

# Sustainable Industrial Wastewater Management: the polluter-pays-principle and Clean Production practices in Palestine

POLICY BRIEF

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## Summary

- ❖ Measures to improve wastewater management in Palestine often overlook the impact and complexity of industrial wastewater. To date, most of industrial wastewater is disposed directly to the environment or sewers without proper (pre) treatment. This disposal often clogs or severely impacts functioning of centralized wastewater treatment plants and sewerage systems, and hampers wastewater reuse. This leads to uncontrolled discharge of industrial wastewater into Transboundary Rivers, and elevated tax payments to neighbours.
- ❖ The promotion of sustainable industrial wastewater management in Palestine can be based on the applicability of Clean Production (CP) innovative treatment technologies. These include pre-treatment of mixed agro-food industrial wastewater, UASB for slaughterhouse wastewater, and enhancing governance of industrial wastewater management.
- ❖ The implementation and continuity of these technologies will depend on the social, economic, and political arrangements in place. Our governance assessment of the current wastewater management identified 4 aspects to consider for the implementation of such technologies in a systemic way.

## Introduction

Wastewater in the State of Palestine (SoP) is characterized by insufficient treatment of wastewater, and unsafe disposal of untreated or partially treated wastewater into wadis and seasonal streams (Samhan et al., 2011). In average, Palestine produces around 114.36 mcm of wastewater per year, from which approximately 68.52 mcm comes from the West Bank and 48.5 mcm from Gaza (Issac & Rishmawi, 2015).

Most of the wastewater monitoring corresponds to household connections to sewerage networks. The most recent environmental census indicates that 69.3 % of economic establishments in Palestine mainly use the domestic wastewater network and 17.7 % use porous cesspits to dispose their wastewater (Palestinian Central Bureau of Statistics, 2017). Currently, there is no official information on how much of this wastewater is attributed to agro-food industrial wastewater production

Little attention has been given to the production and treatment of wastewater by industries. Though separate sewerage networks serve few industrial zones in some urban centres, the majority of wastewater produced by industrial activities lacks adequate treatment and safe disposal. Untreated industrial wastewater in some districts, like Hebron or Qalqilia, is discharged into the municipal sewerage networks. In other areas it is collected separately and disposed into the environment without prior treatment (Samhan et al., 2011).

Industries like olive mills, dairy products, and slaughterhouses generate distinct types of wastewater. Current olive mills in Palestine can produce ca. 1.7 m<sup>3</sup> wastewater/ton olives, the discarded Zibar is high in organic loads, in contents of phytotoxic and antibacterial phenolic substances that usually resist biological degradation and damage the filter used for wastewater treatment (Shaheen & Karim, 2007). Dairy production generates wastewater high in BOD<sup>1</sup> (Biological Oxygen Demand) coming from milk fat, protein, lactose and lactic acid. The whey separated in the cheese making process (ca. 130 Kg/day) also produce high COD<sup>2</sup> load into the discharge. Slaughterhouses create large amounts of organic materials and nitrogen coming from cleaning agents.

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<sup>1</sup> BOD or Biochemical Oxygen Demand is a water quality parameter. It refers to the amount of dissolved oxygen demanded by microbial oxidation, at specific temperature and time period.

<sup>2</sup> COD or Chemical Oxygen Demand is a water quality parameter. It is used to indicate the consumption of oxygen by organic reactions in aqueous solution. It is an indicator of organic matter in water, as the higher the organic matter the lower the COD. In this sense, COD is commonly used to assess the influence of organic effluents on the environment.

The introduction of CP practices in industrial agro-food industries could represent an alternative to the current scenario. Cleaner production practices aim at using natural resources more efficiently, which ultimately translates into a reduction in the generation of wastes and emissions at the source. This is achieved by changing how raw materials, energy, and water are used for the development of industrial products. The implementation of cleaner production principles in Palestine has recently gained attention. Some of these include reuse of wastewater, minimizing milk spills, reducing raw material wastage and reusing waste in food industry factories (Nazer, Al-Sa'ed, & Siebel, 2006).

## Clean Production Strategies and the Polluter-pays-principle

### How is the polluter-pays principle (PPP) enacted?

Israeli settlements and on-going political struggle over the Occupied Palestinian Territory poses a scenario of complex implementation of the polluter pays principle. Israel controls the planning and permitting processes for new facilities, and restricts the movement of Palestinian people and supplies. In addition, there are accounts of Israeli military incursions damaging water and wastewater infrastructure.

Many Israeli settlements discharge their untreated wastewater onto Palestinian lands and wadis (McNeill, Almasri, & Mizyed, 2009; Samhan et al., 2011). Palestinian untreated wastewater flowing into Israel is treated in five Israeli treatment plants, and used in their agricultural sector. The cost associated with this treatment is charged to the PWA and deducted annually by Israel from Palestinian tax revenues. On this account, Israel deducted approximately 82 million NIS (ca. 22.5 mill USD, or 20 mill EU) from Palestinian tax revenues in 2015 (Issac & Rishmawi, 2015)

Internally, the State of Palestine has a comprehensive set of social norms and regulations that frame the principles guiding the use of natural resources (i.e. the polluter pays principle, in Law 7 1999), the transmission of these principles via organisational mechanisms (i.e. the development of EIAs, in Environmental Assessment Policy 2000), and the regulation and control of such mechanisms (i.e. fines due to polluting discharge into sewerages and the environment, in By-law governing house and facilities connection system to the public sewerage network 2013).

However, there is still need to align social norms in a structural way. Not all norms and regulations are known and enacted by authorities in charge if implementing them. Furthermore, there is perceived overlap and ambiguity in the current set of environmental laws, as identified in workshops with relevant actors.

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*There needs to be a mandated periodical revision, update, alignment, and dissemination of existing norms among relevant actors*

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### What are the main challenges in the implementation of the PPP?

- ✓ Internal political struggles hamper the implementation of the current industrial water normative framework. During the focus group discussions, the internal political division between Hamas and Fateh parties was highlighted. This situation enhances difficulties for laws

to be passed and implemented appropriately as the political division leads to slow or no legislative progress in the Palestinian Parliament.

- ✓ Different types of industries need specific treatment strategies, therefore designing one that tackles the necessities of all industries currently does not exist and might not be fully feasible. The existing wastewater treatment plants (WWT) do not have the capacity to treat all types of discharge coming from different (industrial) sectors. Additionally, they are not running at full capacity or lack the necessary technology to do so.
- ✓ Different legal instruments aim at controlling, monitoring, and overseeing discharge and discharge sites. However, these legal instruments do not contemplate the diversity of industries and discharge types, and there is a lack the personnel and resources for law enforcement. Responses coming from the surveys and the focus group discussion highlighted the lack of trained professionals to monitor and enforce the current legal wastewater framework in the different WWTP of the catchments of study.
- ✓ Since installing decentralized pre-treatment carries additional costs (at times far larger than the income of these industries), some industries defer from making their processes cleaner. The implementation of advanced technologies for high capacity wastewater treatment implies a cost-benefit ratio that does not match the relatively reduced flows of small-scale industries.
- ✓ Another issue is physical location of factories and warehouses. Most of them are located in or near domestic areas. This bundle of different users leads to mixing of domestic and industrial discharge in the sewer networks, which consequently clogs main and secondary pipes. Environmental conditions also add-on to this scenario, because prolonged dry periods diminish the water availability, affecting the system as a whole.

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*Given the multiplicity of actors affected by and affecting the implementation of the PPP in Palestine, it is pivotal to jointly define the specific wastewater challenge to tackle. This definition needs to contemplate the diversity of issues and assign particular attention to actors that would implement the CP solutions.*

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## How to encourage the implementation of CP practices and shift the wastewater management?

The Palestinian Water Authority and the Environmental Quality Authority are the *principal actors* - acknowledged by all sectors as the normative and controlling entities of water and wastewater management. To ensure continuity in the implementation of the normative given by these actors, the wastewater management sector needs to be institutionalized in a bottom-up approach. Specifically, more attention (i.e. financial resources, management settings, and capacity development) should be given to the roles and responsibilities of municipalities. Municipalities constitute, in many cases, the first line of governance action in Palestine, therefore channelling the implementation of CP measures through this governing authority could render positive results.

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*The wastewater management sector needs to institutionalize a bottom-up approach, where more attention should be given to the roles and responsibilities of municipalities.*

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### Who should promote this shift?

Promotion of formal and informal points of interaction for all actors could render positive scenarios of interaction for CP implementation measures. An alternative could be **a high-level steering committee for wastewater management in Palestine**, which could build upon past experiences and be the link between the distinct actors in the wastewater management scenario of Palestine.

This steering committee should be composed of all relevant actors, including industry representatives, municipalities, EQA, PWA, ministries, and donors.

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*Create/promote a formal setting of interaction for all relevant actors, such as a high-level steering committee for wastewater management in Palestine.*

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### Recommendations

1. It is fundamental to establish a joint definition of the specific problem to tackle. This definition needs to contemplate the diversity of issues and assign particular attention to actors that would implement the CP solutions;
2. There needs to be a periodical revision, update, alignment, and dissemination of existing norms among relevant actors;
3. The wastewater management sector needs to institutionalize a bottom-up approach, where more attention should be given to the roles and responsibilities of municipalities.
4. Create/promote a formal setting of interaction for all relevant actors, such as a high-level steering committee for wastewater management in Palestine.

The implementation of these four main points of action would begin to address the identified governance barriers for the successful and sustainable implementation of CPs in Palestine by providing a common understanding among actors of the issue at hand, which would be supported by adequate institutional and organizational set-up at the appropriate levels of action.

### Recommendations

The production of this policy brief stems from the document “Promotion of Applied Integrated Practices and Technologies for Sustainable Industrial Wastewater Management in three Watershed Areas in Palestine”. Both were funded by the Palestinian Dutch Cooperation Program (PADUCO 2)