Lessons Learnt

Managing Wastewater through Global Partnership: Demonstration Projects
Introduction

When not managed properly, wastewater can cause serious damage to ecosystems and economies. Pathogens in wastewater are harmful to human and ecosystem health. Wastewater-related emissions of methane and nitrous oxide contribute to global warming. The excess of nutrients in wastewater is causing increasing risk of hypoxic dead zones in coastal areas, with the potential to harm fisheries, livelihoods, and the food chain.

The risks posed by inadequate treatment of wastewater have been increasingly recognised by the international community in recent years. The Sustainable Development Goals, which were adopted by the UN General Assembly in 2015, include a specific goal (6) focused on ensuring clean water and sanitation for all. Within this goal, Target 6.3 states:

“By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally”

The indicators that will be used to assess progress towards this goal are the proportion of wastewater safely treated and ambient water quality.

There are organisations and individuals worldwide working tirelessly to address these issues, and meet the targets laid out in the Sustainable Development Goals. In many cases, they have even managed to transform the burden of wastewater into an opportunity—using treated wastewater for agriculture in water-stressed zones, utilising sludge as a fertilizer, and generally shifting the discussion so that wastewater can be recognised as a valuable resource.

The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) is an intergovernmental mechanism that aims to protect the coastal and marine environment from land-based activities. The GPA Manila Declaration (2012) gave the GPA a renewed mandate, agreeing that the priority source categories for this period would be wastewater, nutrients and marine litter and mandated a focus on developing global multi-stakeholder partnerships in these three priority areas, the Global Partnership on Nutrient Management, the Global Partnership on Marine Litter and the Global Wastewater Initiative (GW²I).

The wastewater programme is designed to implement the Global Programme of Action for the Protection of the Marine Environment from Land Based Activities program of work, approved through the Manila Declaration, at its Third Intergovernmental Review Meeting (January 2012). The wastewater programme seeks to prevent further degradation of the marine environment from wastewater through approaches that recognize wastewater as a resource and highlight strong linkages between ecosystem services and human wellbeing.
The number of projects that aim to address the impacts of wastewater is growing rapidly, and it is important to share the lessons learnt from previous projects to emulate their successes and avoid their pitfalls. This document was created to provide an opportunity for GPA Wastewater partners to share their stories, and for designers of future projects to build upon what they have accomplished and maximise their potential for success in the future. The following are the components under which the work areas fall including the wastewater demonstration projects.

Component 1: Strengthening the normative basis for managing and monitoring the impacts of wastewater on the marine environment

This component focuses on raising awareness and provides guidance and tools to policy and decision makers and stakeholders on sustainable wastewater management practices. The tools and Guidance documents developed and shared (tailored technologies, supportive policies and as well as, innovative financial mechanisms) help to build the basis for enabling environment in member states for a better wastewater management and reuse, considering it as a resource. In pursuit of this, several documents and tools have developed for stakeholder audiences to enable informed decision making at all levels have been developed and shared.

Wastewater Management and Pollution Loads Assessment in Coastal Cities of PERSGA Region

In September 2013, the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA) and UN Environment signed an agreement on wastewater management where UN Environment contributed USD 200,000 towards the project. The purpose of the agreement was to demonstrate and provide appropriate tools for: (i) protection of the coastal communities and the coastal and marine environment in PERSGA region from adverse effects associated with municipal wastewater discharge; and (ii) effective exploitation of the scarce freshwater resources through treatment and minimising losses of freshwater and treated wastewater.

The Red Sea and Gulf of Aden are home to unique and highly biodiverse coastal and marine ecosystems, including coral reefs, productive fisheries, and internationally important populations of turtles, dugongs, and birds. Rapid development and economic growth in the region provides many benefits for residents, but can also place significant stress on these valuable resources. One of the main challenges is the continued discharge of sewage and industrial wastewater into coastal environments. In response to this pressing issue, PERSGA has created a regional Wastewater Management Task Force with the financial support from UN Environment. The main goals of this task force are to demonstrate and provide appropriate tools for protection of coastal communities and the coastal and marine environment in the PERSGA region from adverse impacts associated with municipal wastewater discharge and for effective exploitation of scarce freshwater resources through treatment and reuse. Two outputs of the project are the documents:
Wastewater management Guidelines in the Red Sea and Gulf of Aden Region, and a Manual of Monitoring Wastewater Impacts on Coral Reefs. The guidelines document was targeted towards intermediate wastewater managers and establishment of wastewater treatment plants in the region. The manual for monitoring advocates for and provides guidance to communities interested in participating in environmental monitoring activities. It proposes a “Citizen Science” approach to monitoring and identifies indicators for monitoring the impacts of wastewater pollution in coral reefs. Within the manual are five modules that teach a process-based approach to problem-solving.

Each module contains a section for trainees, and support for training of trainers that can be adjusted by national level trainers to reflect conditions on the ground. PERSGA hopes through this manual to achieve harmonised national monitoring programs that pour into a regional program. The larger aim is to provide necessary information for stakeholders and policy makers involved in marine and coastal resource management and promote reliance on scientific data as a basis in planning and strategies.

The project took an innovative approach to identifying and relying on local specialists, and to engaging with cutting edge research institutes such as the Water Desalination and Reuse Centre at King Abd Allah University of Science and Technology at one end and with the local communities at the other. This carried over through through various stages of data collection. By simplifying the science, they have made it possible for any interested stakeholders to get involved, regardless of their specialisation or level of education. This focus on community engagement will contribute to long-term sustainability of the project, as will their emphasis on inclusiveness and sharing of ideas throughout the region.

In many ways, this project also contributed to realisation of the Sustainable Development Goals. First, the manual aims to address Goal 6 on sustainable water and sanitation for all. Goals 6.6 and 6.3 are particularly relevant- Target 6.3 includes the requirement that water quality be improved by 2030 and target 6.6 includes the requirement that water-related ecosystems be
protected and restored by 2020.

In addition, the project supports Goal 14, to sustainably protect and conserve oceans, seas and marine resources. In its quest to reduce coastal and marine pollution from wastewater, and to identify strategies for taking care of coral reefs in the Red Sea and Gulf of Aden, this project is directly working towards that goal. Targets 14.1 and 14.2 are particularly well met- Target 14.1 requires that marine pollution of all kinds be significantly reduced by 2030, and Target 14.2 requires that marine and coastal ecosystems be sustainably managed to avoid significant adverse impacts.

Throughout this project, PERSGA has taken very seriously their commitment to regional engagement and sharing of best practices at all levels, and the results have been very positive. Multiple regional and national level workshops have provided a valuable platform for exchanges of ideas. This has helped to address the challenges of creating guidelines that are suitable for all countries within the region, as conditions vary and countries have different capacity for wastewater treatment, but by creating a space for collaboration and support, it becomes easier to face those challenges than it would be independently.

Stakeholders were consulted and engaged with at all levels throughout the project, and because of this the objectives were successfully met. There were some unexpected challenges to completing the project in some locations because of the current political climate, particularly in Yemen, but in general, the long-established and respected reputation of PERSGA in the region meant that they could collaborate effectively across local and regional contexts.

Component 2: Managing the Global Wastewater Initiative

Through the Global Wastewater Initiative (GW²I), which is a voluntary multi-stakeholder partnership, the wastewater programme is working with its partners to address wastewater-related issues, prompt coordination and encourage investments in wastewater management as well as working towards having wastewater viewed as a valuable resource instead of a waste product.

The Global Wastewater Initiative exists to promote good wastewater management practices and shift the conversation around wastewater so that it may be viewed as a potentially valuable resource rather than a burden. The voluntary network of stakeholders has an international steering committee and secretariat, both of which are hosted by UN Environment and the Global Programme of Action for the Protection of the Marine Environment from Land Based Activities. The current chair is the Turkish water Institute with UN Habitat as the co-chair.
There are four components through which the Global Wastewater Initiative implements their objectives: addressing data gaps and trends and generating knowledge; capacity development and training; promotion of best practices, technologies, and successful policies; and awareness raising and communication. These are carried out through a combination of publications, collaborative research projects, demonstration projects, and other forms of technology and knowledge transfer.

One of the main challenges the Global Wastewater Initiative has faced since its inception is the lack of a formal mechanism for obtaining funds. The pillars of the project are well defined, but it has been difficult thus far to ensure the broad participation of as many stakeholders as possible in development of tailor-made solutions for each region and locality. To address this issue, the Caribbean Regional Platform and Asian Regional Platform have been created, and though they are still in their early stages, it is expected that this will help to raise the level of engagement among more closely related stakeholders in their regionally specific contexts.
Caribbean Regional Platform of the Global Wastewater Initiative

In October 2016 a regional platform for the Global Wastewater Initiative was launched in the Caribbean. The purpose of this platform is to bring together potential partners to discuss aspects of joining the platform and to identify priorities for the Caribbean. It further aims to promote outreach and advocacy among wastewater partners through distribution of documents and organisation of activities for World Water Day focusing on wastewater. South-South cooperation and sharing of expertise, experience, and information is important to continued development in the Caribbean. The Caribbean Regional Platform is working to strengthen networks between partner institutions, but this is a challenge that will require financial and technical support in the future.

Initial funding for the platform has come from the UN Environment Programme and the Global Programme of Action for the Protection of the Marine Environment from Land Based Activities. In the future, they expect to collaborate with UN Environment Jamaica and the Caribbean Regional Fund for Wastewater Plus project to leverage resources for wastewater management from the Global Environment Facility, and liaise with the Pan American Health Organisation to support wastewater activities in the Caribbean from a health and sanitation perspective.

The current coordinating group for the Caribbean Global Wastewater Initiative Platform is the Caribbean Water and Wastewater Association. The Caribbean Water and Wastewater Association recently hosted a training course for wastewater operators from eight Caribbean Countries that was very well received. The interactive sessions covered topics ranging from the health impacts of wastewater to the potential impacts of climate change and extreme weather conditions on design and maintenance of wastewater treatment facilities. Trainings of this type
are a valuable way to support technical development and knowledge sharing among professionals working on wastewater management throughout the region.

Component 3: Promotion & Demonstration of Wastewater Treatment Technologies

This component focusses on supporting partners in the implementation of wastewater demonstration projects. The aim is to showcase and, later scale up the experience sharing and technology transfer where the need arises, considering the coverage of the systems and the adequacy of the technologies to the specific circumstances of the sites. The successful completions of these projects form good wastewater management practices whose standards and guidelines if adapted to local conditions help protecting public health, as well as the environment.

Demonstration of decentralised wastewater projects in non-sewered areas of Dar es Salaam

BORDA Tanzania, UN Environment, UN Habitat

A project aiming at the construction of decentralized wastewater treatment systems and transferring knowledge and lessons learnt to water experts is currently underway in Dar es Salaam, Tanzania. The project is considering improving the regulatory framework and developing technical standards for proper wastewater treatment in Tanzania. It is a collaboration between UN Environment, the Tanzanian government, the Bremen Overseas Research and Development Association (BORDA) and UN Habitat where UN Environment is contributing USD 100,000 to the project.

Dar es Salaam’s population of 4.36 million (2012 Census) is growing at the annual rate of 6.63% (UN-HABITAT, 2014), meaning that the population will more than double within the next ten years. Currently less than 6% of the city is connected to a public sewer network, and more than 50% of wastewater from these sewer networks is being discharged into the ocean untreated. The remaining 90% of the population use on-site sanitation options, with more than 90% of this wastewater being discharged via soak-aways into the ground, or into storm water drainage and rivers. This lack of wastewater treatment leads to groundwater contamination, public health risks and environmental degradation. The planned extension of the centralised sewerage network and installation of advanced treatment plants by the water authority is expected to increase coverage up to 30% within the next decade. However, the city continues to expand into the surrounding areas with new housing schemes that lack essential public services.

To address these challenges, the Bremen Overseas Research and Development Association designed a project to learn more about effective decentralised wastewater treatment technologies suitable for non-sewered areas of Dar es Salaam, showcase these technologies, and compile and share this information to support improvement of the associated regulatory framework.

The Bremen Overseas Research and Development Association team, in collaboration with local ministries, community based organisations, and participants in the kick-off workshop selected
twenty-two existing decentralised wastewater treatment projects across Tanzania to include in their preliminary monitoring and evaluation activities, which took place in two phases- one in the wet season and one in the dry season. Rigorous data was collected regarding the technical, social, financial and institutional performance of each project using a questionnaire and testing of wastewater quality. The methodology used by the Bremen Overseas Research and Development Association to evaluate local effectiveness of decentralised technologies builds on their experiences implementing similar projects in Indonesia, India, and several other countries in Africa and Southeast Asia.

The second output of this project was to host a series of workshops for urban planners, housing developers, and local authorities. These workshops both provided a platform for sharing knowledge and lessons learnt from the first phase, and encouraged integration of this information into development of recommendations for technical standards and guidelines specially tailored to the Tanzanian context. BORDA hopes that the information and guidelines they have shared will contribute to future scaling up and dissemination of the technologies found to be most viable and suited to the growing settlements around Dar es Salaam.

Globally, this project contributes to the realisation to SDG 6, ensuring adequate and sustainable water supply and sanitation for all. The promotion and facilitation of scaling up decentralised wastewater treatment technologies throughout Tanzania will contribute to achieving target 6.3, which is to halve the proportion of untreated wastewater and increase water recycling and safe reuse. Additionally, by working towards target 6.3, this project will also indirectly contribute SDG 3 and SDG 5. SDG 3 is the goal related to healthy lives and wellbeing, and scaling-up of decentralised wastewater treatment solutions will improve environmental sanitation conditions, which will lead to less outbreaks of waterborne diseases. Furthermore, the project will address SDG 5 on gender equality. Women and children are disproportionately affected by a lack of access to water; sanitation and hygiene, so facilitating the scaling up of sanitation solutions will
provide significant benefits to women and girls. Finally, SDG 11 is to make cities and human settlements inclusive, safe, resilient, and sustainable. Conventional water and wastewater treatment systems have been unable thus far to meet these goals, and so decentralised wastewater treatment systems provide an opportunity to fill in the gaps, particularly in urban and peri-urban areas.


UN Environment and the Global Programme of Action for the Protection of the Marine Environment from Land Based Activities play an important role in projects such as these by advocating for, promoting, and disseminating the outcomes of the project through multi-stakeholder platforms such as the Global Wastewater Initiative. This provides a valuable space for numerous global agencies to come together and discuss issues and solutions relating to wastewater management - ultimately bringing wastewater and sanitation to sustainable development discussions and increasing global awareness on a topic that has been previously ignored.

Korea Forest Service Projects

In an exciting example of what can be achieved through collaboration, four (4) demonstration projects in Benin, Ethiopia, Morocco and Ghana have been fully funded by Korean Forest Services, and are currently under implementation. This project began in the Law Division of UN Environment, and gradually grew to include the Marine and Coastal Ecosystems Branch of the Ecosystems Division and the Regional Office for Africa. The successful cooperation that started with this project has led to an effective and mutually beneficial working relationship on forests, including biodiversity conservation, reforestation, reuse of wastewater and energy. The project entitled “Biodiversity Conservation and Local Community Development through Tree Planting” is a pilot initiative developed by UN Environment with funding from the Korean Forest Service (KFS) to
combat the alarming rate at which desertification, land degradation and biodiversity depletion is negatively affecting the environment.

This initiative hopes to promote the rehabilitation and conservation of biodiversity by treating and using municipal waste water to irrigate tree plantations on degraded land. It is currently being implemented by four African countries namely: Benin, Ghana, Ethiopia and Morocco. The outcomes of the greenbelt will drastically enhance the urban environment by improving air quality, health, and the livelihood of communities. It is expected that the project will foster natural ecosystems at the sites, conserve biodiversity, provide fodder, improve urban greening and enhance urban air quality, health and livelihood of the fringe communities.

**Biodiversity Conservation and Local Community Development through Tree Planting – The Case of Morocco**

In Ouarzazate, Morocco, a demonstration project on “Biodiversity Conservation and Local Community Development; The Creation of Ouarzazate Green Belt Using Treated Waste-Water” is showcased the multifaceted benefits of using treated wastewater to support reforestation efforts. This community based project aimed to use municipal wastewater to irrigate degraded land for tree planting and to create a green belt around Ouarzazate city. The greenbelt now acts as a windbreaker and protects the city against strong winds and dust clouds, while also creating recreational spaces for the urban population. Benefits include an increased number of jobs for local people and access to public green spaces for residents of the city. Furthermore, it is an innovative way to raise community awareness and encourage public participation in the prevention of land degradation and biodiversity loss. The project has catalyzed action of local and national partnerships, and now the Regional Water and Forest Directorate is contributing both financial and technical support.

The plant, once completed in 2019, will contribute 18% to Morocco’s annual electricity generation. It will save the country 1 million Ton Oil Equivalent (toe) and 3.7 million tons of CO₂. The programme includes implementation of 5 solar power projects spread over an area of 10,000 hectares.

(Source, project 2017) (Source, Hunters for luck)
The Moroccan government claims that the project will sequester 3.7 million tons of CO$_2$, through increased soil fertility and storage of carbon in the soil, showing concretely the possibilities for synergy of both fighting climate change and meeting the Sustainable development goals at the same time. Non-traditional solutions, such as using solar energy to pump treated wastewater to these reforestation projects, should continue to be considered as unique and locally specific solutions to environmental challenges. This project has been put forth as a positive example of how to sustainably develop energy supplies while rehabilitating local environmental conditions and reducing waste.

The strong results shown in Morocco and the other countries have encouraged the governments themselves to contribute significantly to these projects, and as such the projects are expected to continue.

**Boye Wetland Biodiversity Conservation and Community Development**

Jimma Town is a regionally important population center in the Oromiya State of Southwestern Ethiopia. The Boye Wetland is adjacent to the town, and has been highly degraded due to inadequate waste disposal, poor watershed management, and encroachment by agriculture and human settlements. To address these problems and capitalise on the significant potential for ecosystem services from the wetland, the Ethiopian Biodiversity Institute designed a project to raise awareness of the importance of the wetland and restore degraded areas.

Stakeholders from the educational, environmental, agricultural, and governmental sectors were included in design of the project. Of particular importance, has been the partnership with Jimma University College of Agriculture and Veterinary Medicine. Because the university aims to support work on natural resources, agriculture, and environmental health in collaboration with the local community, the objectives of this project and those of the university were well aligned. The College of Agriculture and Veterinary Medicine therefore allowed university facilities to be used free of charge, which provided a significant benefit to the project. The Jimma Mayor has also
specifically named dealing with problems of waste in and around the city as one of his priorities, thus the local government is very supportive of the project.

Participants in the restoration activities came from three local Youth Development groups. By providing these groups with the necessary equipment and knowledge to rehabilitate the watershed and plan for more effective management of waste, the project has made a meaningful impact on the livelihoods of these young people. The youth development groups actively participated in surface dredging in the Boye wetland with the aim of restoring populations of fish, birds, and hippopotamus to the area. They hope that this will not only conserve local biodiversity but also attract tourists.

In addition, surrounding communities in the Boye Watershed area have expressed a desire to participate in wetland restoration efforts through the planting of indigenous tree species. To that end, ninety-seven kilograms of seeds were collected from eighteen indigenous tree species and the seeds were distributed to youth groups, primary schools, public stakeholders, and communities within the Boye Watershed.

The need for projects like this one is clearly great in the Jimma Zone of Ethiopia, and participants for all aspects of the project were eager and readily available. The high level of engagement among community members and other stakeholders provides a valuable opportunity for this project to continue sustainably, and to expand in the near future.

**Biodiversity Conservation and Local Community Development through Tree Planting**

*Environmental Protection Agency of Ghana*

The Sakumo Ramsar site in Ghana is in the Greater Accra Region along the coast between Accra and Tema. The wetland is important for migratory birds, and marine and freshwater fish species that provide a significant source of livelihood and income for local fishing communities. Because of its location between two urban agglomerations, the wetland is under pressure from pollution and encroachment.

Coconut trees planted using treated wastewater in Ghana (*Source: Project, 2017*)
The Environmental Protection Agency of Ghana has begun to act to protect the valuable resources of the Sakumo Wetland by leveraging partnerships with the Friends of the Ramsar Site and the Wildlife Division of the Forestry Commission. Through awareness raising and tree planting, the groups aim to rehabilitate the degraded lands and prevent future degradation. They have piloted a project to promote the reuse of treated wastewater in reforestation activities as a means of turning this former burden into a resource for local communities.

Monitoring and evaluation have also been a crucial part of demonstrating and ensuring the success of this project. In the pilot phase baseline surveys were conducted in three key areas to assess wastewater management, biodiversity of the area, and the impacts of degradation on the livelihoods of the farmers surrounding the Ramsar Site. Obtaining comprehensive information about the impacts of the project promotes sustainability by allowing partners to clearly describe and advocate for the value of these activities to all stakeholders. The Environmental Protection Agency of Ghana plans to continue conducting awareness raising activities and education around the country to support local livelihoods, control pollution, and conserve biodiversity in the future. The more engaged and aware the public is of these issues, the better the outlook is for the unique and fragile ecosystem of the Sakumo Wetland.

**Greenbelt Plantation Project in Benin**

*National Authority of Water, Forests, and Hunting of Benin*

Following several prolonged droughts and mounting concerns about deforestation and degradation in Benin, the government and other stakeholders have mobilised to create a large forested green belt in the North of the country. In addition to constructing the green belt, another objective of this project is to raise awareness in, and therefore gain the support of, local communities regarding the threat of deforestation. By using a combination of radio announcements, workshops and trainings, and consultation with local stakeholders, it was possible to incorporate the concerns and well-being of communities impacted by the green belt into all stages of the project.

*Local community awareness raising workshop on growing crops using treated wastewater (Source: Project 2017)*
Local riparian communities have been partners throughout implementation. They were trained and compensated for planting, maintenance, and monitoring activities, as well as protection of tree nurseries from fires and grazing. One challenge is the lack of clear legal land tenure in some of the areas slated for inclusion in the green belt. Wherever possible, farmers were compensated for their participation and use of their land. They were also not fully excluded from continued use of the areas during planting—some crops continue to be maintained alongside the seedlings. School children and women’s groups participated in nursery and reforestation work, and are expected to benefit from potential income generating activities in the forest, including production of honey and processing of agricultural products. This inclusiveness and consideration for the needs of local communities provides a valuable incentive for them to continue to support and protect the green belt, even after the project is completed.

Wastewater treatment in Benin (Source: project, 2017)

Another positive aspect of this project is that it does not exist in a vacuum. Since the UN Convention to Combat Desertification entered force in 1996, several projects have been implemented in Benin in accordance with their National Action Plan. In planning this project, those former activities were considered to avoid duplication and build upon existing structures and frameworks in the area. Local co-management groups already existed, and were used to recruit and organise participants in this project. Overall it has been a great success thus far. As is often the case with projects such as these, however, despite its success, there is always a feeling that more can—and needs to—be done.
Capacity Building in Wastewater Management - Antigua and Barbuda
Caribbean Environment Program

UN Environment CEP/ CrEW and the wastewater programme of the Global Programme of Action/ UN Environment are collaborating on a project entitled “Establishment of Small scale Water Reuse and Recycling Pilot Demonstrations for use in Agriculture”. The wastewater programme is contributing USD 30,000 to the project which seeks to promote treated wastewater reuse and recycling demonstration projects in Antigua and Barbuda and St. Vincent and the Grenadines for small farmer production systems. However, due to administrative challenges all activities are currently being implemented in Antigua & Barbuda. These demonstration projects are to provide an opportunity for training in water and treated wastewater reuse and recycling techniques and water use efficiency in small scale agriculture production, and also to explore opportunities for replication and/or upscaling within the pilot and other countries. Outreach and awareness raising of the potential for safe reuse of treated wastewater is an important aspect of this project.

In Antigua & Barbuda, there is Significant interest amongst stakeholders, good support for communications to promote the benefits and safety of water reuse, and to address the negative perceptions and human health and environmental risk concerns associated with the reuse of treated wastewater where the Environment Division is committed to developing a communications strategy to promote safe water reuse; There is increasing interest in water use efficiency and climate smart agriculture to increase the resilience of the small farmers to the impacts of climate change, particularly as periods of drought increase. This is especially so in the more arid islands such as Antigua & Barbuda where the benefits of water reuse are being recognized more.
Some of the challenges experienced include the absence of existing national policy and guidelines, legislation and regulations to guide and regulate water reuse, in Antigua and Barbuda a draft Wastewater Policy is in place, part of the newly passed Environmental Protection and Management Act but regulations are still being drafted. These regulations need to further identify criteria and conditions for water reuse and for what specific purposes; Difficulty obtaining data and information needed for design of appropriate wastewater treatment systems that also allow for water reuse; Need for early and continuous consultation with stakeholders to ensure understanding of the project and its benefits, to consider their concerns, and to clarify roles and responsibilities and the need for information on the cost of water reuse, existing and possible tariff structures, and existing drivers and incentives for water reuse projects.

**Component 4: Responding to global challenges on wastewater**

This component provides room for UN Environment to respond to global challenges, influences and actions on wastewater issues. It has provided the opportunity to collaborate with UN agencies and other global organizations and together raise awareness, build capacity and contribute to global processes.

At the global level, the wastewater programme in partnership with other agencies have collaborated to address global challenges, for instance, the inclusion of wastewater and water quality in the 2030 agenda for Sustainable Development, developing a Global monitoring mechanism for wastewater and water quality with the involvement of 7 UN agencies and the financial support from the Swiss Development Agency, and building capacity of member states on Safe Use of wastewater in Agriculture.

**United Nations World Water Development Report**

*United Nations World Water Assessment Program*

The World Water Development Report is produced by the United Nations World Water Assessment Programme of UNESCO. The World Water Assessment Programme coordinates the production of the World Water Development Report by writing several chapters of the Report and collaborating with several members and partners of UN-Water, UN Environment being one of them, for content development. Partnerships throughout UN-Water are essential; members and partners from across the UN provide thematic expertise to the publication every year.

Since 2003, the United Nations World Water Development Report has been an annual global report that provides a theme-based assessment of the world’s freshwater resources. Each year the report focuses on different strategic water issues, aiming to provide decision-makers with the tools to implement sustainable use of water resources. The report also includes regional aspects, hotspots, examples and stories, making the report relevant to a broad range of readers, at different levels and in different geographical areas. Although it offers a broad global picture, it focuses particularly on the situation in developing countries, where the need for better
infrastructure and water governance is highest. In recent years UN Environment, has contributed to topics that have included Wastewater as an untapped resource, water and jobs, water and energy, and water for a sustainable world.

Through effective promotion and consistent high-quality presentation of information, the World Water Development Report has become a well-known brand name in the field. There is an annual global launch event as a part of World Water Day, followed by almost thirty regional events that aim to increase international visibility of the report. This project is funded by the government of Italy, with contributions from subject matter experts across the United Nations, contributing to the goal of delivering as one organisation and building on knowledge and synergy between different agencies.

**Safe Use of Wastewater in Agriculture**

The Safe Use of Wastewater in Agriculture (SUWA) initiative, with partners Food and Agriculture Organization of the United Nations, World Health Organization, United Nations University – Institute for Water, Environment and Health, United Nations University Institute for Integrated Management of Material Fluxes and of Resources, UN-Water Decade Programme on Capacity Development and International Water Management Institute came together with the purpose of raising awareness about the possibilities for safe wastewater reuse in agriculture and other areas. Phase I was mainly centered around undertaking a capacity needs assessment project aiming at safe and productive use of wastewater in agriculture. Five regional workshops were held throughout 2012 and 2013 and the first phase of the project was concluded with an International wrap-up Event held in Iran (24-26 June 2013). These capacity development workshops brought together 160 representatives from 73 UN member states from Asia, Africa, and Latin America. Further support in these fields and the continuation of this initiative were strongly requested by participants during these activities. The second phase is moving from a focus on agriculture to a wider scope, taking into account reuse for non-agricultural purposes, such as watering of urban greens, golf courses irrigation, etc., which generate revenue, and/or help alleviate the pressure on
limited freshwater resources.

Among the lessons learnt from this initiative is that policy makers and technical operators need to work together to establish appropriate technologies for treating wastewater. There’s need also for political commitment both to integrate new regulations into the existing laws to ensure funding provision for proposed grants. In addition, selection of crops under a sewage irrigated agriculture system needs further investigations for final recommendations to be given to growers.

Conclusion and Key Recommendations

Some of the most successful projects in this report are those who sought out partners with the potential for unique and meaningful contributions to their goals. Women in Europe for a Common Future's project in Georgia, for example, partnered with the Technical University of Hamburg to design the appropriate technologies that would be used for wastewater treatment. The Korea Forest Service project in Ethiopia also worked with a local university to capitalise on their resources and technical expertise in a way that neither group could have done as effectively alone. Opportunities for synergy exist, and thus, they should be sought out and capitalised on wherever possible.

The reason behind the success of many of these projects is their commitment to involving impacted communities and stakeholders throughout design and implementation. Taking the time to include and educate people who will be affected by a project makes them more invested in carrying on the activities down the road. The Women in Europe for a Common Future project in Georgia taught women's groups and schools to monitor water quality on their own, and in a similar vein, the PERSGA project promoted a citizen science approach that allowed local practitioners and others without a scientific background to play a role in keeping their environment clean and safe. For real sustainability, these local actors are invaluable- they are the only ones who can truly ensure a lasting impact and benefit in their communities. It is therefore imperative to empower local groups to promote sustainability.

Existing systems need to be leveraged to maximise impact, there is no need to reinvent the wheel every time a new project begins. The Korea Forest Service project in Benin was able to hit the ground running because they partnered with already existing groups in their target region that wanted to work to address deforestation. These local groups had willpower, manpower, and the experience needed; the funding and technical expertise provided by the Korea Forest service served as a catalyst for them to continue scaling up their projects and integrating the use of treated wastewater into their tree planting efforts. BORDA in Tanzania also chose not to begin constructing their own wastewater treatment works, but rather to encourage and enable people who were already doing valuable work. The technical and social studies carried out by BORDA
validated the successes of some projects, and let others know where there was room for improvement- providing a roadmap of suggestions for those designing interventions in the future.

Opportunities for groups of stakeholders to come together to share their knowledge are invaluable. The Global Wastewater Initiative and associated regional platforms provide opportunities for this to happen at the global and regional level, as do international fora such as the UN Environment Assembly and other conferences. Publications like the World Water Development Report lead to greater access to the knowledge and technical expertise of experts around the world and increase awareness of water-related issues and their potential solutions. So much important work is being done; we all need to work together to scale up projects that are working and learn from those that do not.

As we work towards the very particular indicators of each project, tailored to a specific context and community, it is important to also remember to think long term and remember the global nature of these issues. We must remember the sustainable development goals, and in particular Goal 6: to ensure availability and sustainable management of water and sanitation for all. Achieving this goal in a lasting and sustainable way will take a monumental effort that no individual organisation is capable of independently.