Sector	Water
Sub-sector	Water supply and sanitation
Technology name	Water treatment
Option name	Water reclamation and reuse
Scale	Large-scale
Availability	Available
Technology to be included in prioritization?	Yes

Background/notes

This technology, an integrated approach that is gaining acceptance, is to consider municipal wastewater as a vital resource for appropriate applications, including agricultural and other irrigation, industrial and domestic uses. This practice is called water reclamation and reuse and is an example of an Environmentally Sound Technology because it protects the environment, results in less pollution, utilizes resources in a more sustainable way, allows its waste and products to be recycled, and handles residual wastes in a more acceptable manner than the technologies for which it substitutes.

It focuses on applications of water reuse that directly affect drinking water supplies. It is important to note that agricultural use accounts for the majority of freshwater consumption worldwide.

A number of sustainable and safe approaches include:

• Substituting reclaimed water for applications that do not require potable water;

• Augmenting existing water sources and providing an additional source of water supply to assist in meeting both present and future water needs;

• Protecting aquatic ecosystems by decreasing the diversion of freshwater, as well as reducing the quantity of nutrients and other toxic contaminants entering waterways;

• Postponing and reducing the need for water control structures;

• Complying with environmental regulations by better managing water consumption and wastewater discharges.

Water reclamation and reuse approaches utilize the same treatment technologies as conventional wastewater treatment, including secondary clarifiers, filtration basins of various designs, membranes, and disinfection basins.

Advantages of the technology:

Technology can help to store and use water during low water periods and, therefore, increase water use efficiently as the system collects water from the nearby area and keeps it from flowing into rivers or other areas or from evaporating.

Disadvantages of the technology*:*

There are a number of socio-political barriers that often limit successful implementation of water reclamation and reuse programs. In many cases, public opposition to the use of reclaimed water for any application to which humans might be exposed (especially for potable reuse) can hinder progress.

Lack of communication and collaboration between stakeholders is also another significant socio-political barrier to water reclamation and reuse programs. The first step in the design and implementation of water reclamation and reuse initiatives should be to identify these institutional gaps and to forge the necessary links among agencies.

Implementation assumptions (How the technology will be implemented and diffused across the subsector)	Among a number of other predictions made by the Intergovernmental Panel on Climate Change, it is anticipated that climate change will lead to increased periods of drought, reduced freshwater storage, and sea level rise. Such changes can have drastic impacts on both the quantity and quality of the world's water resources. However, water reclamation and reuse approaches can and have been shown to be effective for adapting water resource management in the face of such stressors. Most importantly, water reclamation and reuse contributes to climate change adaptation by allowing water resources to be diversified and conserved. Using reclaimed water for applications that do not require potable water can result in greatly decreased depletion of protected water sources and prolong their useful lifespan. In addition, reclaimed water can be applied to permeable land surfaces or directly injected into the ground for the purpose of recharging groundwater aquifers and preventing saline intrusion in coastal areas.

Impact statements (How the options impact countries development priorities)	
Countries social development priorities	• Contributes to increasing water availability • Leads to improved living standards of population and sanitation
Countries economic development priorities	The water and nutrients that can be recovered from wastewater are simply too valuable to waste in areas where resources are limited. For this reason, it is very common for farmers in developing countries to supplement their crop irrigation supplies with wastewater. In fact, except for a handful of cases where applications such as natural filtration systems for water reclamation259, sewage reclamation for industrial uses, or direct potable reuse have been implemented, almost all water reclamation and reuse in developing countries is dedicated to agricultural irrigation. Not only does this practice increase the volume of water available for crops and utilize the nutrients in wastewater in a beneficial way, it also contributes to greater quality of human life by increasing household water availability.
Countries environmental development priorities	• Reduces use of drinking water from centralized system for other purposes • Reduces health and environmental issues related to lack of sanitation
Other considerations and priorities such as market potential	Treated water can be used in different areas of economy.
Costs	
Capital costs over 10 years	The financial requirements for implementing water reclamation and reuse programs will vary significantly based on the type of application that is planned for the reclaimed water. The approximate costs for application of pilot project will be around 60,000–80,000 USD.
Operational & maintenance costs over 10 years	Operational and maintenance costs will be around 20,000-25,000 USD per year.
Other costs over 10 years	Additional costs (around 50,000 USD over 10 years) will be needed to provide necessary capacity building activities.