularly acute, as the source is never transparent, and households are generally forced to purchase what is available. Water boiling is costly, and contributes to an average consumption of 2 large propane tanks per month at the cost of 1200 NIS ($325) for a family of four with two children. Chlorine tablets are distributed for free by local authorities, and families use these. Filtration systems are also available, however few report that they can afford to use these safer methods. The smallest filtration system available, which involves

pouring water through a paper filter system and into bottles, costs 1000 NIS up front for the equipment, and 60 NIS each month thereafter for filter replacements. Boiled/purified water is prioritized for babies and small children to keep costs down. This means that many adults consume untreated and unboiled water, which can lead to health problems. Mothers estimate 3-4L of boiled/purified water per day per child. They report spending up to 2 hours preparing and bottling clean water for per day for a household with two children.

Several public health problems are reported as a consequence of poor water quality. Health problems include parasites, diahrrea, and kidney stones. Residents describe a recent incident when Jenin hospital reported that 75% of the population of the NE Jenin villages had been afflicted with acute diarrhoea. Another resident reports: "Two years ago [in 2005-6] there was a time when Israel did not allow [propane] gas into our area. There was a kidney stone outbreak, and 30% of the population of Jalama had to have them removed. It is a very costly operation."

Water for cleaning and washing – and recycling. Women report using limited water for cleaning the house, and limiting clothes washing as needed. Grey water from kitchens is frequently piped to the garden for irrigation. (This is still not sufficient water for gardens, and regular household water is still needed to water plants and trees) Recycled water collecting in pools attracts mosquitoes and bugs, which are a nuisance around the house. Mosque water used for washing before prayer is also reused for irrigating nearby gardens and cleaning nearby houses.

Analysis

Water is a problem – but could be a good opportunity to improve the lives of Palestinians. Water is probably the biggest constraint to improving living standards – and one on which actions are currently fragmented and sub-optimal. Water costs are on average about one-sixths of the family budget, and the low quality can be harmful to health.

Planning is key. There is no real water planning here. The villagers are left to find their own solutions, and the result is ad hoc, expensive and sub-optimal projects which have produced minimal results so far.

Strong links need to be forged between the community level and the governance and institutional framework for water development and water services. The village councils and the JSC are excellent, subsidiarity in action, but they are not empowered. They do not have access to instruments of water management, they can only operate on a small local scale, and they do not have the critical mass to do good projects.

Because of poor sector planning and management there are a number of water conflicts in waiting here: (1) between illegal wells and village water supply; (2) between agricultural uses and domestic uses; and (3) between town and country.

The problem of illegal drilling is symptomatic and indicative of several things:

- First, it is a sign of **a certain desperation** as in the case of Arrabuna, where villagers were so desperate that they squandered $30,000 on an attempt to develop resources themselves. The agricultural wells are also a sign of desperation – a region rich in agricultural potential with land and people lying unemployed for lack of water, so the natural tendency is to take the water lying beneath one's feet.

- Second, it is a sign of **a lack of support**, that people "take the law into their own hands" because they feel that the PWA and the PA generally is doing nothing to help them.

- Third, it is a sign of **weak water governance**, that the PWA in Ramallah can do nothing to stop the drilling of 1,400 illegal wells.

- Fourth, it shows the **reality of control within the West Bank**. When Israel wishes to it can intervene in strength and can stop illegal drilling. Nonetheless, 1,400 agricultural wells have been drilled.

* * *

Jenin Case Study 2: Jenin Agriculture Case Study

A rich agricultural area. In the past, Jenin area is said to have been a rich agricultural area with lots of water. The Governor reflects: "We had a lot of water in the past. Marj Ibn Amr – 62,000 dunums – was the best agricultural area in all Greater Syria. But the Israelis have taken all the water from our springs."

The need for agriculture for employment and incomes. Officials in Jenin commonly assert that agriculture should be revived as a source of employment. With the downturn in the Palestinian economy and the return of those who had worked in Israel before 2000, the Governor says there is a crying need for agriculture to create jobs and incomes.

Agricultural potential and intensive irrigated production. The head of the Agricultural Union for Jenin Governorate, says that the ten villages of North East Jenin still have 25,000 dunums of the best agricultural land. He says: "Less than 5% is irrigated, largely over by Jalama, but the irrigation is 98% intensive plastic house cultivation."

Indeed, we see all over the plain, many plastic houses with high standards of management and husbandry. Most irrigated farms are indeed small, with one or two plastic houses, covering 1-2 dunums. But it seems even a small operation can be profitable, as growers estimate 6-7,000 shekels ($1,800) a year in net income from a single plastic house. Typically, land is rented, and tanker water is purchased, with locally-harvested water as a supplement. The entire family will work on the operation.

Rainfed agriculture is much less profitable. Farmers estimate a net income of 250 shekels a dunum "when rainfall is good."

Farmers feel that the cost of water is much higher than in Israel, placing them at a competitive disadvantage. Amjad from Jalama, which is adjacent to the main exit station for agricultural produce into Israel, complains of unfair competition. He says that Israeli farmers pay 0.6 shekel/m3 for their water, whereas Palestinian farmers are paying between 4 and 12 shekels/m3.

The Palestinians have low levels of drinking water. On the Israeli side of the wall, Palestinian report seeing sprinklers used for irrigation. At Fuqua, the community gets its drinking water by tanker from the Mekorot filling point at Arab al Suweitat almost 20 km away. Their village stands on a low hill commanding a view of the wall and, beyond, a large ploughed field. In November the field lies fallow, but the villagers say that in summer farmers on the Israeli side grow potatoes and carrots irrigated by sprinkler.

Wells run dry and cannot be deepened. At Jalama, next to the major border crossing, there were 5 licensed wells, each producing 70-80m3/hour. They all went dry. Amjad alleges that "Israel drilled 600 wells along the Green Line – and all the Palestinian wells went dry. We apply for permission to deepen them. It takes years. Nobody ever succeeded." Salem says: "In 2007, I applied for permission to deepen my well. The PWA passed it on to the Civil

Administration. I am still waiting for a reply." Jamal had two wells, and he explains that one went dry seven years ago, another one last year. Application was made to deepen them, but no reply has been received. An NGO came with a project to rehabilitate wells but "as you are not allowed to deepen them, this is useless."

Irrigation by well from deeper aquifer would be hard to justify economically. A well owner near to Deir Ghazzali, is still irrigating, despite the dwindling resource. He irrigates about 100 dunums of his own land, and sells water for a further 150 dunums. He produces fruits, zatar (thyme), tomatoes and onions. He sells to traders at the farm gate. He is contemplating whether he should deepen his well, as it will certainly dry up soon. He reckons that drilling costs could be as much as $1,000/m at that depth, and the whole project could cost him $40,000. He is aware that he will need a license. He is not confident about getting one, and he is not sure about the water resource either. "I don't believe that PWA has the information to help me," he says.

Agriculture is very short of water. Overall, there is a feeling that agriculture – for whatever reason – is deprived of the water it needs to fulfill its potential. Khaled says "Equitable distribution is needed."

Most plastic houses are irrigated by shallow illegal wells. The well owner near Deir Ghazzali estimates that 95% of plastic houses are irrigated from illegal wells, either directly or from tankers. Indeed, it is a common site in the area to see a tanker "plugged in" to the drip system at the back of a plastic house. Owners also harvest rainwater from the roof, and collect run off from the surrounding area into black plastic lined ponds.

Local people are of two minds about the explosion of unlicensed agricultural wells. Some see it as the only way to create jobs and income. Others, particularly community representatives on the JSC – see it as an individualistic and selfish act "that only creates problems for others". This group blames PWA for not putting any pressure on the illegal well owners."

Drip irrigation and plastic houses with ponds between the villages of Fuqua and Arrabona

Food prices and safety concerns pervade the home. Women report that in times of greatest water scarcity, fruit and vegetable costs, and even the cost of flour, become too expensive for a middle income household. Food prices have steadily increased over recent years, in part because of extended drought. Families are forced to reduce their consumption and change their diets. The high cost of water also means a reduction in the cultivation of household gardens. Women are particularly concerned about the safety of fruits and vegetables because raw sewage, in lieu of safe irrigation water, is sometimes used for irrigation. This has cause public health problems in the past, specifically the outbreak of food-borne diseases. The refrain is repeated: "We do not know the source of irrigation water. We must plant and buy locally, but we cannot trust the crops. Some people irrigate with sewage, so we cannot trust the food." The cost of

untreated wastewater is significantly cheaper and more readily available than safe water for irrigation. "Farmers who use wastewater have the trucks come at night so no one can see." Women describe methods for making produce safe for eating through washing with carbonates and boiling. They complain that these methods, particularly boiling, cause the food to lose some of its vitamin content.

Despite the difficult circumstances,, people are necessarily optimistic about farming. Ali from Arrana says: "If we solve the agricultural water problem, we solve the unemployment problem. Instead if sitting doing nothing or becoming a thief, do agriculture. Even a 400m2 garden would be something – tomatoes, vegetables – food security – local markets…" Even markets do not seem such a hurdle to Ali: "We will send to other areas."

The livestock economy is in decline because of lack of water and pasture. Jenin is also a major area for raising sheep – about 12,000 animals in the 10 villages. The head of the Jenin Agricultural Union says "numbers are declining continually as people cannot find the water, and pasture has been lost behind the wall. In Arrabuna, there were 2,500 head, but now reduced to 1,200."

Israel monitors Palestinian agricultural wells. The Israelis, in the "JSETS" enter on farms to read the meters on agricultural wells.

Export to Israel continues, but on small scale. At the Jalama gate, there is a truck park and Israeli-maintained security and warehouse arrangements. We meet one local farmer, Abdul, standing by his pallet of *kusa* (squash) awaiting transport. He says he is in a small way of business, about a ton of produce each day. He explains that the money is fair bit not sensational: a box of kusa will get him 50-60 shekels today in Jenin, and he is expecting 60-70 at the border. Palestinian Israelis who live in the northern area of Israel use this product for traditional cuisine. He is licensed to trade. To get the license he sends a sample to Tel Aviv, and then gets a license valid for three months. He explains that about once a year, a pallet is rejected on phytosanitary grounds. He says when there are security problems the border may close, but that this year things have been alright. He reckons about 200 pallets total cross this checkpoint each day, off-loaded, inspected, then loaded onto Israeli trucks. Most of the market is Israeli Arabs.

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Jenin Case Study 3: Jenin Urban Water Supply Case Study

The Governorate Ten-Year Plan. The Governor explains that there is a Jenin Governorate Strategic Plan, which includes water supply. The Governorate started planning on their own, then obtained UNDP funding to prepare a ten-year plan. For water supply, the Governor, says, "the issue was to find new sources."

The Governorate also has plans for wastewater treatment and reuse. The Governor describes plans to complete the sewerage network, to develop a treatment plant and to reuse the treated waste water for agriculture. "We can irrigate 192,000 dunums, and create an agricultural industry. The project is approved by the Ministry of Planning, by the Ministry of Local Government, and by the local councils."

Current supply situation

There are big problems in supplying bulk water. The Director of Water and Wastewater Department of Jenin says there are "big problems" with water supply[111]:

- Well # 1 is too shallow (90m), and has been out of commission for the last four years
- Well # 2 was drilled and has been operational since 2000. A deep well with a submersible pump, the capacity is 4,800m3 per day (1.75 MCM a year).
- Mekorot: 2,300m3 per day (1.0 MCM a year).

Current raw water production is well below capacity. Current theoretical production capability is about 8,000m3 per day (2.9 MCM per year), according to local authorities. Current actual availability, local authorities explain, is about 5,500m3 a day, against the requirement to maintain 24 hour service of 11,000m3. There is also 470m3/day from good quality agricultural wells. The Jenin Water Department says that for two years they have been requesting PWA to allow the drilling of new wells, but none have come to fruition.

Supply gaps for Jenin city are met from the Mekorot filling point. In 2003, USAID completed a filling point for tankers on the Mekorot line for Jenin city. Capacity is 1,000m3 a day, but actual off take is only 600m3 each day, as locals explain, "because of the high cost".

Mekarot supplies are billed through the PWA. Each month PWA reads the meter and bills the Jenin Water Department, at NIS 2.6/m3.

WBWD is seen by local stakeholders as more of a "doer" than PWA. The management of wells is the responsibility of WBWD. Execution of projects and management of wells and bulk distribution is done by WBWD, which seems to have a good reputation with people in the governorate as a practical, problem solving organization. By contrast, PWA is not seen as contributing much: "PWA is a big lie", Khaled offers during our meeting with the Governor.

The Jenin utility

The utility has a semi-autonomous status and serves 43,000 people. The Jenin Water and Wastewater department is a semi-autonomous department of Jenin municipality. With KfW support over the life of a six year project, the Department was hived off as a self-accounting utility, owned by the Municipality. The department services about 7,000 water supply house connections, serving a population of 43,000 people.

Sewerage coverage is "40-45%", with about 4,000 connections. There is no wastewater treatment plant and the raw sewage is discharged to the wadi where it flows into Israel. The Israelis treat it, charging the PWA 2 shekels/m3 for the wastewater crosses the Green Line.

The Department plans to develop a modest traditional sewage plant, "just ponds, with aerator". The Utility Director says: "There is a project on this with UNDP/KfW. But we are left with the problem of sludge. We fear we will still be charged by the Israelis because we do not meet the 10-10 standards, which is higher than in Germany".

[111] *In Oslo, new resources were allocated to Jenin.* The Governor informed us that Jenin benefits from three deep wells: the Ali Yammous well; (2) the well in the Industrial Area; and (3) Jenin III. But this seems at variance with the account of Waddah Labbadi.

The pricing structure has a fixed charge, and then block tariffs: There is no charge for wastewater. According to one official, the connection charges implemented by the Department were $70.

Monthly metered consumption	Tariff
0-5m3	NIS 23.56 fixed charge
5-50m3	NIS 4.20 /m3
51-999m3	NIS 6.20 /m3

Performance

Performance is very poor, and there are signs of a utility close to meltdown, unless action is taken soon.

Service provision is very poor, with water once every – days, and some areas not receiving water for months. "The higher area, with its 460 connections, has not received water for four months." Yet they still are supposed to pay the flat charge.

Arrears are the equivalent of months of billings. Arrears currently amount to NIS 16 million. *The collection rate is down to 32%.* The tariff schedule would not cover O&M, and the collection rate, which "was 75% before the Intifada", is currently 32%, according to the Director of the Department. The negative cash flow is "covered by the municipality from the electricity revenues".

Unaccounted for water (UfW) is down, but still stands at 36%. Previously, UfW was 50%, but local authorities report that the KfW project had as its objective to reduce UfW throughout renewal of the network and pipes. Current UfW is about 36%, according to the Department, which breaks down into: (1) continued physical losses; (2) about 10-15% lost to illegal connections; and (3) some meters do not work.

Water quality is good. The Utility Director says: "Water quality is good, because it comes from deep wells. We control both at the well head and at the house connection. We have a good laboratory."

Human resources are well developed – but completely demotivated. Staff training and recruitment was a priority under the KfW project, and there were three good engineers. However, one has already left, and "most staff would leave if they could find another job. Because we have headache all the time. There is nothing on the ground that makes you hope." Even the Director says: "*Why spend my life here for nothing*?" In fact, he and his Deputy are alone in the office – he says the other staff are all on strike, because "they have not been paid for three months."

Part 3: Analysis

Bulk water supplies are inadequate to meet urban demand, and the sources allocated are not producing at full potential. There seem to be management and O&M problems.

- There is a need for governorate level WR planning and management, and revival of joint accounting for extractions
- There is a serious need to improve Palestinian maintenance and management capability
- There is a need to check on the actual fulfillment of Oslo in the Jenin area, and link this to check on the difficulty of getting licenses,

Dependence on Israeli bulk supplies makes Palestinian supply vulnerable to Israeli decisions about bulk supply.

- There is a need to be clear about which WB wells are being operated by Mekorot, and where the water goes to. And is the water actually from West Bank?

Rural v. urban water rights. Water taken by the city from agricultural wells may be at the expense of village water supply, or other agricultural uses. And do the villages benefit from the Article 40 supplies?

- There is a need to check on whether this is a transfer out of agriculture, an whether this is depriving rural communities of their drinking water rights in a cash market transaction

Paying for bulk services

Paying for bulk water and for WW treatment services by "deduction from tax revenues" could create perverse incentives to reliance on Israel.

- There is a need to see this issue at both, the municipality and the PA level, to determine whether it is distorting investment and behavior on any significant scale

Problems with planning

There seems to be more than one water and sanitation plan around. This is presumably caused by the weak role of PWA and the general water governance conditions. It is not clear how the Governorate planning meshes with PWA and its various plans. PWA, which is responsible for water sector planning, is conspicuously absent, and its reputation is very low.

- There is a need for PWA decentralized presence
- Also, there could be a need for some serious decentralized dialogue with the JWC about the most rational development plans for an area like Jenin. Questions raised for follow-up include: "could an integrated water resource development and use plan for Jenin Governorate be presented to the JWC, approved there, and then implemented?

The system of seeking finance for projects is unclear. The Governor is well-versed in soliciting aid wherever he can, but questions raised include: "shouldn't the MoP and the PWA be taking the lead in this?"

- There is a need for some coherent and integrated planning, with harmonization between the centre and the local level

Much of Jenin's supply currently comes from inefficient and high cost tanker supplies.

- There is a need to develop a plan for proper stable supplies and network distribution.

Performance of the utility

The performance of the Water department is good but catastrophic. It is not clear that there is any institutional direction, and there is no prospect of improvement in services without a coherent water resources plan, a physical investment plan, and a long term institutional development and financial self-sufficiency plan.

- There is a need for a rethink, of how to revive services and the institutional structure to get it up to the level of JWU. Substantial alternatives like privatization or OBA could be looked at.

Sewage network and WW treatment and reuse are needed, and could form a very attractive project. But questions arise which include "why are there 2-3 projects for the same thing – is this die to lack of proper PWA planning? There is a need for a rational approach to WW treatment and reuse for the governorate. And a need to present one coherent project to the JWC. And the institutional model would have to change.

- Assessment of which packages might work under the existing conditions.

Annex 8

The Tulkarem Case study[112]

Tulkarem City, located in the North West part of the West Bank, is part of the catchment area of the largest groundwater source in the region, the Mountain Aquifer. Through this area has some of the highest precipitation rates in the West Bank (average 600-700 mm/year), it is a region characterized by increasing water scarcity.

One of the major concerns for the security of this water resource is seepage of untreated wastewater into the aquifer. Being one of the main sources of water supply for Israel and the West Bank, the quality of the mountain aquifer is in acute danger. Hydrogeological studies show that the main receiving streambed in the area is the Wadi Zeimar. This wadi is used as drain for sewage from the towns of Nablus, Anabta, parts of Tulkarem and other villages located along the wadi. Local experts estimate that roughly half of the sewage load generated between Nablus and Tulkarem infiltrates into the groundwater. Besides this, the geological situation (limestone, karstic underground) provides only light protection for the groundwater. Besides the wastewater discharged into the wadi, local experts suggest that a large portion of the sewage from houses not connected to central sewerage systems is received by cesspits adding to wastewater infiltration into the aquifer.

The wastewater collected in the Tulkarem sewerage system is treated in the Tulkarem Wastewater Treatment Plant west of the town, located directly on the green line. The treatment plant consists of one screen and three ponds. The effluent of pond 1 is discharged into pond 3 nearby the outlet of the pond. Due to the short circuit flow and the corresponding short retention time, only very limited additional degradation of organic substances can be expected.

Originally, the two ponds have been designed as facultative ponds, while the third pond should operate as a polishing pond. Today the ponds are feasibly fully anaerobic due to overloading and accumulated sludge at the pond bottom and surface. Since the ponds were rehabilitated in 2000-3 by the installation of a HDPE liner, no sludge has been removed. According to the Director of Water and Sanitation Department of Tulkarem Municipality, the municipality of Tulkarem and KfW were able to obtain verbal approval from Israeli authorities that they would not object to the rehabilitation of the ponds. This means that the rehabilitation of the ponds were not approved through the JWC. It was supported by the Emek Hefer Council. At present, the screen is not working properly due to many problems with the control device. After passing the pond, the wastewater is discharged to a streambed located south of the WWTP conveying the sewage to the Israeli side of the Green Line, where it is subsequently treated in the Emek Hefer WWTP. The volume of each pond is presented in table 1.

Table 1: Surface area and volume of the ponds

	Unit	**Pond 1**	**Pond 2**	**Pond 3**	**Total**
Surface area	[m^2] [m^2]	4,370	3,906	2,182	10,458
Bottom area	[m^2] [m^2]	1,516	1,472	407	3,395
Depth		3.30	3.30	3.90	
Volume		9,418	8,032	6,926	24,376

Emek Hefer Wastewater Treatment Plant

In 2002 the Alexander River Restoration Administration initiated the planning and construction of an emergency project for the treatment of the wastewater of the Wadi Zeimar

[112] Source: Fieldwork interviews and focus groups, Tulkarem, November 2008

and the pre-treated wastewater of Tulkarem. The Emek Hefer wastewater treatment plant started operation in 2003. The pre-treated wastewater of Tulkarem is pumped to an aerated lagoon with a volume of 180,000 m^3 equipped with surface aerators. After treatment the effluent is conveyed to the Eastern Reservoir with a storage capacity of 5 million m^3.

Since the sewage discharged to Wadi Zeimar contains industrial wastewater, (e.g. the wastewater from olive mills, stone cutters and tahina factories) the sewage is pre-treated by means of chemically enhanced sedimentation units. After adding ferrum chloride and polymers, the settled primary sludge is dewatered by means of a membrane filter press. The pre-treated wastewater is further purified in the aerated lagoon with a volume of 100,000 m^3. Depending on the chloride concentration within the effluent, the treated wastewater is either conveyed to the eastern reservoir or discharged to the Alexander River.

Currently there are pilot investigations going on for the extension of the treatment plant towards nitrification by means of constructed wetlands and subsequent de-nitrification.

The "Regional Wastewater Disposal Tulkarem" Project

The "Regional Wastewater Disposal Tulkarem" Project is financed by the German Government through KfW. The Project Execution Agency (PEA) is the Joint Service Council (JSC). Located in the northern part of the West Bank, this project comprises the Wadi Zeimar catchment area west of the proposed site for the Nablus wastewater treatment plant (starting at Beit Leed) up to the Green Line.

A "Feasibility Study for the Sewerage Project Tulkarem Region" has been prepared by the German-Palestinian Joint Venture DAR – Universal Group ("DAR-Study") in 2000. As a result of the DAR-Study, a regional sewage collection system, as well as a central wastewater treatment plant, have been proposed. Due to the second Intifada, the project has never been implemented.

The project area differs for the three parts of the services. While Parts 1 and 2 comprise the catchment area of Wadi Zeimar between Beit Leed in the East and Tulkarem in the West, the catchment area for Part 3 will be the whole of Wadi Zeimar including the western part of the City of Nablus, as well as the eastern part of Nablus, which drains towards the Jordan Valley. The municipalities and villages included in the project area for Parts 1 and 2 are Anabta, Rameen, Bal'a, Beit Leed, Iktaba (considered as part of Tulkarem), Irtah (part of Tulkarem municipality), Kufr El Labad, Kufr Rumman (part of Anabta municipality), Nur Shams Camp, Shuweika (part of Tulkarem municipality), Thinnabeh (part of Tulkarem municipality), Tulkarem and Tulkarem Camp.

Proposed Site for the New Tulkarem WWTP

The new Tulkarem WWTP, which would service the area east of the Green Line and south of Wadi Zeimar, was approved by the Israeli Coordinator of Government Activities in the Palestinian Territories on 10th July 2005. The signature was reputedly given on condition that the design of the WWTP will be in accordance with the design criteria mentioned in the MoU signed by the Joint Water Committee on 21st December 2003, which specifies 10-10 effluent standards. This means that the project is not yet formally approved by the JWC.

Through the construction site for the WWTP has been approved within the Palestinian Authority auspices, the area remains under private ownership. However, this land, which was previously used for agriculture, has been converted into an area suitable for the construction of a WWTP.

In addition to the Municipality's and KfW's consent, the final design is subject to the approval of the Joint Water Committee (JWC).

The table below summarizes the primary memoranda that are associated with the approval and implementation of the WWTP:

No.	Description	Date
9.	Israeli-Palestinian Joint Water Committee: "Memorandum of Understanding on Guidelines and Technical Criteria for Sewerage Projects"	2003
11.	Ministry of Defense, Coordinator of Government activities in the Territories – Letter concerning Wadi Zeimar Sewerage Projects"	2005
12.	Israeli-Palestinian Representatives: "Memorandum of Understanding for Wadi Zeimar Sewerage Projects".	2006

Annex 9:

Al-Bireh Wastewater Treatment Plant[113]

In order to provide environmentally-sound wastewater disposal services, Al-Bireh Municipality initiated the construction of a wastewater treatment plant (WWTP) project for purification of the domestic wastewater. In 1992, GTZ began project preparation, facilitating technical and financial cooperation. More specifically, the investments undertaken within the framework of financial cooperation include the construction of a central treatment plant, the installation of sewerage network in the urban growth area, and the construction of an effluent pipeline to convey the treated wastewater into the neighboring and reputedly less ecologically sensitive Wadi Nuema. The treated wastewater was to be used for irrigation in the agricultural land in Dir Debwan. Approval for the project was obtained in 1992 through the Civil Administration. The project was initiated before the establishment of the Palestinian Water Authority (PWA). The approval was made for the project as a whole without official written documentation.

Upon the request by Al-Bireh Municipality and GTZ, the joint venture of Consulting Engineering Center (CEC) and Dahlem Consulting Engineers designed the WWTP using the basic design data provided by GTZ and the Municipality. The final design and the tender documents were completed by the end of 1995. The Municipality realized that some fundamental design criteria have changed over the preparation period, and that the estimated number of sewered inhabitants, and wastewater production requirements needed adjusting.

In January 1996, the consultants were asked to verify the design data for the wastewater treatment plant and the reuse project. The results of the investigation were completed in a short period of time and the design modification was completed at the end of February 1996. Construction was subsequently initiated. During the construction of the treatment plant, Israel constructed a "bypass road" passing through the location of the plant. This action resulted in essential modifications to the construction plans. Consequently, local authorities report, the completion date was delayed by approximately two years.

According to local authorities, in March 1998 during a JWC sewage subcommittee meeting, Palestinian authorities wanted to increase the capacity, switching the10 inch diameter pipe with a 14 inch pipe. The Palestinians requested financial assistance from the Civil Administration, but this request was refused.

Palestinian authorities report that in March 1999 during a JWC sewage subcommittee meeting, the issue of connecting the Israeli settlements, Cochav Yacov and Psagot, with Al-Bireh WWTP was discussed. The Israeli authorities explained that integrating these and other communities into Palestinian treatment installations is neither a technical nor budgetary problem. PWA officials report that in June 1999, the Israeli environment staff officer and coordinator sent a letter to the Head of PWA, stating that the integration of Cochav Yacov with Al-Bireh WWTP is an important issue, and requested immediate construction of the connection.

According to meeting records, in the meeting held on August 2002, it was agreed that the Palestinians would submit "as soon as possible" the final pipeline design for approval at the JTC and JWC. It was agreed that the Israelis would expedite the approval for the pipeline and the payment for connection between Cochav Yacov and Psagot will be settled within the agreements with other municipalities and in the document of principle. The PWA emphasized that connection of Israeli sewage systems to a Palestinian project funded by Germany is not acceptable by KfW. According to the PA, in 1999 the Israelis made the connection from the

[113] Source: Fieldwork interviews, Jerusalem, Ramallah, November 2008

settlement to the sewer trunk line flowing into the treatment plant without the approval by PWA and/or KfW.

In the agreed minutes of consultation on the Palestinian-German Development Cooperation 2001, Palestinian officials confirmed that they have received the right of landowners to execute the pipe laying works on their territory. The German side requested Al-Bireh Municipality to present a cost estimate with regard to cost coverage for the year 2001 based on a new tariff to be introduced by end of January 2001. Because of the Intifada Palestinian officials emphasized that under the increasingly tenuous political situation the implementation of the tariff increase may induce a negative reaction from consumers due to socio-economic impacts.

In the agreed minutes of consultation on the Palestinian-German Development Cooperation 2002, Palestinian officials affirmed that the Ministry of Agriculture would be the executing agent for the reuse project. In cooperation between PWA and MoA, the detailed concept of reuse was requested by the KfW. KfW agreed to proceed with the project appraisal. In parallel, Al-Bireh Municipality would continue with the tendering and subsequent construction of pipe-laying works to Wadi Nuema.

In 2002, ANERA and the Government of the Netherlands showed a serious interest in initiating and financing the reuse project. A farmers association was formed and agricultural land was identified. According to meeting records, in June 2003 and during JWC sewage subcommittee meetings, the pipeline of treated sewage for reuse in the Deir Dibwan area was approved in principle and was awaiting final official approval after Israeli officials reviewed the detailed technical plans. KfW emphasized to the Israeli authorities, letter dated February 2002, that German Financial Cooperation was not prepared to utilize German budget funds to finance detailed technical studies with high risk that projects later on would not materialize at all due to rejection.

Al Bireh WWTP was constructed in the year 2000 and is located in Wadi Al-Ein (East of Al-Bireh city) over 2.2 ha with enough capacity to serve present and future expansion. The plant was funded by the Germany government through the KfW. Total capital investment for the wastewater treatment plant was 6.75 million USD. The reuse component of the project was not implemented due to lack of funds. During the tendering process of the project, the original design of the plant consisted of a high rate activated sludge tanks followed by trickling filters and anaerobic sludge digestion for sludge treatment. However due to limitation of available financial resources and operation constraints, the plant design was modified and extended aeration process with mechanical sludge treatment was selected as an appropriate treatment method.

The treatment plant is classified as a full automatically-operated conventional system. It consists of mechanical screen, aerated grit chamber, two parallel aeration tanks, two parallel

final clarifies and finally UV for disinfection. Excess sludge is thickened and then transferred to the belt filter press for dewatering. The effluent of the treatment plant is discharged to a storage basin and then disposed into Wadi Al-Ein. A portion of the effluent is pumped into the non-potable water system of the treatment plant and used for irrigation of landscaping around Al-Bireh. The plant site has an administrative building which contains the workshop, plant control panels and well-equipped laboratory with equipment adequate for ongoing operation and maintenance activities. The plant is operated by seven employees who, because of lack of technical experience in West Bank and Gaza, received training in Germany. The operators are physically present to manage the plant from 8:00 to 14:00. Outside of these hours the plant is managed by remote sensing.

The treatment plant was designed to achieve effluent Bio-chemical Oxygen Demand (BOD) of 20mg/l, suspended solids (SS) of 30mg/l, nitrogen concentration of 20 mg/l and Fecal coliform of 1000 CFU/100 ml. pH values should be within 6 to 9 range before discharge to any water body. Since its establishment, the plant has been able to achieve the effluent standards recommended by Palestinian Standard Institute (PSI). In the year 2005, the treatment plant has faced malfunction in the programmable logic controllers system (PLC). Since then the Municipality reports that it has been working to resolve the issue. However due to the lack of financial resources and local expertise, the Municipality has not been able to repair the PLC system. For approximately for one year the sludge was discharged into the wadi. More recently, the plant operators report that they have been able to manually operate the treatment system in order to achieve the recommended effluent standards.

Reuse practices

Due to the high effluent quality from Al-Bireh treatment plant, in 2004 the plant was selected to demonstrate the reuse of reclaimed wastewater and to investigate the potential agricultural value of the bio-solids. The demonstration project has been initiated by the CH2MHILL within the framework of the West Bank Water Resources Program, coordinated by the Palestinian Water Authority (PWA) and funded by the U.S. Agency for International Development (USAID). Al-Bireh Municipality in cooperation with PWA and the Ministry of Agriculture (MoA) runs the demonstration site. Two effluent qualities were identified for reuse: the high and very high effluent qualities recommended by the Israel Ministry of Health and the Israel Ministry of Health and US Environmental Protection Agency (EPA), respectively. Subsurface drip was used for high quality effluent and the drip irrigation system was used for very high quality effluent.

The objectives of the demonstration project are: establishing the initial institutional relationships, raising the profile of wastewater and compost reuse and developing the first stage of on-the-ground experience of reuse. Twenty-five different species of orchard trees, 15 date palms, 500 flowers and shrubs, 300 m^2 of grape stocks (4 different species) and 600 m^2, nursery for annual cultivation of 80,000 seedlings of indigenous trees and cooking vegetables were planted. Four automatic irrigation head controls were installed, including fertilizer injection points, pressure control and filtration devices (Meerbach, Abdo, Itleib and Hind, 2003).

Experience from the demonstration site shows that coordination between stakeholders is a key component of successful wastewater reuse facility development. Also, the reputedly high performance of the treatment plant is essential to maximizing the use of effluent and mitigating any negative impacts on down-stream springs and aquifers.

Analysis

- Connection from the Israeli settlement Cochav Yacov and Psagot with Al-Bireh wastewater treatment plant was installed without the approval from the PWA and/or the Kfw.
- Delay in planning and design is due to lack of information and representative design criteria
- Delay in implementation is due to the implementation of Israeli detour road which was decided without taking into consideration the Palestinian plans
- Israel requested detailed technical studies for approval however this is not affordable to the Palestinian and not realistic for donors to finance these studies
- Reuse pipeline is pending approval of JWC due to its presence in area C
- Delay of implementation of the reuse component is also due to lack funds
- There are lack of skilled labor and local experience
- ***There is interruption of treatment operation and occasional reduction in performance due to adoption of high wastewater treatment technologies***
- Lack of donor coordination i.e. German and Dutch
- Modification of tariff system to accommodate cost recovery is not feasible due to the negative economic effects of the Intifada

Annex 10
Hebron Municipality, Southern West Bank[114]

Introduction

Southern Hebron is one of the most arid regions of the West Bank. Many isolated rural communities suffer from inadequate water supply and poor water quality. Infrastructure schemes have been designed to alleviate these problems, but they frequently face implementation delays as a consequence of a lack of financing, donor disengagement, and Israeli Defense Force security administration in Area C. As a consequence, poor households are regularly faced with a decision to use either tanker water at high prices, or to use unsafe well water at no cost.

Case Study Field Notes

The team drives first to a PWA Facility south of Bethlehem: the East Herodian Wells. Local authorities explain that a USAID-financed project to drill new wells here in order to provide additional water resources to the area was stopped after the election of the Hamas government in January 2006. At the well site the team meets staff from PWA and the PMU, who then escorts the Bank team by car to the Al Faas filling point near the City of Hebron. On the way to the filling site the car passes over an arid landscape, and past vast grape fields. Hebron is famous in West Bank for its grapes.

The El Faas filling station, which is privately owned, fills an average of 15-20 tankers per day – according to local staff at the station. The tankers are generally owned and managed by the West Bank Water Department, though some humanitarian aid agencies such as the UN-OCHA also provide tankered water from this site as well. Local officials report that a total of 7,200 people depend on water from this filling point, either because they are not connected to a supply water network, or because the supply provided through the network does not meet demand. The officials estimate that 90% of the households served by the tankers that fill at this site are poor. These households that purchase from the tankers are mostly located in permanent rural settlements, though nomadic Bedouin communities also purchase from the tankers.

The cost of water at the El Faas filling point is reportedly 3 NIS/m3 in summer and 6 NIS/m3 in winter. The tankers in turn sell the water to households at the cost of up to 35 NIS/m3 according to tanker drivers and local consumers. This price generally increases in summer for several reasons. First, greater demand for tankered water due to lower water levels in wells means longer lines at the filling station. Longer waiting times mean tanker trucks burn more gasoline while standing idle. Some drivers pay extra to jump ahead in line. The extra costs of acquiring bulk water in summertime are passed on to the consumer. A tanker driver explains that when competition is particularly high and the filling station cannot satisfy demand, trucks travel to the neighboring Israeli settlement, Qiryat Arba, where they purchase water from Israeli settlers selling from their domestic supply. Residents from Qiryat Arba receive water from Mekorot, the Israeli national water utility, at the cost of 3 NIS/m3. According to local authorities, water is provided to Qiryat Arba 24 hours a day, seven days a week.

The El Faas filling station is the closest filling station to the town of Yatta, 35 km to the south. Tanker drivers say that the most direct route from the filling station to Yatta is frequently hindered by military checkpoints, causing them to use poorer and longer roads to reach village consumers.

[114] Source: Fieldwork interviews and focus groups in Hebron Governorate, Masafir Yatta area, September 23, 2008

On an empty hillside in Ad Deirat, several people show the team the location of a proposed reservoir and water network. The scheme has been designed and the project approved by the Joint Water Council, however financing for the project has still not be secured. Some parts of the water network pipeline would cross Area C near an Israeli settlement. This part of the pipeline is awaiting approval from the IDF Department of Civil Administration. Households in neighboring Israeli settlements, Karmel and Ma'on, reportedly receive water 24 hours a day, seven days a week from Mekorot.

The Ad Deirat reservoir and network scheme would service villages southeast of Yatta, including Al Tiwani (population 250). Al Tiwani village has no water or sanitation network. Virtually all residents of the village are very poor. The village economy is dependent on olives, sheep, and civil service employment (Palestinian Authority). The village is located in Area C, directly adjacent to a military zone. The village sits in a valley directly below the Israeli settlement of Ma'on, which is located at the top of the neighboring hill. The village city council head reports his home was recently demolished by IDF based on a claim that his residence was too close to the perimeter of the settlement.

The residents of Al Tiwani have two sources of water for household consumption. The villagers can purchase water from the tankers that bring water from the Al Faas filling point and Qiryat Arba settlement. The price of water, as paid by the villagers can be as high as 35 NIS/m3 (as described above). Because the villagers are very poor, most rely heavily on the free water that is drawn from the community well. Because of several years of drought the level of the well water is extremely low, making supply scarce and increasing the concentration of pathogens. A rainwater cistern was partially constructed in the village with the intent of providing an additional source of free water to the villagers. The cistern project, financed by the Spanish Government, was stopped by the IDF, who claim jurisdiction over civil works projects in Area C.

Care International has constructed and continues to staff (one day per week) a women's health clinic in Al Tiwani. The clinic nurse reports that many residents of the village suffer from water-related diseases, including parasites and dysentery, anemia (and stunted growth), skin diseases (including scabies). She reports that she treats approximately 20 patients per week, 50% of which are children. She estimates that 30% of all patients suffer from water-related health problems. For treatment the nurse provides medication subsidized by Care International. A single course of antibiotics for treating dysentery costs 1 NIS. She explains that most patients do not understand how to take the medicines, and so they do not take them properly and continue to become ill. As a preventative mechanism the nurse provides information to villagers about how to sterilize unsafe water in order to make it potable. She explains how to properly boil water for drinking, and provides chlorine tablets to villagers free of charge.

Analysis

1. Many communities in Southern Hebron lack safe and adequate drinking water supplies at affordable price. Men, women and children suffer from water-related diseases.
2. Lack of financing, changes in donor policy, and Area C governance issues contribute to delays in water infrastructure project implementation and low levels of water supply and sanitation conditions.
3. Queries for follow-up may include measures to improve provision of safe and affordable drinking water to Hebron area households to alleviate the economic, health and social costs borne under current conditions. Financing and completion of planned and partially constructed infrastructure, such as the Al Tiwani rainwater cistern and the Ad Dierat scheme, could be considered as lower-cost alternatives.

Annex 11

Gaza Private Water Supply Case Study

Background

In Gaza, alternative water sources and providers are needed to meet water supply demand and to ease the stress on the coastal aquifer. Innovative private water supply complements the public water supply of PWA and CMWU. The private sector in Gaza is active and entrepreneurial – since 1998, over 20,000 consumers have installed domestic 'reverse osmosis' (RO) desalination units. Today, private desalination plants (industrial and domestic in parallel) are a viable commercial market with further growth potential. Small brackish water desalination units are installed in households or in the community, which are considered as a generally affordable, self-sufficient, and sustainable way to supply water to Gaza's citizens. By entering into formal contracts with the private provider, households or communities receive regular water supply. For most consumers, willingness to pay seems not to be an issue, as water from other suppliers is not equally available (e.g. public supply) or is simply more expensive (e.g. private tanker water). Additionally, as desalination units use sea-water (not brackish water), they do not tap the aquifer, and thus they have additional value-added for preserving groundwater.

Local authorities report that movement and access restrictions (e.g. closures around Gaza) and non-water sector issues hamper the development of the water sector. For instance, IDF implemented closure-related import restrictions and frequent closures of checkpoints limit the availability of spare parts essential to operating and maintaining the desalination plants (industrial, community or household facilities), and chemicals (e.g. chlorine, etc) – needed to maintain safe water supply. Electricity to operate water pumps to fill up water tanks (especially rooftop tanks) is not always available. Furthermore, desalination is electricity-intensive and about 60% of operation costs go into covering energy costs. Similarly, domestic 'RO' desalination units cause an increase in a household's electricity expenses of up to 25%. Local authorities estimate that when private plants are to be run on a cost recovery basis, tariffs need to be increased from the current 1 NIS to 4-5 NIS to cover the investment costs. This will however have a potentially negative effect on households. Finally, desalination water has a lower quality standard than public network water, supplied for instance through PWA.

Desalination – the start

In the 1990s, water quality was generally low in Gaza Population density was already high, and the 1.3 millions inhabitants used groundwater as their only water source. Overdrafting caused the water table to sink below sea level, resulting in sea water intrusion and high salinity.

In 1998, a UK company, Acqua, started a pilot project with a small desalination plant of 200m3/ per day to provide potable water to Shejaia, a Governorate East of Gaza City. The price for a jerry can (20 liters) was 3NIS, equivalent to US 0.78 (1998 prices). Poor households reportedly were unable to afford such prices. In 2000, a NGO project in a refugee camp, "Beach Camp" provided water for poor households at 1NIS per jerry can. Several small private investors also supported this project on a micro-finance basis.

By early 2000, people in Gaza had realized that tap water, sourced from the coastal aquifer, was no longer drinkable due to high salinity from the sea water intrusion and high nitrate pollution from agricultural activity. With an active and entrepreneurial private sector, some Gazan households were able to install small 'reverse osmosis" (RO) desalination units in their kitchens at a unit price of about US$ 300-400. Such a RO unit complements the tap water, supplied by the municipality, now in over 50% of Gaza households. Its capacity is about 100-

200 l/ per day, and water quality is high, reaching TDS levels of below 100, and filtering out the nitrate – a frequent component at dangerously high levels in Gaza's water.[115] According to GVC, Gaza's private sector supplied about 100,000 households with RO plants (including replacement of old units).

Experts report that the investment costs of a commercial desalination plant ranges between US$ 20,000-40,000, most of which private investors cover with their own resources, not through commercial banks. Today, approximately 100 industrial desalination plants are still operational, but only about 30% of them are registered with PWA and MoP and in compliance with regulation, inspection, and water quality standards. Water quality in other plants is kept at high standards due to the strong competition of the market, but in absence of regular inspections these standards remain to be confirmed.

Poor households, however, are unable to afford such a domestic RO installation. They continue to purchase water with jerry cans from commercial desalination plants. Hence, in 2005, an alternative to the domestic RO unit was developed to provide water also for poor households. The new system consists of 200 liter polyethylene tanks, which are filled by a tanker once a week at a price of 10 NIS. Again competition is high, and some private providers give the tank for free, as the household enters into contract with the private provider. If households fill their tank from a competitor, the "free" tanks are taken back. A private provider reports that if water is purchased in bulk, prices drop to 0.5 NIS per jerry can, which is still above the public network price but lower than alternatives.

Although private sector desalination water is generally affordable, self-sufficient, and sustainable, it is very energy intensive, many households are still unable to afford it, and its quality is still a warning sign,. For instance, about 60% of operation costs go into covering energy costs. For a household, the installation of an 'RO' desalination unit can push up its monthly electricity expenses to up to 25%. Plus electricity cuts, associated with the closures, cause disruptions in power supply. According to a private desalination water supplier, GVC, the development of a Gaza power plant could be viable option. Furthermore, when private desalination plants have to operate on cost recovery basis, tariffs will need to be increased from the current 1 NIS to 4-5 NIS to cover the investment costs – this could have negative effects households. Finally, desalination water has a lower quality standard in terms of low water minerals compared to public network water that is supplied for instance through PWA.

PWA or municipalities provide about 70 l/c/d, but cannot reach all households. Local authorities report that low pressure in the network is often an issue, making the filling of rooftop water tanks a frequent challenge. The siege-related restrictions on movement and access and frequent closures of checkpoints limit the import of spare parts -essential to operate the desalination plants (industrial, community or household plants), or of chemicals (e.g. chlorine for disinfection, and sodium hydroxide to restore the ph balance of desalinated water, etc) – needed to maintain safe water supply. Electricity is not always available to operate water pumps to fill up water tanks (especially rooftop tanks).

Analysis

- The key issue is scarcity of safe water. Causes include the over-pumping of the coastal aquiver leading to sea water intrusion; the high nitrate levels in the water due to agricultural activity; and the M&A restriction on import of necessary water treatment chemicals, spare parts and materials to build and maintain water structures.
- Another problem is affordable water supply for poor groups, especially in remote areas of the Gaza strip. Siege-related movement and access restrictions have led to an increase in unemployment and poverty rates, making basic services, such as water supply, increasingly difficult to afford for many households.

[115] GVC has collected data on nitrate and chlorine levels in all governorates in Gaza

Annex 12

Annex 12a : Implementation status of Palestinian Projects approved by JWC (West Bank)

STATUS OF IMPLEMENTATION OF PALESTINIAN PROJECTS APPROVED BY JWC FOR THE WEST BANK

#	Location & Governorate	Code	Project Components				Project description	Planned beneficiaries [No. of people]	Estimated total funding [$]	Funding organization (donor)	Implementing agency/ utility	Current status [prep, ongoing, compl]	date of submittal to JWC	Date of approval by JWC	Months b/w submittal & approval
			Main line	Network	Water Tank	Other									
	Legend:	R: Rehabilitation Project													
		N: New Project													
		G : On-Ground storage water tank													
		E: Elevated storage tank													
		(100m^3 B) : 100m^3 capacity balance water tank, needed for booster station													
		Not impl: Not implemented project													
	Year 2001														
1	Atton	219		Rehabilitation	200 m^3 - E		The project consists of A: Internal Water Network. 1- 4" =950m, 2- 3" =1200m, 3- 2" =5000m, B: 200 m3 Elevated Water Tank.	1000	235,000	No		Not Impl.	31/10/2001	21/05/2002	7
2	Al Zababdeh	220		Rehabilitation			The project consists of A: Internal Water Network. 6"– 250m. 4" –700m. 3" – 4000m. 2" – 10000m.	3410	550,000	Save Child., Caritas, Swedish, Pecdar	WBWB, Municip., Municip., Pecdar	impl.	31/10/2001	21/05/2002	7
3	Bil'in	221		Rehabilitation	300 m^3 - E		The project consists of A: Internal Water Network. 4" =6000m, 3" =400m, 2" =3500m, B: 300 m3 Elevated Water Tank.	1512	540,000	Ministry of finanace/ phase I	WBWB	part impl.	31/10/2001	21/05/2002	7
4	Sarta	222	New	Rehabilitation	300 m^3 - E		The project consists of: 6"-2500 main pipeline. Internal Water Network. 6"– 750m. 4" –900m. 3" – 1800m. 2" – 10,000m. 300 m3 Elevated Water Tank	2278	600,000	Netherlands	WBWB	impl.	31/10/2001	21/05/2002	7
5	Khoshoum Al Karim/Hebron	223				replacement of pipeline	The Bedouins (Khoshoum Al Karim) in Yatta were supplied with water by a 2" galvanized old pipe line from main 3" existing pipeline from Mao'un settlement to Army camp in the area. The old 2" pipe line is repairing many times and now not suitable to be used, these for its needed to executing a new 2" pipeline of 2000M under ground instead of the old one.	513	40,000			impl.	31/10/2001	21/05/2002	7
6	El Jalameh-Dahiet Sabah Al Khair	224	New				JWC agreed to supply Palestinian side with additional water quantity of 1000 m³/day from Jalamah new Mekorot connection to utilize this quantity, it is needed to construct a 8" pipeline with 3.5 km along the route of the main road from El-alamah to Dahiet Sabah El-Khair /Jenin and executing main filling point near Al-Jalamah village supplied with two Balance Tanks 100 m3 for each.		750,000			impl.	31/10/2001	21/05/2002	7
7	A'nza	225	New		500m^3-G 50m^3-B		The project consists of Constructing of 500m³ ground and circular water tank. 4" Supplying and distributing main pipe Line. Pumping Unit. 50m³ Ready made balance water tank	1771	300,000	Rafeed	WBWB	impl.	31/10/2001	21/05/2002	7
8	A'ttara	226	New		300 m^3 - E		Constructing of 300m³ elevated and square water tank in order to increase the storage capacity of distributing of water through the internal water network . with the needed of 1500m – 4"steel Pipe for the main supplying pipeline.	2022	200,000	Ministry of finanace	PMU	Not Impl.	31/10/2001	21/05/2002	7
9	Marka	227		Rehabilitation	200 m^3 - G		The project consists of: A : Constructing of 200m³ ground and circular Water Tank. B : Internal Water Network. 4" steel pipeline with 2000m. 3" steel pipeline with 1000m. 2" steel pipeline with 3500m	1373	300,000	CARE/ PHASE I	WBWB	impl.	31/10/2001	21/05/2002	7
10	Bani Zaid	228	New		1000 m^3 - G		The project consists of: Constructing of 1000m³ ground and circular Water tank And Constructing of 6" Supplying and distributing main Steel Pipeline with 3700m total length.	5299	400,000	Red Cross	PMU	Not Impl.	31/10/2001	21/05/2002	7
11	Jaba'	229		Rehabilitation			Extension in this area. Many houses are built for this case rehabilitation of the internal water network which is necessary from steel pipe 2" diameter with total length 2500m and steel pipe 3" diameter with 500m total length.	7684	100,000			Not Impl.	31/10/2001	21/05/2002	7
12	Qalqilia Municipality	230			2000 m^3 - G		Qalqilia Municipality intends to construct 2000m³ ground Water tank made of reinforced concrete in Sufeen area (North eastern part of the town) to: To cover the demand in the peak hours. To control the pressure and to divide the system to pressure Zones. Increase the storage capacity	38583	350,000			impl.	31/10/2001	21/05/2002	7
13	Bitunia	231				replacement of pipeline	Existing 16" pipeline between Betunia water tank and Ramallah booster station is very old deteriorated and suffering from many Breakage's and high percent of UFW. It is needed to replace it With a new 24" pipeline. Total length 650m.	11426	180,000			Not Impl.	31/10/2001	19/12/2004	38
14	I'zbet Salman	232	New	N	200 m^3 - E		Construction of 6" pipelines, 650m and 600m from well No. 14-17/043 and 15-17/015 to the proposed tank respectively. Reinforced concrete 200m³ elevated water tank. Network consisting of the following pipes.3": 850m and 2":1200m.	555	240,000	Ministry of finanace/ phase I	PMU	part impl.	31/10/2001	19/12/2004	38
15	Ein Bait Elma R.C	233				replacement of network	The existing water network has shown a high percentage Of UFW in addition to the possibility of contamination . The Existing pipes are undersized. Nablus Municipality made A design for a new network to replace the old one. The Components of this network is: 6" pipes about 350 m long. 4"pipes about 900m long. 3" pipes about 500m long. 2" pipes about 1050 long.	4454	250,000	UNDP	WBWB	Not Impl.	31/10/2001	11/12/2002	14

#	Location & Governorate	Code	Project Components				Project description	Planned beneficiaries [No. of people]	Estimated total funding [$]	Funding organization	Implementing agency/ utility	Current status [prep, ongoing, compl]	date of submittal to JWC	Date of approval by JWC	Months b/w submittal & approval
			Main line	Network	Water Tank	Other				(donor)					
16	Nuweimeh	234				irrigation pipelines	The existing irrigation system is an open canal, to save water through preventing evapotranspiration and to benefit from the head, it is required to replace the old canals by a closed irrigation system using PVC pipes.	1015	1,000,000			Not Impl.	31/10/2001	11/12/2002	14
17	Jenin	235	New				The Ministry of Agriculture intend to construct an agricultural school in the area. To supply this school with water for domestic purposes, it is needed to construct 3" pipeline – 1 km length from Jenin well No. (2).	31568	40,000			Not Impl.	31/10/2001	11/12/2002	14
18	Amari R.C	236				replacement of network	The existing network of Al'-Ama'ri R.C. was installed in the mid-sixties. Research has shown more than 38% of the water supplied to the camp is lost due to the deterioration of the network, in addition to the possibility of contamination. The existing network is of undersized diameters and not covering the new developed areas. The proposed network consists of 6"=230m, 4"=350m , 3"=1250m ,2"=3250m pipelines with 5080 m total length.	4923	350,000			Not Impl.	31/10/2001	11/12/2002	14
19	Al Jalazon R.C	237				replacement of network	Network of Jalazoon R.C was installed 25 years ago. Research conducted by JWU has shown that over 35% of water supplied to the camp is lost due to the deterioration of the network, in addition to the possibility of contamination. The existing network is of undersized diameters and not covering all the new developed areas. The proposed network consists of 8"=640m,6"=220m, 4"=1050m, 3"=2000m and 2"=3800m pipelines of 7710m total length.	7475	400,000			Not Impl.	31/10/2001	11/12/2002	14
20	Bani Na'im	238			500 m^3		Proposed elevated and Square water tank with 500m3 capacity in order to increase the storage capacity of water and control the pressure and the distribution of water and to meet demand during peak hours.	16343	200,000			impl.	31/10/2001	11/12/2002	14
21	Es Sekak	239		N			Proposed elevated and Square water tank with 500m3 capacity in order to increase the storage capacity of water and control the pressure and the distribution of water and to meet demand during peak hours. There is no water supply system for this village and the inhabitations are suffering from the shortage of water.For this case we would like to construct anew water project which is consist of: 3"steel main pipeline with 1200m total length. b.internal water network from. 2" steelpipe line with 700m total length. 1" steel pipe line with 300m total length.	145	65,000			Not Impl.	31/10/2001	11/12/2002	14
	Year 2002														
22	Duyyuk village	243	New		500m^3-G		This project is needed to instal the components required for installing a supplementary main pipeline from Duyyuk Spring to Ein–Sultan for use by residents of the Ein Sultan Refugee Camp.The components are: 1. A feeder pipeline of 3,700m length and 150mm diameter. 2. Underground reservoir of 500 m³ capacity		400,000			Not Impl.	11/12/2002	19/12/2004	24
	Year 2003														
23	Al Mediah	245	New	Rehabilitation Project			Existing network was implemented more than 40 years ago. Investigation shows that this network suffers high percent of water losses (over 40%), in addition to undersizing of the existing lines, and existing networks does not cover the new developed area. Accordingly, PWA prepared the study, design drawings needed to replace the network. Proposed networks components are: 1- 4"–5000m main pipeline. 2- Internal water net with the following pipes. a- 4"– 500m, b 3"–350m, c 2"– 1700m.	1280	310,000	UNDP	WBWB	impl.	10/6/2003	21/12/2003	6
24	Kufr Thulth	246		N			The components of the proposed networks are: 1- 8" – 1200 m, 2- 6" – 770m, 3- 4" – 1500m, 4- 3" – 2100m, 5- 2" – 6500m.	4287	480,000	UNDP, Red Cross		impl.	10/6/2003	21/12/2003	6
25	Halhul-Kharas-Nuba	247	New	Rehabilitation	1000m^3-E		1- 12" Pipeline from Halhul Res. To Nuba – 11km. 2- Reservior to(1000m3) at Kharas. 3- Rehabilitation of Kharas Network HDPE: □ ø 180mm – 1400m, □ ø 160mm – 370m, □ ø 110mm – 570m, □ ø 90mm – 750m, □ ø 75mm – 1430m, □ ø 50mm – 4930m. 4- Rehabilitation of Nuba Network HDPE: □ ø 160mm – 630m. □ ø 110mm – 150m. □ ø 90mm – 940m. □ ø75 mm – 2340m. □ ø 50 mm – 8710m.	32832	4,500,000			Not Impl.	10/6/2003	21/12/2003	6
26	Deir Qidees	248		Rehabilitation			The components of the proposed networks are: 1- 6" – 350 m. 2- 4" – 450m. 3- 3" – 1000m. 4- 2" – 4000m	1931	200,000	LG	Sami Off.	impl.	10/6/2003	21/12/2003	6
27	Falameh	249		Rehabilitation	200m^3-E		Existing network was implemented more than 20 years ago. The investigation shows that this network is suffering from high percent of water losses (more than 40%), in addition to the under-sizing of the existing lines and that the existing networks does not cover the new developed area. Accordingly, PWA prepared a study, design and drawings needed to replace the network. Project components are: • 6"– 680m main pipeline. • Internal water net with the following pipes a- 3"– 700m, b 2"– 2200m. • Proposed 200m³ elevated water tank. • Booster station and 100m³ balance tank.	694	235,000	UNDP/ PHASE I	UNDP WBWD	part impl.	10/6/2003	21/12/2003	6
28	Abud	250		Rehabilitation	300m^3-E		The existing network was implemented more than 30 years ago. The investigation shows that this net is suffering from high percent of water losses (more than 40%), in addition of the under-sizing of the existing lines and that the existing networks does not cover the new developed area. Accordingly PWA prepared study, design and drawings needed to replace the network. Project components are: • Internal water net with the following pipes: 6" – 1200m, 4" – 1500m, 3" – 2000m, 2"- 3500m. • Proposed 300m³ elevated water tank.	2412	400,000			Not Impl.	10/6/2003	21/12/2003	6

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			Main line	Network	Water Tank	Other				(donor)					
Year 2004															
29	Rantis	258				replacement N connection	Rantis village is supplied with water since 30 years ago through 2" pipeline which is started from point (A) near Lubban village. We replaced the 2" Main pipeline to a new one 4" pipeline, depending that pipeline will start from point "B" AS Mekorot installed a new pipeline passing near Rantis, So it is needed to change the existing Main connection form point (A) near Lubban to point (B).	**2839**		UNDP	UNDP	impl.	19/12/2004	4/4/2005-JSC-W, 11/9/2005-JWC	10
30	Ramallah/Jabal At Taweel-JWU	259	New			replacement of 16" pipeline to 24"	The present 16" pipeline connecting Ramallah pumping station and Jabal Al Taweel reservoir more than twenty years old and has reached its capacity for conveying the present demand . This situation limits the quantity of water supplied to the consumers and causes high power losses . The new 24" diameter, 1.4 Km . Pipe will satisfy demand requirements for the next 20 years and reduce pumping (power) losses.		650,600				19/12/2004	4/4/2005-JSC-W, 11/9/2005-JWC	10
31	Rammmun-JWU	260		Rehabilitation			Replacement of existing old deteriorated pipes with new steel pipes of 2", 3" and 4" diameters . The total estimated length is 12.6 Km . this will reduce water losses.(See attached Application Form) .	**3150**	483,649				19/12/2004	4/4/2005-JSC-W, 11/9/2005-JWC	10
32	At Taybeh-JWU	261		Rehabilitaiot			Replacement of existing old deteriorated pipes with new steel pipes of 2", 3" and 4" diameters .Total estimated length is 11.6 Km. this will reduce water losses.	**2086**	315,338				19/12/2004	4/4/2005-JSC-W, 11/9/2005-JWC	10
33	Burqa-JWU	262		Rehabilitation			Replacement of existing old deteriorated pipes with new steel pipes of 2", 3" and 4" diameters. Total estimated length is 11.6 Km . this will reduce water losses.	**2273**	183,924				19/12/2004	4/4/2005-JSC-W, 11/9/2005-JWC	10
34	Ramallah-JWU(Sinjil-Bait Hanina low income)	263		Rehabilitation			At present a large number of consumer meters are installed in the road leading to the consumer's houses because of the inability of the customers to pay the required fees. The total length of these extensions is estimated around 50 Km. of diameter from 3/4"to 2". This cause leaks which , sometimes runs from days until someone notices it and reports it. Extending the network to the consumer's houses will reduce leaks, pollution to the environment and maintenance costs.	**11494**	1,000,000				19/12/2004	4/4/2005-JSC-W, 11/9/2005-JWC	10
35	Qalailia	264		Rehabilitation	Soufin 500m^3 -E		The area of Soufin within Qalqilia municipality suffers from water supply shortage. Most existing pipelines in this area and within the municipality are very old and deteriorated with high UFW (≈ 45%). This affects water quality with possibility of contamination. Accordingly, the municipality plans: 1. Reinforced concrete elevated tank 500 m³ Soufin area. 2. Supply pipeline , DN .250 mm., 325m from Soufin well to tank. 3. Distribution network DN. 250 mm., 400m from the proposed water tank to the centre. 4. Replacement of some old pipelines within the network with new pipelines DN150mm: length 200m. DN100mm: length 600m. DN75 mm: length 450m.	**43920**	320,000			impl.	19/12/2004	4/4/2005-JSC-W, 11/9/2005-JWC	10
36	Qalailia/Falameh-Jayyous	265					To cover demands in Falameh, Jayyus, Azzon …etc, plan is to implement a water supply project, depending on 6 local irrigation wells as source. This will give flexibility in supply, each 2 wells will supply water 2 days/week. Components are: Main pipelines 1:- 6"pipeline from site No. (1) , site No.(2) , site No. (3) until site No. (9) , with total length of 3000m. 2:- 6"pipeline from site No. (4) , site No.(5), site No. (10) to site No. (6) , with a total length of 2300m. 3:- 8"pipeline from site No. (10) , site No.(7), site No. (9) to site No.(8) , with a total length of 1150m. 4:- 12"pipeline from site No. (8) to site No.(11) with a total length of 1300m. Water tanks. 1:- 300m³ capacity water tank , booster station and chlorine room at site No. (3). 2:- 500 m³ capacity water tank and a booster station at site No. (7) . 3:- Booster station and chlorine room at site No. (8).		85,000				19/12/2004	4/4/2005-JSC-W, 11/9/2005-JWC	10
37	South east of of Nablus/10 villages	266					To supply 10 villages located to the South- East of Nablus with domestic water, PWA prepared a project depending on Rujeeb well as source of water. This well was approved by JWC on 11/7/2001. Villages supplied are: Awarta, Aqraba, Osarin, Jurish, Qusra, Talfit, Jalud, Qaryut, Majdal Bani Fadel & Duma. Project components are: 1. Rujeeb well pumping station & facilities, a. Deep well submersible pump. b. Booster pumps & shed. c. Balancing R.C. Water tank 2000m³ capacity. d. Two fuel tanks, generator and concrete pad. e. Equipment building and guard house. f. All other civil and mechanical works needed to operate the well. 2. Main Transmission Pipelines: a. DN 450 mm, length 800 m. b. DN 350 mm, length 7000 m. c.DN 300 mm, length 9000 m. d. DN 250 mm, length 4000 m. e. DN 150 mm, length 1600 m. f. DN 100 mm, length 3000 m. g. DN 50 mm, length 180 m. 3. Awarta Booster station. a. Two balancing tanks – 3000m³ capacity. b. Booster Pumps & Shed. c. Diesel generator, fuel tank and Concrete Pad. d. Equipment building & guard house. e. All other civil & mechanical works needed to operate the well. 150 mm, L = 2510 m, DN. 100 mm, L=1220m (steel		12,000,000			part impl.	19/12/2004	4/4/2005-JSC-W, 11/9/2005-JWC	10
38	Al Ram	267		Rehabilitation			Replacement of existing old deteriorated pipes with new steel pipes of 2"(34.0 km), 3"(12.0 km_ , 4" (3.7 km) ,6"(2.15 km),8"(0.10 km),10"(1.0 km) and 12"(0,05km) diameters . The total estimated length is 53 Km . this will reduce water losses	**25348**	1,980,000				19/12/2004	4/4/2005-JSC-W, 11/9/2005-JWC	10

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			Main line	Network	Water Tank	Other				(donor)					
39	Al Jalameh	268		Rehabilitation			Replacement of existing old and deteriorated pipes with new steel pipes of 2",3",4",6" diameters. The total estimated length is 6 km. this will reduce the water losses	**2286**	300,000			impl.	19/12/2004	30/5/2005 - JSC-W, 11/9/2005-JWC	10
40	Barta'a Esh-Sharqiyya	269				N connection	Barta'a Esh-Sharqiya village has a water supply project. The main source is a spring located in the village. The average discharge of this spring is reduced to 6-8 m³ /hr at Summer time. Total population in Barta'a and the Surrounding khirabs is about 4000 people. Total demand is estimated at 30 m³ / hr. It is suggested to have a Connection from Mekoroth system in the area to cover the gap in the demand (24 m³/hr.) with a proposed pipeline – of 100 mm. diameter, total length of about 1000–1500 m, depending on the location of the connection	**3574**	75,000			impl.	19/12/2004	30/5/2005-JSC-W, 11/9/2005-JWC	10
41	Tell-Sarra	270					Tell & Sarrah villages have no water supply distribution networks. The JWC approved a water connection on the 6" pipeline connection Beit Iba well with Qadumim water tank . It is proposed to supply the water to the two villages through networks within the same allocated water quantity in the approved connection. The components of the project are: 1. Main 6"pipeline , L= 4.0 Km. 2. a. Network for Sarrah. Network for Tell. 3. a. water tank in Sarrah.(300m³ on Ground) b. Water tank in Tell. (500m³ on Ground) 4. Booster & Balance tank	**7579**	1,500,000	ANERA, WORLD VISION	ANERA		19/12/2004	30/5/2005-JSC-W	6
42	Kufr Thulth(source:Al Ashqar well)	271	New				Kufr thulth village has no water supply distribution net work .It is proposed to supply the water to the village from a privet well. The JWC approved the network and it is needed to approve the following components of the project: 1-pumping station 2-8" Main pipeline-3400m length 3-500m3 elevated water tank	**4287**	485,000	Red Cross	WBWB	impl.	31/12/2003, 19/12/2004	31/12/2003, 5/07/2004	7
43	Bal'a	272	New		500m^3		Bala'a town is supplied with water from a private well .The existing water project consists of a booster ,6"Main pipeline ,Water network and 200m3 elevated water tank .There are many houses higher than the existing water tank .So it is needed to construct a new water tank to supply these houses with water. The components of the project are: 1-Pumping station 2-6" Main pipeline -3000m 3-500m3 elevated water tank	**7237**	410,000	NO		not impl.	19/12/2004	30/5/2005-JSC-W	6
44	Masha	273			300m^3, E		There is a water network in Masha. The village suffers from deficiency in the water supply in summer time . It is needed to construct a water tank to store water to meet the demand at the peak hours and to control the pressure	**1955**	120,000	NO		not impl.	19/12/2004	30/5/2005-JSC-W	6
45	Ya'bad	274	New		1000m^3,G		There is a water network and existing 300m³ water tank. The volume for storage is not sufficient. In order to increase the storage capacity and to meet the demand during the peak hours, it is needed to construct a new water tank on ground with 1000m³ capacity. A distributing 8"main pipeline with total length of 1000m for the water tank to the centre of consumption is needed to divide the system to pressure zone.	**14315**	250,000	UNDP		impl.	19/12/2004	30/5/2005-JSC-W	6
46	Al Zawyeh	275		Rehabilitation	500m^3		Al-Zawyeh village is located to the west of Salfit and has a water distribution system.It is suffering from a shortage of water supply .In addition that most of the existing pipelines are very old and the losses are about 35%.The project is consists of: 1-Rehabilitation the water net by replacing the old pipelines with new pipelines as the following. 6"-pipelines-1300m. 4"-pipelines-2500m. 3"-pipelines-3000m. 2"-pipelines-10000m. 2-Construction of 500m3 elevated water tank.	**5010**	880,000			not impl.	19/12/2004	30/5/2005-JSC-W	6
47	Deir Abu Mish'al	276		Rehabilitation			Deir Abu Masha'l village is located to at the west of Ramallah and has a water distribution system .It is suffering from a shortage of water supply .In addition to the fact that most of the existing pipelines are very old and the losses are about 40%.So we have to replace the old pipelines by the following pipelines: 6"-1000m. 4"-1200m. 3"-1500m. 2"-6000m	**3376**	400,000	NO		not impl.	19/12/2004	30/5/2005-JSC-W	6
48	Qarawet Bani Hassan	277			500m^3,E		Qarawet Bani Hassan is a village located to the west of Salfit . There is a water distribution network in the village . To control the pressure and the distribution of the water between the customers , it is needed to construct a 500 m³ elevated water tank . This tank is also needed to store water to meet the demand at the peak hours.	**3662**	150,000	Save Child.		on-going	19/12/2004	30/5/2005-JSC-W	6
49	Al Qubeiba	278		Rehabilitation Project			Al-Qubeiba village is located to the west of Jerusalem .The internal water net was established in 1980.The net is highly suffering from losses due to deteriorated pipelines.The losses is about 40%. There is need for rehabilitation, development, extensiio & replacement. Project components are: 6"distribution pipeline L=600m. 4"distribution pipeline L=600m. 3"distribution pipeline L=2800m. 2"distribution pipeline L=10000m	**2049**	500,000	NO		not impl.	19/12/2004	30/5/2005-JSC-W	6
50	Bait Iksa	279		Rehabilitation Project			Beit Iksa village is located to the north-west of Jerusalem. The internal water network was established in 1980. The net are losses is about 40% There is need for rehabilitation, development, extensiio & replacement. Project components are: 6"distribution pipeline L=1320m. 4"distribution pipeline L=750m. 3"distribution pipeline L=1360m. 2"distribution pipeline L=6000m	**1554**	400,000	NO		not impl.	19/12/2004	30/5/2005-JSC-W	6

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			Main line	Network	Water Tank	Other				(donor)					
51	Bait I'nan	280		Rehabilitation			Bait I´nan village is located to the north - west of Jerusalem .The internal water network was' established in 1984.The net is highly suffering from losses due to deteriorated pipelines The losses are about 40%.There is need for development extension & replacement. Project components are: 6"distribution main pipeline L=950m. 4"distribution pipeline L=1500m. 3"distribution pipeline L=1550m. 2"distribution pipeline L=10000m	**4223**	350,000	NO		not impl.	19/12/2004	30/5/2005-JSC W	6
52	Dura Al Qare'	294		Rehabilitation	300m^3,E		Dura al Qarea' is located to the north of Ramallah. There is a distribution water network in the village which was constructed in 1978. The network is suffering from high percent of UFW (about 40%) due to deterioration of pipelines. The pipeline are under sized and not covering the new developed areas. There is no storage facility. It is needed: 1. Rehabilitation, replacement and expansion of the network by installation the following: 4" diameter pipelines, L = 430 m. 3" diameter pipelines, L = 1800 m. 2" diameter pipelines, L = 3200 m. 2. Construction of 300 m³ capacity elevated water tank for storage, control the pressure and distribution of water between the customers and to meet the needs at the peak hours. It is needed also to construct the main supply pipeline to the tank, and the pipeline between the tank and the network, diameter 6 ", total length (1800 m).	**2688**	479,000	NO		not impl.	19/12/2004	30/5/2005 - JSC-W	6
53	Nablus- Deir Sharaf	306	New				The 8" main pipe line connecting Deir Sharaf well with Ein Beit Elma booster station is very old and deteriorated . Most of the existing route is passing through sewage canals and subject at any time for contamination. It is needed to replace this old pipeline with a new one 14"diameter pipeline, total length is about 9.0 km.	**2740**	1,800,000				19/12/2004	4/04/2005-JSC W, 16/02/2006 JWC	14
54	Bruqeen	309	New				New Main Pipeline 6"x6500 m from existing filling point to Kufr Eddik village .		160,000	Red Cross/ PHSE I	PMU	on-going	19/12/2004	30/05/2005-JSC-W, 14/08/2007-JWC	33
56	Idna - Hebron	312				N connection	New Connection for Idna Village	18505					19/12/2004	30/1/2005	2
57	Imatin,Hajja, Baqa Al Hatab,Far'ata	313				connections	Connection for 4 Villages in Qalqilia	7254		NO			19/12/2004	30/1/2005	2
58	Zbuba-Jenin north West villages	321	New			water supply	• The components of the project on the Palestinian side are as follows: 1- 12" diameter pipeline from Givat OZ to Rummaneh- Zbuba Junction with a total length of 3.0 km.Cost= 650,000 US $. 2- Pumping station at Givat OZ to increase water supply by 300 m³ / hr to elevations(+ 245) and (+153) with total head of (130m) . Cost = 350,000 US $ The components of the project on the Israeli side are as follows: 1- Replacement of the existing pumping units at keeled station or addition of stages to these units Cost= 100,000 US$. 2- Replacement or replacement of the existing AC section from keeled pumping station to Megiddo Reservoir by 16"' pipeline of total length 3.1 km Cost =620,000US$. 3- Replacement or replacement of the existing section from Megiddo Reservoir to Givat OZ by 12" pipeline of total length 2 km Cost= 300,000US$		1,000,000	UNDP	UNDP	impl.	19/12/2004	11/9/2005	10
	Year 2005														
59	Bani Na'im Package(USAID)	323			1000m^3		To control the pressure and operation of pumps of the new Bani Naim water supply system (which was previously approved by the JWC), it is recommended by the designer CH2MHILL to construct a 1000m³ on ground water tank.		400,000				20/1/2004	JWC30/1/2005 , by CA-Area C16/3/2005	15
60	Ijnisinia	332		Rehabilitation	200m^3, E		Ijninsinya village is located to the north of Nablus city , the existing internal water network is established since 25 years , and it is very old and deteriorated so it is needed to rehabilitate the water network and construct 200 m³ on ground water tank in order to increase the storage quantity of water.	580	220,000			impl.	4/4/2005	4/4/2005	0
61	Bait Dajan-Bait Furik	334	New	N	x		Beit Furik and Beit Dajan villages are located to the east of Nablus city. A nearby well belongs to PWA and they are supplying water via tankers from this well. For this case we have to execute a new water projects for them. The water project consists of: 1. Booster estimated cost (50,000) US$. 2. Internal water net for Beit Furik with the following pipelines: 8" -600 m. 6"– 1000 m. 4"-2000 m. 3"– 3000 m. 2"– 7000m (with est. cost 600.000) US$. 3. Internal water net for Beit Dajan with the following pipelines: 6"– 600 m. 4" -1200 m. 3"– 2000 m. 2"– 4000m (with est. cost 350.000) US$. 4. Main pipeline for Beit Furik to supply the water from the existing well to the Proposed water tank. 8"– 4000 m. with est. cost (300,000)US$. 5. Main pipeline for Beit Furik to supply the water from the existing well to the Proposed water tank. 8"– 3000 m. with est. cost (220,000)US$. 6. 1000 m³ on ground water tank for Beit Furik (est.cost 100,000) US$. 7. 500 m³ on groundwater tank for Beit Dajan (est. cost 80,000US$.	14506	1,700,000			on-going	4/4/2005	14/8/2007	17
62	Maithaloun villages project (7 villages)	337				water supply	water projects		10,000,000	AFD			4/4/2005	14/8/2007	17

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			Main line	Network	Water Tank	Other				(donor)					
63	Shibtin-Ramallah	338		Rehabilitation			Shibtin village located to the west of Ramallah. There is a water distribution network which was constructed since more than 30 years. Most of the pipelines are deteriorated and the network suffers from high percent of UFW (about 40%). The pipelines are undersized and the network is not covering the new developed areas. There is need for network rehabilitation, replacment, expansion. Project components are: 4" pipelines– 1200m. 3" pipelines– 450m. 2" pipelines– 3000m.	900	180,000	UNDP	WBWB	impl.	11/9/2005	14/8/2007	24
64	Hajjaa-Baqa al Hatab/Qalailia	339				water project	Hajja and Baqa El Hatab are two villages located about 15 km to the east of Qalqilya. New water project is needed to supply water to the two villages from Mekorot. A new connection for Jinsafut, El – Funduq, Hajja, Baqa El –Hatab, Immatin and Farata was approved by JWC. The project consists of the following components: 1- 6" – 3200m main pipeline for the two villages. 2- Proposed Internal water net for Hajja including the following pipelines:- 1000m , 1400m , 9000m pipelines of6" , 3" and 2" respectively. 3- Proposed 300 m³ elevated water tank for Hajja . 4- Proposed Internal water net for Baqa El – Hatab including the following pipelines :-500m , 700m , 650m , 8500m pipelines of 6" ,4" ,3" and 2" respectively. 5- Proposed 300m³ Elevated water tank for Baqa El –Hatab. 6- Proposed Booster Q = 40m³/h, H =100m .	4410	1,400,000	NO		not impl.	11/9/2005	14/8/2007	24
65	Deir Ammar Camp	340		Rehabilitation			Deir Ammar camp is located to the west of Ramallah city. The existing water project was performed aince 20 years. Most of the pipelines are deteriorated and the network suffers from high percent of UFW (ABOUT 40%). The pipelines are undersized and the net work is not covering the new developed areas. The existing water network consists of small pipes diameter 2" and 1". There is need to replace old pipelines with the following pipelines: 4"– 800m. 3"– 2000m. 2"– 3000m.	2297	250,000	NO		not impl.	11/9/2005	14/8/2007	24
66	Jiftlik/ Jericho	341		Rehabilitation			Al –Jiftlik village is located to the north of Jericho. There is a water distribution net work which was constructed since more than 25 years. Most of the pipelines are deteriorated and the net work suffers from high percent of UFW (about 40%) . The pipelines are under sized and the network is not covering the new developed areas. So it is needed to rehabilitate , replace and expand the network. TProject components are: 3" – pipeline – 300m. 2" - pipeline – 4300m.	4550	150,000			not impl.	11/9/2005	14/8/2007	24
67	Bir Al Basha	342				water project	Bir Al Basha is a village located about 10 km to the south of Jinin. New water project is needed to supply water to the village from Araba well. A new connection for Bir Al Basha village to supply 135m³ /day is needed on Arrabeh – Jenin 8" pipeline. The project consists of the following components: 1- 4" - 3000m Main pipeline. 2- Internal water net including 3" – 500m, 2" – 7500m. 3- 300m³ elevated water tank.	1296	550,000	NO		not impl.	11/9/2005	14/8/2007	24
	Year 2006														
	Year 2007														
68	Um El Khair	347		Rehabilitation			Um El Khair village is located to the south of Hebron. There is a water distribution network which was constructed since more than 30 years. Most of the pipe lines are deteriorated and the network suffers from high percent of UFW (about 40%). The pipelines are under sized and the network is not covering the new developed areas. So it is needed to rehabilitate , replace and expand the network .The components of the project are: 1- 3" – 1800m proposed pipelines. 2- 2" – 2500m proposed pipelines.	**600**	150,000	UNDP		not impl.	25/02/2007	10/8/2008	18
69	AL Luban AL Gharbiyya	349		Rehabilitation			Al- Luban Al – Gharbi village is located to the west of Ramallah. There is a water distribution network which was constructed since more than 30 years. Most of the pipe lines are deteriorated and the network suffers from high percent of UFW (about 40%). The pipelines are under sized and the network is not covering the new developed areas. There is need for network rehabilitation, replacement, expansion. TProject components are: 1- 4"– 1500m proposed pipelines. 2- 3"– 260m proposed pipelines. 3- 2"– 4000m proposed pipelines.	**1709**	100,000	Ministry of finanace/ phase I	WBWD	on-going	25/02/2007	10/8/2008	18
70	Anabta well no. 3 / Tulkarm	350				well equipping	Install and supply a new well pump for Anabta well (60m3/hr) , booster pump with accessories and balancing tank of 200m3.						4/2/2007	14/8/2007	7
71	Yatta - sammu' / Hebron	354	New		2000m3		Construction of new transmission line with a total of 8 km of 12" Steel pipeline , from Yatta to Samou' and 2000m3 reservoir in Samou'. The project will be carryied out through assistance from ICRC.					impl.	4/2/2007	14/8/2007	7
72	Hizma / Ramallah	357				new well	New well is required to increase water supply for Ramallah Districts. The expected depth of this well is around 850m , while the expected pumping rate is around 200m3/hr	**6872**					4/2/2007	10/8/2008	7
73	Jordan Valley wells	363				wells reha.	The project aims to improve water supply for irrigation through rehabilitation of 25 agricultural wells distribution in several locations of Jordan Valley . The rehabilitation and maintenance works include civil , mechanical and electrical works (supply and install new pumps , raising and checking old pumps) as well as deepening of wells with related accessories .The project will be carrying out through assistance from Arab Fund.						4/2/2007	14/8/2007	7

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			Main line	Network	Water Tank	Other				(donor)					
74	Bir AL Basha2	364	New		300m3 E		Bir Al Basha is a village located about 10 km to the south of Jinin. New water project is needed to supply water to the village from Araba well. A new connection for Bir Al Basha village to supply 135m³ /day is needed on Arrabeh – Jenin 8" pipeline. The project consists of: 1- 4" - 3000m Main pipeline. 2- 300m³ elevated water tank.	**1296**	550,000			not impl.	4/2/2007	14/8/2007	7
75	Azzun / Qalqilia 15-17/004	366				drilling substitute well	The existing well in Azzun No. 15-17/004 suffers fro technical problem (misalignment). Many failure to the pumps occur from time to time. It is suggested to drill a substituted well and close the existing one. The elevation 210m. Depth of well 275m.	**9349**	150,000				17/2/2007	14/8/2007	7
76	Tubas	387				drilling substitute well	New substitute well is required to increase water supply for Tubas District. This new well is considered as substitute well for the old existing Tubas well. The expected depth of this new well is around 650 m, while the expected pumping rate is around 150 m3/hr	18155	60,000			impl.	18/07/2007	14/8/2007	1
77	Deir Sharaf/Nablus	388				drilling substitute well	New substitute well is required to increase water supply for Nablus District. This new well is considered as substitute well for the old existing Deir Sharaf No.3 well. The expected depth of this new well is around 680 m, while the expected pumping rate is around 150 m3/hr.	3106	600,000			impl.	18/07/2007	14/8/2007	1
78	Safarin	396	New	N	N		Safarin village located to the South – East of Tulkarim. The village is suffering from a shortage of water supply for domestic use. The village council had an agreement with the owners of the irrigation well No. 15-18/19 to supply them the needed quantities for domestic. It is needed to construct a pumping station and 6" main pipeline from the pump to the 200m3 elevated water tank & Internal water network. Project components are: 1-pumping station. 2-6" Main pipeline L=7500m. 3-200m3 elevated water tank. 4-Internal water network consisting the following pipelines: 1-3" Pipelines – L = 1500m. 2 – 2" Pipelines – L=2000m.	1167	850,000	Ministry of finanace	PMU	not impl.	18/07/2007	10/8/2008	14
79	Al Naqura	397	New				Al Naqura village located to the South – West of Nablus. It is supplying with water from a private spring. They are suffering from shortage of water, so it was approved by JWC to give them a new connection from Mekorot. It is needed to connect the new connection to the existing water tank. The project consists of 1800 m- 3" Main pipeline.	1866	80,000	ANERA	ANERA	not impl.	18/07/2007	10/8/2008	14
80	Ammorya	398	New	N	N		Ammorya is a small village without water service located at the south of Nablus and it is far about 3 kilometer at the west from El -Luban al – Sharqiya. We are looking forward to serve this village with water from Mekorot main transmission to Labonah Settlement. The Project consists of: 1- 200m³ Reinforced ground and circular res. 2- 4" main pipeline. 3- Internal Water network.	367	400,000	NO		not impl.	18/07/2007	10/8/2008	14
81	Nwei'meh - Jericho	399				R water spring	The Pilot project aims to improve water supply for irrigation through rehabilitation of small part (1.2 Km) of Nweima Spring. The rehabilitation and maintenance works include civil works (lining open channels, replace small part of the open channel with closed pipes) with some related works.	1314	250,000			not impl.	18/07/2007	10/8/2008	14
	Year 2008														
82	Nablus – Nablus City(Modified	409	New				It is required to operate the newly drilled well of Deir Sharaf well No.(3). The discharge is about 200 – 250 m³/hr. The following components are needed: 1. Equipping the well with a pump Q=250M³/hr. , H=250m.-600,000 US$. 2. Booster station.-300,000 US$. Towards Deir Sharaf well No. (2) 3. Booster station -300,000US$ Towards the Surrounding villages (from Naqura till Al Fandoqumi) 4. Balance tank capacity 2000m³.-200,000 US$. 5. Guard room & chlorine room.- 200,000 US$. 6. Other electrical and mechanical works including generator.-600,000 US$. 7. 12" -3500m length pipeline from the newly drilled well to Deir Sharaf existing well on Nablus –Tulkarem road.600,000 US$. 8. 12" – (900m) Length pipe line from the newly drilled well (Deir Sharaf No.3) to the existing 8" pipe line. Cost 155,000 US $.	156987	2,500,000				18/07/2007	10/8/2008	14

Annex 12b Pending JWC approval of Palestinian Projects: West Bank and Gaza

Palestinian WATER Projects on the WEST BANK pending JWC approval

No.	Location	Project No.	Project type	Project Description	Estimated number of beneficiaries-up to 31.7.2008	Estimated total funding [$]	Implementing agency/ utility	Current project status [under preparation, ongoing or completed?]	Start date (planned)
1	Tell /Nablus	270	Domestic Water Supply	New water supply project .	5000	1600000	WBWD	Israel refused to increase water supply rates	2004
2	Masha	273	Domestic Water Supply	Construction of 300m^3 elevated water tank	2200	150000	WBWD	* Pending Israeli approvals (JWC in area A&B, Civil Administration in area C).	2004
3	Al - Zawyeh	275	Domestic Water Supply Project	Rehabilitation of Internal Water network and construction of 500m^3 Water tank and execution of booster.	5500	800000	WBWD	e	2004
4	Deir Abu Masha`l	276	Domestic Water Supply	Rehabilitation of Internal Water net work	3700	450000	WBWD	*	2004
5	Qarawat Bani Hassan	277	Domestic Water Supply Project	Construction of 500m^3 elevated water tank	3950	200000	WBWD	*	2004
6	Al - Qubeiba	278	Domestic Water Supply	Rehabilitation & development of the existing water network	2200	600000	WBWD	*	2004
7	Beit Iksa	279	Domestic Water Supply	Rehabilitation & development of the existing water network.	1700	450000	WBWD	*	2004
8	Beit I'nan	280	Domestic Water Supply	Rehabilitation & replacement of the existing network	4500	750000	WBWD	*	2004
9	Azmut	281	Domestic Water Supply	Proposed square and elevated water tank with 500 m^3 capacity & Proposed 6" supplying and distributing main pipelines with total length 2000 m	2880	350000	WBWD	*	2004
10	Deir Nitham	282	Domestic Water Supply	Rehabilitation of internal water network	1000	350000	WBWD	*	2004
11	Muthalath Al Shuhada	283	Domestic Water Supply	Water tank, Network Rehabilitation & Main Pipelines.	1900	750000	WBWD	*	2004
12	Habla	284	Domestic Water Supply	Water tank & main pipe lines.	6600	450000	WBWD	*	2004
13	Al -Janyeh	285	Domestic Water Supply	Construction of 500 m³ Elevated Water Tank , with the needed pipeline .	1400	350000	WBWD	*	2004
14	Surif	286	Domestic Water Supply	Constructing of 1000m ^{3} ground and circular R.C. Water tank , Executing of 8" supplying and distributing main pipelines L= 4000m Installing of Pumping Unit , & Constructing of 100m3 ground and circular R.C. balance tank.	14500	800000	WBWD	*	2004
15	Yasuf	288	Domestic Water Supply	Rehabilitation of the water net work and construction of 300m^3 water tank.	1900	500000	WBWD	*	2004
16	Kufr Qadum		Domestic Water Supply	Rehabilitation of the water network and construction of 500m^3 water tank.	3800	750000	WBWD	*	2004
17	Rafat	291	Domestic Water Supply	Constructing of 200m ^{3} Square and elevated R.C. Water tank & Executing of 6" supplying and distributing main pipelines	2200	350000	WBWD	*	2004
18	A`ttil	292	Domestic Water Supply	Proposed ground and circular water tank with 1000 m^3 capacity & Proposed 8" supplying and distributing main pipelines	11200	600000	WBWD	*	2004
19	Za`tra	293	Domestic Water Supply	Constructing of 500 m^3 ground and circular R.C Water tank, Executing of 6" supplying and distributing main pipelines & Rehabilitation of the existing internal water network	6600	900000	WBWD	*	2004
20	Dora Al – Qarea `	294	Domestic Water Supply Projetc	Rehabilitation, replacement and expansion of the existing water network & construction of 300m^3 elevated water tank.	2900	600000	WBWD	*	2004

No.	Location	Project No.	Project type	Project Description	Estimated number of beneficiaries-up to 31.7.2008	Estimated total funding [$]	Implementing agency/ utility	Current project status [under preparation, ongoing or completed?]	Start date (planned)
21	Esh - Shyoukh	295	Domestic Water Supply	Installing of Pumping Unit , balance tank & main pipelines .	10100	200000	WBWD	*	2004
22	Beita	296	Domestic Water Supply	Constructing of 500m ^{3} square and elevated water tank & Executing of 6" main pipelines	9400	300000	WBWD	*	2004
23	Ras Karkar	297	Domestic Water Supply	Ground and circular 300 m³ water tank.	2100	120000	WBWD	*	2004
24	Yatta Village Group Water supply system	298	Domestic Water Supply	Water Tank, main pipelines and internal water networks	30000	4500000	WBWD	*	2004
25	Jama`en	299	Domestic Water Supply	Constructing of 500m ^{3} ground and circular R.C. water tank & Executing of 6" supplying and distributing main pipelines	6200	450000	WBWD	*	2004
26	Al – Nabi Elias	300	Domestic Water Supply Project	Rehabilitation of the Internal water net work and construction of 300 m³ water tank.	1350	400000	WBWD	*	2004
27	Jit	302	Domestic Water Supply	Rehabilitation of the water net work and construction of 300m^{3}Elevated water tank.	2600	550000	WBWD	*	2004
28	Marj Ghazal-Mohammad Jawad Riziq	304	Domestic Water Supply	Construction of 500m^3 on-ground water Tank and the needed supplying & distributing pipelines .	400	250000	WBWD	*	2004
29	Marj Ghazal-Bade' Sulayman	305	Domestic Water Supply	Construction of 500m^3 on-ground water Tank and the needed supplying & distributing pipelines.	400	300000	WBWD	*	2004
30	Hebron / Different villages	307	Domestic Water Supply	Cisterns for Rain water Harvesting .	n/a	n/a	WBWD	*	2004
31	Hir Zakaria– Beit Lehem	308	Domestic Water Supply	Enlargement of connection .Conn. No. 62992 , Water Mete R 1"- No.992802765	n/a	n/a	WBWD	*	2004
32	Wadi El- Maleh .	310	Domestic Water Supply	New 3 Connections .	250	n/a	WBWD	*	2004
33	Idna-Hebron	312	Domestic Water Supply	New Connection for Idna Village.	20000	n/a	WBWD	*	2004
34	Beit Iba	315	Domestic Water Supply	New Connection	3500	n/a	WBWD	*	2004
35	Hebron / Hathalin village .	316	Domestic Water Supply	Pipelines extensions.	2000	200000	WBWD	*	2004
36	Qalqilya / El Funduq	317	Domestic Water Supply	Construction of 300m^{3}Elevated water tank.	750	250000	WBWD	*	2004
37	Qalqilya / Jinsafut	318	Domestic Water Supply	Rehabilitation of the water net work and construction of 300m^{3}Elevated water tank.	2500	650000	WBWD	*	2004
38	Ramallah / Qarawat Bani Zaid	319	Domestic Water Supply	Rehabilitation of the water network	2900	300000	JWU	*	2004
39	Hebron / Twaneh village	320	Domestic Water Supply	New Connection	350	n/a	WBWD	*	2004
40	Al-Niwe'meh	322	Domestic Water Supply	Construction of 500m^{3}on - ground water Tank and the needed supplying and distributing pipelines , booster & rehabilitation of the internal water network.	1500	500000	WBWD	*	2004
41	Qalandia R.C.	326	Domestic Water Supply	Rehabilitation of water network	9700	n/a	JWU	*	2005
42	Jifna/ Beir Zeit	327	Domestic Water Supply	Rehabilitation of water network	1450	300000	JWU	*	2005
43	Abu Falah/ Sinjel	328	Domestic Water Supply	Rehabilitation of water network	4400	500000	JWU	*	2005
44	Surda	330	Domestic Water Supply	Rehabilitation of water network	1550	450000	JWU	*	2005
45	Jiljilia- Mazare'Al Noubani	331	Domestic Water Supply	Rehabilitation of water network	3800	800000	JWU	*	2005
46	Al –Tarem-Jenin	333	Domestic Water Supply	Construction of 200m³ elevated water tank & Rehabilitation of water network	450	450000	WBWD	*	2005
47	Barta'a – Jenin	335	Domestic Water Supply	Replacement of 4" main pipeline	3900	200000	WBWD	*	2005
48	Jenin- Eastern Jenin Village	336	Domestic Water Supply	Water supply project for un-served communities	20000	12,500,000	WBWD	*	2005
49	Edna	344	Domestic Water Supply	Proposed 6" Main pipe line	20000	150000	WBWD	*	2007
50	Samu'- Daherya	345	Domestic Water Supply	8" Proposed supplying main pipeline and 2000 m3 ground and circular water tank.	31500	750000	WBWD	*	2007

No.	Location	Project No.	Project type	Project Description	Estimated number of beneficiaries-up to 31.7.2008	Estimated total funding [$]	Implementing agency/ utility	Current project status [under preparation, ongoing or completed?]	Start date (planned)
51	Um –El khair	347	Domestic Water Supply	Rehabilitation the internal water network	1000	150000	WBWD	*	2007
52	Ed dyouk	348	Domestic Water Supply	Rehabilitation the internal water network	400	30000	WBWD	*	2007
53	Al – Luban Al Gharbi	349	Domestic Water Supply	Rehabilitation the internal water network	1650	300000	WBWD	*	2007
54	Sanur - Jenin	352	Domestic Water Supply	Well Rehabilitation	50000	500000	WBWD	*	2007
55	Arraba - Jenin	353	domestic well	Well Rehabilitation, domestic well to improve Water Supply System,	20,000	500000 Euro	WBWD	*	Feb. 2007
56	Simia & Al Dahiriya / Hebron	355	Domestic Water Supply	Main transmission system	31500	450000	WBWD	*	Feb. 2007
57	South Bethlehem village	359	Domestic Water Supply	Rehabilitation of Water networks.	25500	370000	WBWD	*	Feb. 2007
58	Ubeydia / Bethlehem	360	Domestic Water Supply	Rehabilitation of Water networks.	9500	450000	WBWD	Major part implemented	Feb. 2007
59	Beit Ula - Hebron	361	Domestic Water Supply Project	Rehabilitation of Water networks.	10500	800000	WBWD	*	Feb. 2007 (Est.)
60	East Herodian – Bethlehem Well No. (3)	365	Domestic Water Supply	Drilling New Production well.	n/a	n/a	WBWD	*	Feb. 2007 (Est.)
61	Doma / Nablus	367	Domestic Water Supply	Proposed new water connection	2500		WBWD	*	Feb. 2007 (Est.)
62	Beit Lid & Safarin	368	Improve water supply system	Additional water for Beit Lid village From 20 to 30 m3/hr	7500	6200 $/month	WBWD	*	Feb. 2007 (Est.)
63	Salem villages	370	Domestic Water Supply	Additional water From 25-40 m3/hr	10000	9300 $/month	WBWD	*	April 2007 (Est.)
64	Beit Ur Al Tahta	371	Domestic Water Supply	Additional water From 15 to 20 m3/hr	20000	3000 $/month	WBWD	*	April 2007 (Est.)
65	Bani Zeid villages	372	Domestic Water Supply	Additional water From 25 to 40 m3/hr	8500	9300 $/month	JWU	*	April 2007 (Est.)
66	Howwara villages Nablus	374	Domestic Water Supply	Additional water From 20 to 25 m3/hr	6200	3000 $/month	WBWD	*	April 2007 (Est.)
67	Tarqumya	375	Domestic Water Supply Project	Additional water From 25 to 30 m3/hr	15500	3000 $/month	WBWD	*	April 2007 (Est.)
68	Brokin Kufr Al Deek	376	Domestic Water Supply	Additional water From 10 to 40 m3/hr	9500	19000 $/month	JWU	*	April 2007 (Est.)
69	Beithlehem	377	Domestic Water Supply	Additional water From 60 to 75 m3/hr	32000	9300 $/month	WBWD	*	April 2007 (Est.)
70	Joret Al Shama'ah villages	378	Domestic Water Supply	Additional water From 25 to 35 m3/hr	3500	6200 $/month	WBWD	*	April 2007 (Est.)
71	Qusra villages	380	Domestic Water Supply	New connection 10 m3/hr	8500	6200 $/month	WBWD	*	380/04/2007
72	Ramallah (J.W.U)	381	Domestic Water Supply	Additional water 20,000 m3/d	40000	600,000 $/month	JWU	*	April 2007 (Est.)
73	South Nablus villages	382	Domestic Water Supply	New connection 15 m3/hr	18500	9300 $/month	WBWD	*	April 2007 (Est.)
74	Faqou'a	384	Domestic Water Supply	New water project 15 m3/hr	76000	9300 $/month	WBWD	*	April 2007 (Est.)
75	Jaloud	386		Connection for filling tankers	500		WBWD	*	June 2007 (Est.)
76	Budrus /Ramallah	389	Domestic Water Supply	Rehabilitation the internal water network	1600	350000	JWU	*	July 2007 (Est.)
77	Shufa /Tulkarem	390	Domestic Water Supply	Drilling New Substitute Production well	2400	750000	WBWD	*	July 2007 (Est.)
78	Tulkarem wells	391	Agricultural wells	Rehabilitation of 12 Agricultural wells	n/a	500000 Euro	Municipality	Pending Israeli approval	July 2007 (Est.)
79	Habla - Qalqilya	394	Sewage	Sewage Collection network	6600	2 million	WBWD	*	Aug. 2007 (Est.)
80	Mukhmas-Ramallah	395	Domestic Water Supply	Rehabilitation the internal water net work	2100	550000	JWU	*	Aug. 2007 (Est.)
81	Safarin	396	Domestic Water Supply	Proposed water project	1100	850000	WBWD	*	Sept. 2007 (Est.)
82	Al Naqura	397	Domestic Water Supply	Proposed 3" Main pipeline .	1800	80000	WBWD	*	Sept. 2007 (Est.)
83	Ammorya	398	Domestic Water Supply	Proposed water project	350	400000	WBWD	*	Dec. 2007 (Est.)
84	Al –Uja - Jericho	400	Agricultural well	Renew Well Permit	n/a	n/a	WBWD	*	Dec. 2007 (Est.)
85	Al Jeftlek Well Basel Kana'an	401	Domestic Water Supply	Proposed water project	n/a	200000	WBWD	*	Dec. 2007 (Est.)
86	Bile'in Main Con.	402	Domestic Water Supply	Replacement of the existing 2" Main connection	2000		WBWD	*	Dec. 2007 (Est.)
87	A'aba Al El Sharqiyah	403	Domestic Water Supply	Proposed water project	450	350000	WBWD	*	Jan. 2008 (Est.)
88	Jenin /Ta'anek Abd Al Kareem Zaied	406	Agricultural well	Rehabilitation an Agricultural well	n/a	150000	WBWD	*	Feb. 2008 (Est.)
89	Jiftlik – Jordan Valley	407	Agricultural well	Rehabilitation an Agricultural well Id: 19-17/007	n/a	100000 Euro	WBWD	Pending civil admin. approval; Area C	March 2008 (Est.)
90	Nablus – Nablus City (Modified)	409	Domestic Water Supply	Proposed 12" Main pipe line	25000	3 million	Municipality	*	March 2008 (Est.)

No.	Location	Project No.	Project type	Project Description	Estimated number of beneficiaries-up to 31.7.2008	Estimated total funding [$]	Implementing agency/ utility	Current project status [under preparation, ongoing or completed?]	Start date (planned)
91	Jordan Valey – Al Auja	410	Agricultural well	Rehabilitation of well No. 19-15/023	n/a	150000	WBWD	*	March 2008 (Est.)
92	Jenin	411	Agricultural well	Deepening and Rehabilitation of well No. 17-20/036J	n/a	500000	Municipality	*	March 2008 (Est.)
93	Tubas – Al Fara'a Camp	412	Domestic well	Drilling New Production well.	6600	750000	WBWD	*	April 2008 (Est.)
94	Jenin_Industrial City	413	Water for industry	Proposed 8" Main pipeline		300000	Municipality	*	June 2008 (Est.)
95	Hebron/ Dura Village	414	Domestic Water Supply	Development of Water Supply Project	20	4500000	WBWD	*	July 2008 (Est.)
96	Bardala –Ain al Beydah .(Irrigation)	415	Water for agriculture	Proposed main 6" pipeline	n/a	270000	WBWD	*	July 2008 (Est.)
97	Khirbet Jbarah	417	Domestic Water Supply	New Water Project (Internal Water net & Water Tank)	400	300000	WBWD	*	July 2008 (Est.)
98	Rehabilitation of 7 agricultural wells		Agricultural wells	Rehabilitation of 7 agricultural wells in Qalqilia area	n/a	n/a	WBWD	*	2008 (Est.)
99	Drilling of Azzun Substitute well	366	Domestic well		20,000	350,000	WBWD	Area C permit	8\2007
100	Drilling of Kufr Zeibad Substitute well		Domestic well		3000	750000	WBWD	Pending	3\2002
101	Drilling of Yamun, Abu Arab and Beit Qad Production Wells	418,423	Domestic well	Drilling three production wells to serve communities in Jenin Governorate, to improve Water Supply System,	200,000	1.5 million Euro	WBWD	Rejected Affecting Beisan Springs	6\1999
102	Drilling of Tulkarm No.2 substitute well	419	domestic well	Well Rehabilitation, domestic well to improve Water Supply System,	40,000	500000	Municipality	Pending Israeli approval	Mar-02
103	Rehabilitation of 25 agricultural wells in Jordan Valley	363	Agricultural wells	Agricultural wells	n/a	1.0 million €	WBWD	Only 7 were approved	Mar-07
104	Drilling of Hizma No.1 and 2 wells	357	Domestic wells	Improve Water Supply System	100,000	500,000 €	WBWD	Pending Area C permit	Mar-02
105	Drilling of AL-Auja well		Domestic well	Ditto	20,000	500,000 €	WBWD	Pending JWC approval Area C permit	Apr-00
106	Rehabilitation and substitution of 60 Agr. Wells in WB		Agricultural wells	Agricultural wells	n/a	1.0 million €	WBWD	Pending JWC approval	Jun-99
107	Faraa		Resource management	Integrated watershed management project	n/a	n/a	Environmental Quality Authority	After the Palestinian election the project was frozen till May 2007 and Ministry of Environment (MENV) –Jordan became the project leader. The project is supposed finish on 30 Nov. 2008	2003

Palestinian WASTEWATER Projects on the WEST BANK pending JWC approval

DCL = District Coordination Liaison

No.	Location		Project type	Project Description	Estimated number of beneficiaries-up to 31.7.2008	Estimated total funding [$]	Implementing agency	Current project status [under preparation, ongoing or completed?]	Start date (estimated)
1	Halhul		Wastewater	Wastewater treatment plant	42,000 (2020)		Muncipality	Submitted to the JWC on 8 June 1997. not approved	
2	Nahalin		Wastewater	Wastewater treatment plant	700		Muncipality	Submitted to the JWC on 7 Oct. 1999. not approved by District Coordination Liaison (DCL)	
3	Jifna/Jalazoun/Birzeit		Wastewater	Wastewater treatment plant	28,000		Muncipality	Submitted to the JWC on 8 June 1997. not approved	
4	Al-Ram		Wastewater	Wastewater treatment plant	86500		Muncipality	Submitted to the JWC on 7 July 1999. not approved by JWC	
5	Azerieh.Abu Dees		Wastewater	Wastewater treatment plant	26000 (2020)	20 million €	Muncipality	Submitted to the JWC on 8 June 1997. not approved by JWC	
6	Ramallah/Bitunia		Wastewater	Wastewater treatment plant	40000 (North); 40000 (South)	10 million €	Muncipality	Submitted to the JWC on 28 Sept. 1999. Verbal approval by JWC but not approved by DCL. The site of the plant has been already identified and approved by the Civil Administration.	2008
7	Salfeet		Wastewater	Wastewater treatment plant	8000 (2003)	5 million €	Muncipality	Submitted to the JWC on 28 Nov. 1996. approval not issued by DCL due to Israeli CA preconditions. Initial approval for the Salfit WWTP project was awarded by JWC, but due to CA security concerns, a new site had to be designated. The Israeli side then asked to link this project with the treatment of wastewater from the Ariel settlement. PWA rejected the concept of Salfit WWTP serving Israeli settlements. Since then project has been frozen due to CA preconditions and the donors' inability to commit under these circumstances	Sept. 2003
8	Nablus West		Wastewater	Wastewater treatment plant	172000 (now) 240000 (2025)	26.5 million €	Muncipality	Submitted to the JWC on 8 Aug. 1997. Approved by JWC & DCL. Project stopped due to security (area C). Postponed until transport of equipment and contractor's staff to the site can be secured and security situation improves	Mar-98
9	Hebron		Wastewater	Wastewater treatment plant	239000 (2015)	45 million €	Muncipality	Submitted to the JWC on 1999. Approved by JWC. Approval by DCL not issued. Changes requested by Isrealis increased the cost to 75 million € causing the project to not go ahead from lack of sufficent funding. Donor continued commitment to fund project uncertain.	2006
10	Jenin Industrial Estate		Wastewater	Wastewater treatment plant		2 million €	Muncipality	Submitted to the JWC on 28 Sept. 1999. approval not issued by DCL	
11	Jenin regional area		Wastewater	Wastewater treatment plant	40,000 (2003)	35 million €	Muncipality	Submitted to the JWC on 16 Jan. 2000. approval not issued by DCL due to security concern.	
12	Tulkarem		Wastewater	Tulkarem Regional Sewerage and Wastewater Treatment Project	70,000 (2015)	40 million €	Muncipality	The Tulkarem Regional WWTP project has been pending for over 10 years. Due to long delay, project was broken up in 2 phases. Phase 1 consisted of the construction of a trunk line, collection system, and pre-treatment. Since the completion of Phase 1, cleected sewage has been treated in Emek Heffer (Israeli plant) until Phase 2 (regional wastewater treatment plant) can be implemented. Phase 2 will be revisited in 2013.	2003

Palestinian WASTEWATER Projects in GAZA suffering implementation delays

No.	Location		Project type	Project Description	Estimated number of beneficiaries-up to 31.7.2008	Estimated total funding [$]	Implementing agency	Current project status [under preparation, ongoing or completed?]	Start date (estimated)
1	North Gaza		Wastewater	Wastewater treatment plant		Value 50 MUSD available 35 MUSD	Coastal Utility	Pre qualified International bidders did not submit offers because of being reluctant due to security and clearance issues for personnel and materials. PWA is preparing for re tendering ADF is committed to cover additional 3 MEuro SIDA is committed to cover additional 1.5 MUSD It is needed to secure the deficit in funds (9 MUSD) Time for re bidding and construction : 3.5 years	To be re tendered
2	Gaza &Middle Area		wastewater	Wastewater treatment plant		Value 70 M Euro available 70 M Euro	Coastal Utility	KFW is worried for the security and clearance of Personnel and materials KFW is planning to use part of the fund to upgrade the existing system Project documents are ready. Tendering can be activated when KFW makes sure of practical arrangements with Israel on materials and staff Time for bidding and construction : 4 years	Frozen
3	Khanyounis		wastewater	Wastewater treatment plant		Value 21 MUSD available 14 MUSD	Coastal Utility	PWA prepared Preliminary designs Japan commitment is allocated to the construction works (12 MUSD) and the rest is for UNDP Management.Japan allowed UNDP to use 1 MUSD for detailed design without substitution. Japan wants PNA to look for complementary funds. Time for design, bidding and construction : 3 years	

Annex 13

List of stakeholder organizations, public meetings

1. Stakeholder groups consulted:

Palestinian Authorities:	Israeli Authorities
▪ Palestinian Water Authority	▪ Israeli Water Authority
▪ PMUs (West Bank, Gaza)	▪ JWC- Water Administration for West Bank and Gaza;
▪ West Bank Water Department	▪ Coordinator Water and Sewage for West Bank and Gaza (COGAT);
▪ Ministry of Planning	▪ Civil Administration
▪ Ministry of Agriculture	
▪ Governorate of Jenin, Joint Service Council of Eastern Villages,	
▪ Hebron Masafir Yatta area	
▪ Municipalities of Falamyeh and Jayyous,	
▪ Khan Younis Municipality	
▪ NSU	
▪ EQA	

- **Palestinian Utilities:** Coastal Municipalities Water Utility; Jerusalem Water Undertaking; Jenin Utility.
- **Donor Agencies:** OCHA, UNDP; UNICEF, UNRWA, WHO, JICA, AFD, GTZ, KfW, USAID, Norwegian Representative Office, ECHO
- **Universities, research institutes, private sector:** Birzeit University, London School of Economics and Political Science, Hebrew University, ARIJ, PHG, Consulting Engs., Tal-Con.T.Ent Consulting, Benor Consulting, independent consultants, Philipps Robison & Associates, Gruppo di Volontario Civile-Italy
- **NGOs/CBOs:** EWASH, Friends of the Earth Middle East, House of Water and Environment, EWASH, Israel-Palestinian Center For Research & Information (IPCRI)), B'Tselem Israeli Information Center for Human Rights in the Occupied Territories

2. Public Meetings held:

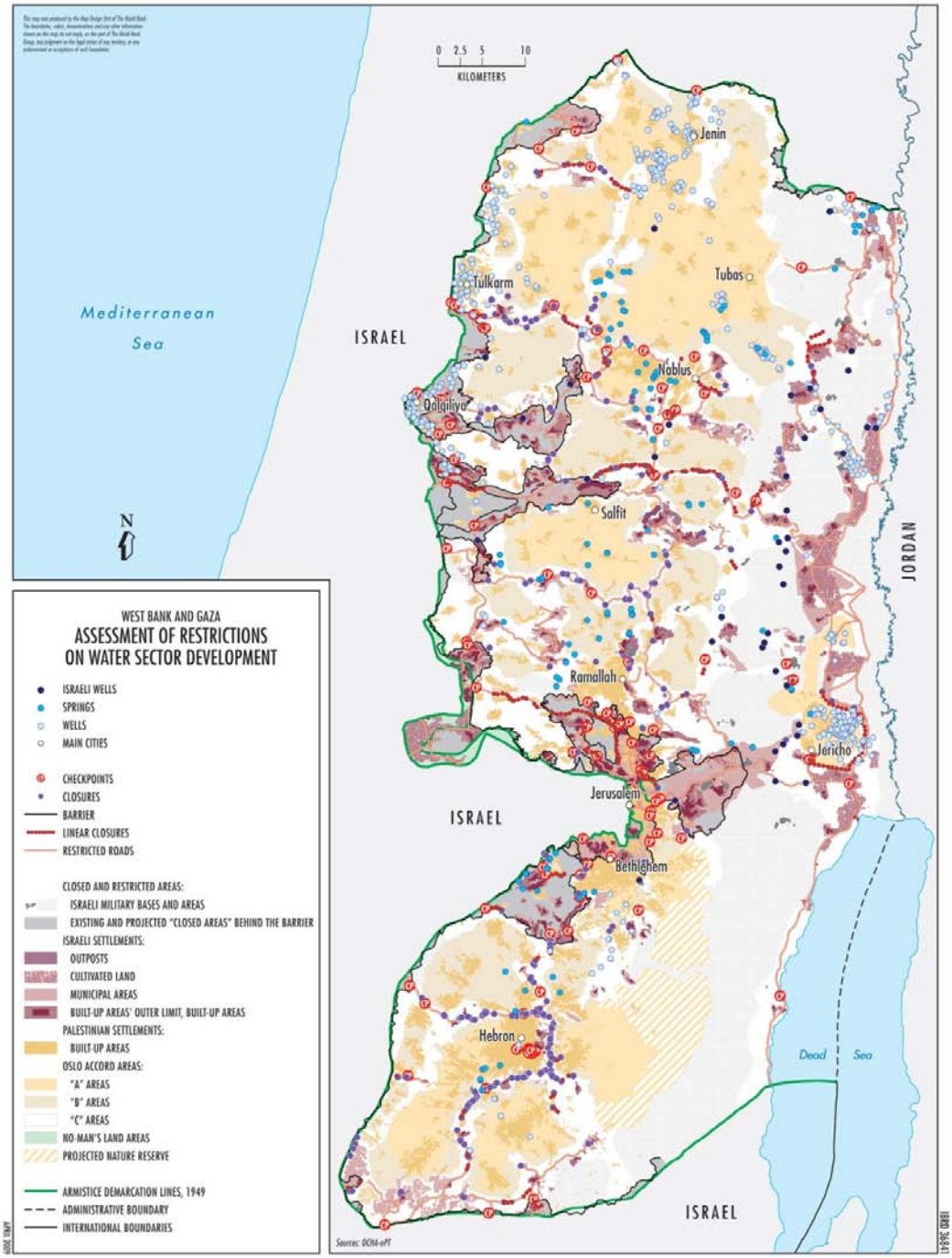
July 2, 2008	Water Sector Governance Roundtable #4: "Social Aspects of Water Policy and Reform", PWA HQ, Ramallah
September 22, 2008	Stakeholder Design Workshop: "Impact Assessment of Restrictions on Water Sector Development", PWA HQ, Ramallah
November 17, 2008	First Informal Country Counterpart Team Meeting with PWA, MoP, MoA, NSU, EWASH (NGO representatives), donors (via co-chair of Water Sector Working Group), and local consultants, PWA HQ, Ramallah
November 30, 2008	Second Informal Country Counterpart Team Meeting with PWA, MoP, MoA, NSU, EWASH (NGO representatives), donors (via co-chair of Water Sector Working Group), and local consultants, PWA HQ, Ramallah
February 3, 2009	Consultation meeting with Israeli stakeholders, Benor Consulting, Tel Aviv
February 4, 2009	Stakeholder Consultation Workshop, PWA HQ, Ramallah

Public meetings attended

November 18, 2008	EWASH meeting, PWA HQ, Ramallah
November 26, 2008	Water Crisis, Conference organized by IPCRI, Ambassador Hotel, Jerusalem

Annex 14

Maps


WEST BANK AND GAZA
ASSESSMENT OF RESTRICTIONS
ON WATER SECTOR DEVELOPMENT
ISRAELI WELLS
SPRINGS
WELLS
MAIN CITIES
CHECKPOINTS
CLOSURES
BARRIER
LINEAR CLOSURES
RESTRICTED ROADS
CLOSED AND RESTRICTED AREAS:
ISRAELI MILITARY BASES AND AREAS
EXISTING AND PROJECTED "CLOSED AREAS" BEHIND THE BARRIER
ISRAELI SETTLEMENTS:
OUTPOSTS
CULTIVATED LAND
MUNICIPAL AREAS
BUILT-UP AREAS' OUTER LIMIT, BUILT-UP AREAS
PALESTINIAN SETTLEMENTS:
BUILT-UP AREAS
OSLO ACCORD AREAS:
"A" AREAS
"B" AREAS
"C" AREAS
NO-MAN'S LAND AREAS
PROJECTED NATURE RESERVE
ARMISTICE DEMARCATION LINES, 1949
ADMINISTRATIVE BOUNDARY
INTERNATIONAL BOUNDARIES
0 2.5 5 10
KILOMETERS
Mediterranean
Sea
N
ISRAEL
Jenin
Tubas
Tulkarm
Nablus
Qalqiliya
Salfit
JORDAN
Ramallah
Jericho
Jerusalem
ISRAEL
Bethlehem
Hebron
Dead
Sea
ISRAEL
Source: OCHA-oPT
IBRD 36841


IBRD 36842
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ISRAEL
Erez
Crossing point for people
NORTH GAZA
Mediterranean Sea
Nahal Oz
Crossing point for fuels
Karni
Crossing point for goods
GAZA
MIDDLE AREA
ISRAEL
N
KHAN YUNIS
RAFAH
A. R. EGYPT
Sufa
Rafah
International terminal for passengers
Airport
Kerem Shalom
Both used as alternative crossing points for commercial and humanitarian goods
WEST BANK AND GAZA
ASSESSMENT OF RESTRICTIONS ON WATER SECTOR DEVELOPMENT
ELECTRIC POWER STATION
WASTEWATER TREATMENT PLANTS
WATER TREATMENT PLANTS
WATER WELLS
PUMP STATIONS
CROSSING POINTS
BUILT-UP AREAS
REFUGEE CAMPS
GOVERNORATE BOUNDARIES
ARMISTICE DEMARCATION LINES, 1949
INTERNATIONAL BOUNDARIES
Sources: OCHA-oPT
MARCH 2009