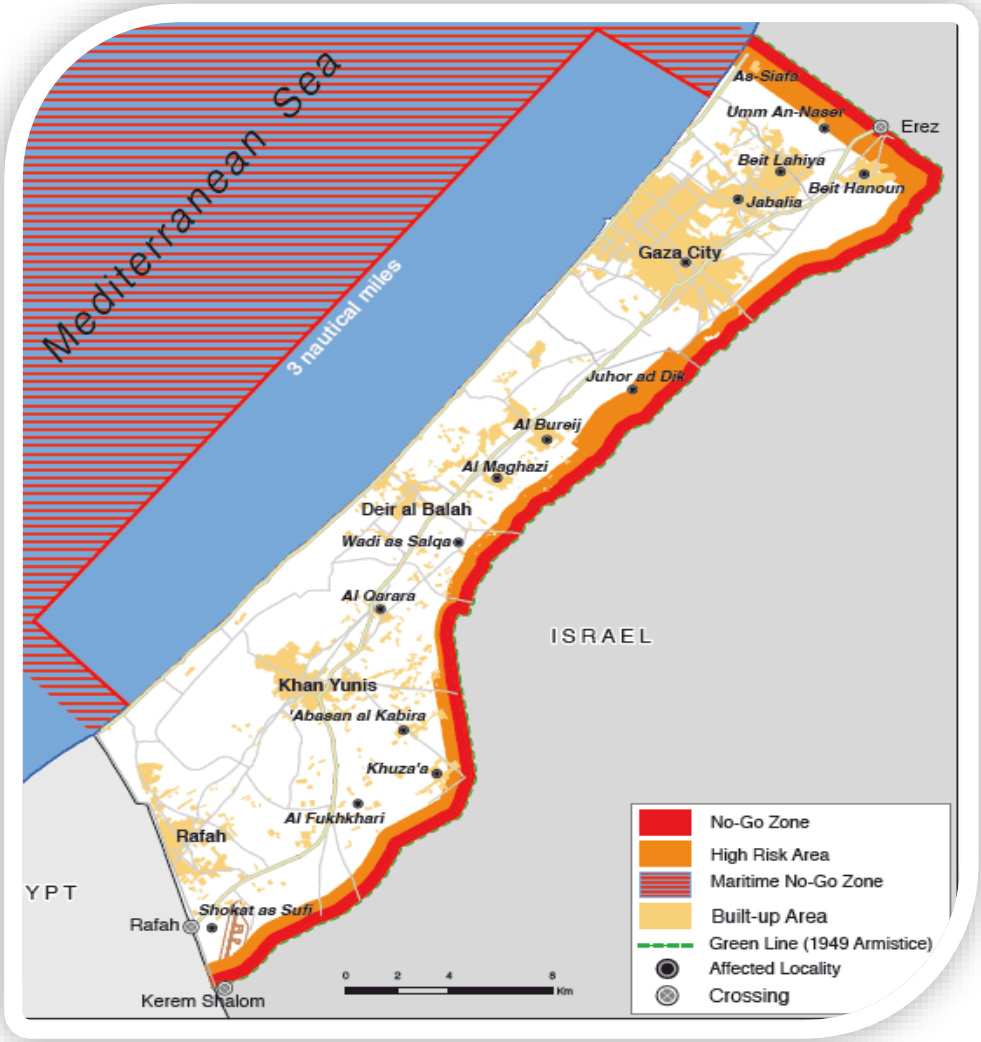
Sustainable Water Integrated Management programme (SWIM II)

Re-use of treated wastewater for agricultural irrigation in Southern Gaza Strip

April, 2019

Gaza Context



- Population: 2,000,000 individuals in a total area of 365 square kilometers
- Ongoing blockade since 11 years
- Unemployment rate reached to 49%
- Five years after the 2014 conflict, 10,000 people remain displaced
- 80% of the Gaza population is dependent on humanitarian assistance
- 96% of the groundwater in Gaza considered unfit for human consumption.
- 12-18 hours of power shortage per day

Gaza Context – WASH and Energy

I. WASH

Ground Water Status

Quantity

- The current abstraction from the aquifer far exceeds the natural recharge.
- Current abstraction: 183 MCM/ year (50% for agriculture, 50% for domestic).
- Natural recharge: 55-60 MCM/year.
- Deficit: 123-128 MCM/ year.

Quality

- Overall, more than 96% of the aquifer water quality exceeds the WHO standards in terms of quality (PWA, 2017)
- **Salinity**: 82% of the aquifer water exceeds WHO standards, (250 ppm - Cl).
- **Pollution**: 89% of the aquifer water exceeds WHO standards, (50 ppm – NO3).

Gaza Context – WASH and Energy

I. WASH | Sanitation

72%

40 MCM per year. Collected and discharged to 5 wastewater treatment plants distributed across the Gaza Strip.

+

28%

17 MCM of raw wastewater is dumped into the aquifer through septic tanks/ cesspits causing pollution to groundwater

57 MCM/ year

Wastewater generated in the Gaza Strip

Gaza Context – WASH and Energy

I. WASH

Sanitation

The existing 5 WWTP are overloaded as they receive more quantities of wastewater than their design capacities. Accordingly, they do not work efficiently and the effluent generated is usually with poor quality that is not compliant with the WHO and/ or PA standards and causing pollution to the sea (final effluent dumping destination).

Gaza Context – WASH and Energy

II. Energy

Since 2006, the Gaza Strip has been suffering from a chronic electricity shortage, which affected negatively all aspects of living conditions. This situation has severely impacted the availability of essential services, particularly health, water and sanitation services, and undermined Gaza's fragile economy, particularly the manufacturing and agriculture sectors.

The situation has further deteriorated since **April 2017**.

Taking **February 2018** as an example, the overall shortage in electricity reached **80%**.

However, the situation is better **now** and the current shortage is about **50%.**

According to PWA strategic plan, by 2022, the power demand of WASH facilities in the Gaza Strip will reach 92 MW.

Electricity Shortage and impact on WASH

According to CMWU, the public WASH facilities need approximately 36 MW – power for being operated.

Same as other sectors, electricity shortage in the Gaza Strip has affected the WASH sector negatively

The daily per capita domestic water supply decreased from 91 L to 53 L during severe shortage periods (80%).

Desalination capacity was reduced to 55% of the total capacity.

A daily amount of more than 100,000 cubic meters of raw sewage is currently dumped into the Mediterranean.

Flooding might happen in the locations of the sewage pumping stations (low points), especially during rainy seasons (critical public health issue)

SWIM Project Background

- This project came as a response to the increasing of water crisis in the Gaza Strip.

- The project adopted the strategy of PWA in relation to wastewater reuse as an integrated water management mechanism to face the water crisis of the Gaza Strip.

Project Information

Beneficiaries	213,124 Individuals
Project Duration	36 Months From 01/04/ 2017 to 31/3/ 2020
Budget	EUR. 2,176,517
Donor	EU Co-financing (20%)

Project Objectives

Specific Objective

To strengthen integrated water resource management in the Gaza strip through innovative environmental and agricultural solutions in southern Gaza.

Overall Objective

To contribute to more sustainable water and agricultural practices in the Gaza strip through reducing land-based sources of marine pollution.

Target group

- Farmers
- Farmers Families
- Al Mawasi Community
- Municipal Wastewater Treatment Staff
- Casual Agricultural Laborers
- Rafah Community

Outputs (x 5)

Output I

200 dunums of productive agricultural land have been irrigated by reuse of TWW through an innovative and sustainable waste water treatment and irrigation system.

Status	Activity
Completed	• A comprehensive gender analysis was conducted in Al Mawasi to inform best gendered practices and the involvement of women of this Action
Completed	• 116 farmers (Total area: 200 donums) were selected from Al Mawasi area based on clear selection criteria and mechanism
Completed	• 116 farmers received training on waste water management, potential health and environmental risks of TWW and its mitigation measures, safe methods of TWW reuse
Ongoing	• Training course will be delivered to 50 of TWWP operators, engineers, and specialists on the practical aspects and applications of post-treatment filtration process

Outputs (x 5)

Output I

200 dunums of productive agricultural land have been irrigated by reuse of TWW through an innovative and sustainable waste water treatment and irrigation system.

Status	Activity
Completed	• Technical assessment of the WW Post Treatment Unit and drawing up of engineering designs were carried.
Completed	• Construction of post treatment unit was accomplished to improve the treated wastewater effluent quality to meet the requirements.
Ongoing	• Drip Irrigation System/networks for 200 dunums of agricultural lands will be constructed.

Proposed area
Targeted area by PECDAR funded by JICA
Main carrier line of treated wastewater 14" aqueduct
Location of post-treatment unit
Rafah wastewater treatment plant

Target Area

OXFAM

OXFAM

OXFAM

OXFAM

Outputs (x 5)

Output II

Wastewater re-use management has been institutionalized through development and activation of a legal framework and governance model that includes a sustainable and equitable tariff system

Main activity

Development of a legal framework for treated waste water re-use management and monitoring, to be endorsed by PWA as sector regulator

Status	Activity
Completed	• The legal framework for TWWR management and monitoring was devloped
Completed	• The water tariff system was estimated with 0.5 NIS and agreed with the farmers
Completed	• Roles and responsibilities of the administrative committee for WWRU were prepared and shared, the committee members (9) which represent (PWA,CMWU, MoH, MoA, EQA, NGOs, farmers, Rafah municipality)
Ongoing	• The socioeconomic and environment study (Baseline, end line) for the project has been carried
Completed	• Users committee for WWRU from Almawasi was established, the committee roles and responsibilities were identified according to the water users law

Outputs (x 5)

Output III

A monitoring and verification system for the full treatment and reuse cycle, from soil through to product quality monitoring, has been established and activated.

Status	Activity
Completed	• A monitoring and verification system was established for the waste water treatment and reusing.
Completed	• The environmental and health impacts of reusing treated waste water in agriculture were identified with all stakeholders in addition to the mitigation measures

Outputs (x 5)

Output IV

A replicable model for TWW re-use for agricultural irrigation has been developed and evaluated.

Status	Activity
Completed	• Exchange visit for Joint learning with stakeholders across West Bank on relevant issues of WW re-use for agriculture was carried
Planned	• OXFAM will participate in SWIM and Horizon 2020 for joint learning

Outputs (x 5)

Output V

Acceptance of using TWW for agriculture irrigation has been generated among farmers and consumers.

Status	Activity
Ongoing	• Workshops and meetings have been conducted with farmers to raise their awareness on reuse of TWW in irrigation
Ongoing	• Workshops and meetings have been conducted with farmers to raise their awareness on reuse of TWW in irrigation
Ongoing	• Mass media campaign to raise public awareness in waste water reusing issues

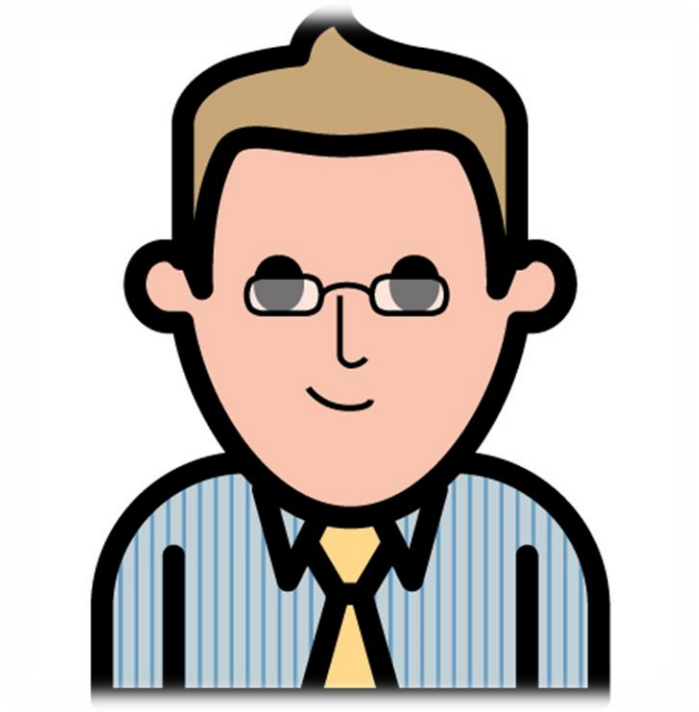
Challenges

- Gaza Blockade and GRM
- Fragmentation between Gaza and WB
- Mentality and culture of people in some areas
- Coordination with different stakeholders
- Lack of fund needed for the PV system

Lessons learned

- Project steering committee to ensure effective coordination
- Stakeholder analysis for the targeted community
- Suitability of the operation mitigation actions
- Alternative source of electricity
- Community engagement

Q & A



Many thanks