



# EPoNa – Upgrade of Wastewater Ponds in the North of Namibia

## Future-oriented Technologies and Concepts to Increase Water Availability by Water Reuse and Desalination – WavE

The high population growth in many African cities leads in many places to the overloading of the pond systems, which were built for the treatment of the wastewater. However, insufficiently treated wastewater carries health risks for humans and animals. At the same time, the cities are confronted with the problem of water scarcity as droughts may last often more than nine months. As a result, it is impossible to grow enough forage crops for feeding the animals. The joint research project „EPoNa“ therefore addresses the question, how wastewater pond systems in Africa can be rehabilitated and upgraded with simple means, so that irrigation water for fodder plants is available all year round. The project participants want to develop techniques to increase the capacity of the overloaded pond systems. At the same time, methane emissions are to be reduced, the quality of the discharge improved and the nutrients contained in the water and sludge used as fertilizer for the crops. Special attention is paid to questions of profitability as well as the social and ecological impacts.

### Opportunities Resulting from Reuse

The wastewater ponds constructed in the city of Outapi in the north of Namibia more than twelve years ago are an example of wastewater treatment of many African cities: Problems, such as overload and insufficient management, result in the inadequate processing of the wastewater. During the rainy season, the discharge of the ponds is in direct contact with the flood waters of the Oshanas, a widely branched floodplain. This leads to the contamination of the water and, hence, to health risks by the uncontrolled spread of pathogens. Municipalities and superior management structures in the region are lacking technical and operational know-how to adequately maintain, refurbish and upgrade such pond systems. Proper operation of wastewater ponds, however, would allow for the reuse of water as irrigation water all year-long. In addition, the nutrients contained in the water and sludge can be used to fertilize the crops. Hence, water reuse especially in dry rural areas is an important alternative to adapt to the impacts of climate change. Moreover, successful treatment of wastewater leads to a drastic reduction of the pollution in the floodplains and decreases health risks caused by pathogens.

### Plant of Model Character

When the wastewater ponds were built in Outapi, the town had about 4,000 inhabitants. Only few of them were



Sampling for water quality analysis in the sewage pond.  
Photo: Jochen Sinn

connected to wastewater system. Meanwhile, more than 5,000 inhabitants use the sewage system in the ever-growing city. The ponds are now overloaded and muddy, and the water surface is covered with algae. Methane bubbles up and is released into the atmosphere. The originally built evaporation pond frequently runs over. As a result, the wastewater is only insufficiently treated. The aim of EPoNa is to demonstrate an exemplary refurbishment, extension, and upgrade of the wastewater ponds to a production plant for irrigation water in Outapi. For this purpose, new, close-to-practice technologies will be developed.

## Education and Training of Local Actors

The project partners from research and industry are investigating various methods of wastewater pretreatment, one being an anaerobic biological process, the other mechanical fine screening. Guide walls in the ponds are intended to improve the flow. A discharge filter is installed to enhance water quality in terms of solids and algae retention and hygienic characteristics. In addition, a robust irrigation technology is to be developed. Education and training of the local actors and establishment of proper management structures will ensure sustainable operation of the systems. The results thus obtained are to be made available to the public.

The model measures can be transferred to both, neighboring municipalities in the north of Namibia, and other parts of the country. There is also great demand in other countries in Africa and the Middle East where wastewater ponds are used and irrigation water is needed. Future projects could further optimize this process, using water from wastewater ponds for irrigation and production of hygienically safe plant foods.



Cattle on the way to the waterhole. Photo: Jochen Sinn

### Funding Action

Future-oriented Technologies and Concepts to Increase Water Availability by Water Reuse and Desalination (WavE)

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EPoNa – Joint Research Project: Upgrade of Wastewater Ponds to generate Irrigation Water, using the Cuvelai-Etsha-Basin in Namibia as an Example

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### Project Partners in Namibia

Ministry of Urban and Rural Development (MURD)  
Ministry of Agriculture, Water and Forestry (MAWF)  
Outapi Town Council (OTC)  
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