

# Sustainable Sludge Management in Jordan

## Unlocking the potential of sludge in Jordan

### The challenge

In Jordan, more than 105,000 tons of dried sewage sludge were produced in 29 wastewater treatment plants in 2020 and are expected to increase to up to 139,000 tons per year by 2035. Most of these quantities are either stored and dumped onsite or transported to unsanitary landfills. This unsanitary storage and dumping of sludge does not only affect the quality of surface and ground water but also causes high GHG emissions due to the high methane formation during biodegradation. In addition, this approach is a waste of energy and material resources, and it involves high disposal costs that range between 2.00 and 8.00 EUR/m<sup>3</sup>.

The use of sludge has been considered mainly for agricultural purposes – which was faced with social and cultural reservations – as well as being used for biogas production – which does not reduce sludge quantities significantly nor valorize the material resources in sludge.

Project name	Sustainable Sludge Management
Commissioned by	German Federal Ministry for Economic Cooperation and Development (BMZ)
Project region	Jordan
Political Partner	Ministry of Water and Irrigation (MWI), Water Authority of Jordan (WAJ)
Duration	2020 – 2024

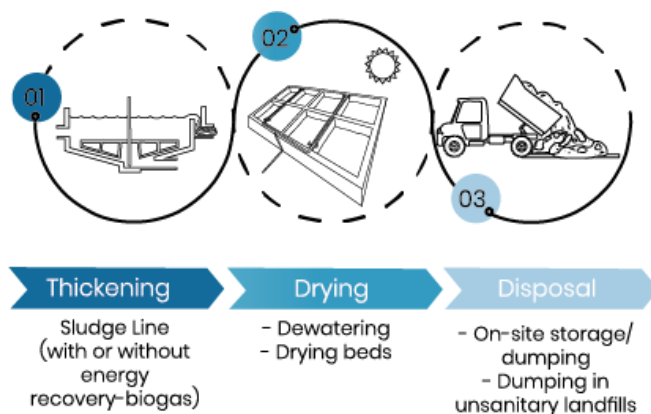
### Our approach

The project aims to improve the economic and ecological sustainability of sludge management in Jordan through the deployment of technology-based upcycling solutions such as pyrolysis and pelletizing. This would allow the valorisation of treated sludge as an alternative energy carrier/ industrial fuel, industrial raw material, or as compost additive.

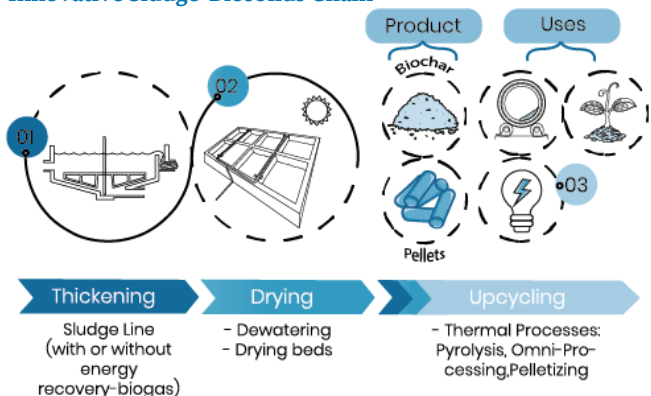
The Project supports water utilities in increasing the economic efficiency of these applications by ensuring the marketability of new sludge products, encouraging private sector participation, developing and stabilizing distribution channels to open up national and international markets, and generating revenues that ensure economic sustainability.

Fostering an enabling environment for the use of new sludge products will be ensured through joint decision making and action by various stakeholders, creating legal foundations (e.g. standards, regulations or guidelines) for the production and use of products,

### Conventional Sludge-Biosolids Chain



### Innovative Sludge-Biosolids Chain



Left: Sludge Drying Beds in a wastewater treatment plant

Right: Stockpiling of sludge in a wastewater treatment plant



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*Left: One of the meetings with stakeholders to review recommendations*

*Right: Storage area of sludge in a wastewater treatment plant*

mobilising international know-how, and running positive awareness campaigns about sludge products and their uses.

The concept of Sustainable Sludge Management will be applied in three locations where the highest economic and ecological feasibility is proven. The project will support designing and operating test facilities (prototype/s) to obtain information on the optimum operation settings for useful product configuration and to work towards developing recommendations for the standardisation of sludge products.

## Impact in Figures

A Mapping Study has been developed by the Project to understand the quality and quantity of the generated sewage sludge in the country, considering seasonal changes, current sludge management practices, forecasted population increases, as well as future expansion projects for wastewater treatment plants. This study is considered a cornerstone for the project as it allows for more well-informed decisions that would support the MWI and WAJ in sludge management related plans.

Furthermore, a rigid feasibility study has been also developed to define suitable treatment technologies and processes that could unlock the potential of treated sewage sludge and allow for further uses of treated sewage sludge in agricultural and industrial sectors. Solar greenhouse drying, pelleting and pyrolysis have been among the technologies which have been considered for the Jordanian context. The project aims to utilise its results as well as prototypes to better understand the expected quality of the new products and implement highest ranked options to attain useful products from selected locations.

The project has been engaging with various stakeholders relevant to the use of treated sewage sludge in Jordan, to develop sound recommendations for the standardisation of treated sewage products based on expert knowledge and international references.

## Impact in Faces

With the increase in population and limited land availability, the water sector has been working to find adequate solutions to manage the challenges of the increasing generated sewage sludge.



Eng. Wael Dweiri, Assistant Secretary General to Wastewater Affairs of Water Authority of Jordan (WAJ), expressed his gratitude for the project's continuous support and described that it has supported WAJ in creating a solid understanding of the seasonal generated quality and quantity of sewage sludge from wastewater treatment plants, and suitable technologies that could solve one of the sector's major issues, which allows for better planning and decision-making.

The project is implemented in the context of the “**German Climate Technology Initiative**” (Deutsche Klime – und Technologieinitiative, DKTI). The initiative promotes the dissemination of climate technologies in emerging economies and developing countries – linking climate protection, sustainable development, and poverty reduction. The initiative aims at transforming to a low – carbon economy and contributing to the achievement of the 2-degree climate goal. In addition, the initiative also focuses on mobilizing economic potentials for climate technology.

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