التعاون الألماني
DEUTSCHE ZUSAMMENARBEIT

Implemented by:

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

In cooperation with:

Ministry of Water & Irrigation
وزارة المياه والري

WATER AUTHORITY

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 (DS 100%) were produced in 29 wastewater treatment plants in 2020 and are expected to increase to up to 139,000 tons per year of dried sewage sludge (DS 100%) 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, where for Muta Mazar WWTP, the unit cost of transporting 1m³ of sewage sludge @40% DS to the nearest dumpsite is 22.33 EUR.

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 remaining material resources in sludge.

Project name	Sustainable Sludge Management
Commisioned 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

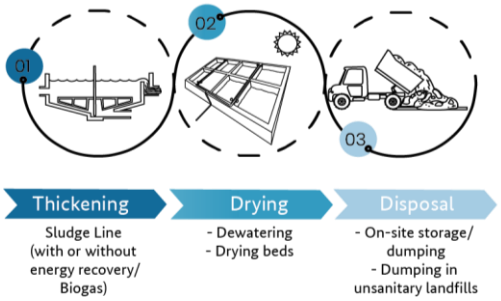
Our approach

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 pelleting. This would allow the volarisation of treated sludge as an alternative energy carrier/ industrial fuel, industrial raw material, or as compost additive.

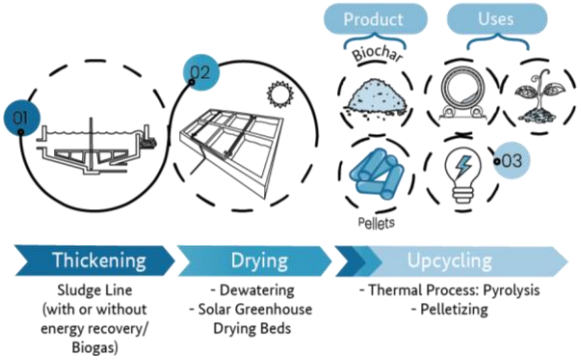
The Project supports water utilities in increasing the economic efficiency of these applications by ensuring the marketability of new sludge products, encouraging private sector participation, developing and stabilizing distribution channels to open up national and international markets, and generating 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, mobilising international know-how, and running positive awareness campaigns about sludge products and their uses.

Conventional Sludge-Biosolids Chain



Innovative Sludge-Biosolids Chain



Left: Sludge Drying Beds in Wadi Mousa Wastewater Treatment Plant

Right: Stockpiling of sludge in Muta Mazar Wastewater Treatment Plant

Contact person

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

Right: Storage area of sludge in As-Samra Wastewater Treatment Plant

The innovative sludge-biosolid chain (inlc. Greenhouse drying, pelleting and pyrolysis) will be applied in Muta Mazar WWTP where the highest economic and ecological feasibility has been proven. The project is supporting the 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

The Project has developed a Mapping Study to define quantity and quality of generated sewage sludge in the Kingdom. This paved the way for continuous development of a sturdy database to achieve a well-rounded profile of sludge. Moreover, a Feasibility Study has been developed to define suitable treatment technologies and processes to unlock the potential of reusing treated sewage sludge. Such technologies include Solar greenhouse drying, pelleting and pyrolysis. A demonstration of a real operation for the three technologies in Muta Mazar WWTP, will provide evidence that feeds into decisions on the future design of national sewage sludge management strategy.

The project has also developed three (3) sound recommendations for the standardisation of treated sewage and its reuse in land application, as an alternative fuel source and as a Biochar product.

Based on intensive market assessments, the project has been able to define short-, medium- and long-term strategic models to capitalizie the reuse of treted sewage sludge considering required actions to be taken by the MWI and WAJ. As a first step, the water sector has included the construction of Solar Greenhouse Drying technologies in two (2) of its WWTPs.

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:

"The project 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 Klima- 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 mobilising economic potentials for climate technology.

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