

## Circular economy – transforming waste into resources

*From linear to circular water and sanitation models*

*June 26<sup>th</sup> to 30<sup>th</sup> 2017, Spiez, Switzerland*

### About AGUASAN

AGUASAN ([www.aguasan.ch](http://www.aguasan.ch)) is an interdisciplinary Swiss Community of Practice (CoP) that brings together a broad range of specialists to promote wider and deeper understanding of key water and sanitation management issues in developing and transitioning countries. It builds on committed sector professionals from various specialised institutions involved in Swiss development cooperation, humanitarian aid and research. Since 1984, the CoP has provided an exemplary, vibrant and most pertinent exchange platform and think-tank serving the water sector, and constitutes an essential link in the innovation and knowledge management strategy of the Swiss Agency for Development and Cooperation (SDC). Besides convening quarterly knowledge sharing events, every year members of the CoP organise an international **AGUASAN Workshop** in Switzerland. During these events water and sanitation specialists from all over the world gather for five days to collectively reflect on a cutting-edge topic of the water sector. The workshops provide a joint learning experience and utilise the broad knowledge gathered by the participants to elaborate strategies and conceptual tools of practical use for development work, highly relevant for sector interventions at the local, national and global level. They are the annual highlight of AGUASAN and provide a unique forum for in-depth exchange and cognition by exploring new issues, whilst consolidating relevant experiences.

### Topic

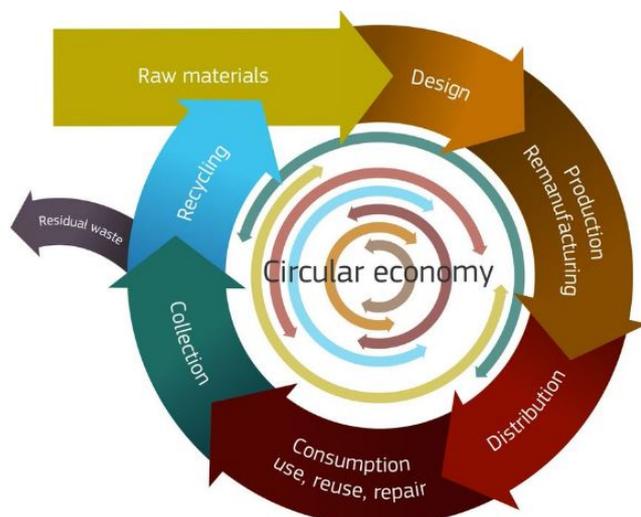
#### *The concept of circular economy*

The concept of circular economy provides opportunities to sustainably meet the needs of people and simultaneously relieve pressure on natural resources and ecosystems. Much of these pressures have been driven by **linear economic models** established during the Industrial Revolution in the early 19<sup>th</sup> century. These linear models are still prevalent today and follow a “make-use-dispose” pattern where companies extract raw materials from the natural environment, use them to manufacture a product that is sold to a consumer, who then discards it when it is longer used.



**Circular economic models** are cost-recovering as well as resource and energy efficient. Resources in waste streams are reused as valuable inputs for creating the desired products rather than extracting new raw materials. These models offer a solution to **decouple population and economic growth from resource consumption and pollution of the environment** and can be applied to **transform the water and sanitation sector**.

The choice of topic for the AGUASAN Workshop 2017 aligns with the UN World Water Day theme of “Wastewater” and the next Stockholm World Water Week’s topic of “Water and waste – reduce and reuse”. The workshop seeks to use synergies and provide an opportunity to participants to prepare and build relevant knowledge to **better engage in the international dialogue** at major water and sanitation sector events such as the World Water Week in Stockholm.



### ***The potential of circular economy in the water and sanitation sector***

With the world's population expected to grow to 8.5 billion by 2030<sup>1</sup>, one billion people are expected to come out of poverty and two billion people will adopt a middle-class lifestyle and start consuming more goods and services<sup>2</sup>. A large portion of this growth is expected to occur in developing and transitioning countries which will increase the demand for natural resources if development follows along the current “make-use-dispose” pattern. Another challenge for these countries is their large proportion of export goods to meet the consumer demands in industrialized countries thereby further exacerbating the pressure on water and other natural resources. If we maintain a business-as-usual approach to managing water, we can expect a **40 percent gap between fresh water supply and demand** by 2030. 90% of wastewater from agricultural, industrial and domestic use is untreated and **contaminates freshwater and coastal ecosystems**, threatening food security, access to safe drinking water and a major health and environmental management challenge. Discharging untreated wastewater into natural water bodies also interferes with the natural nutrient cycle. The lost **nutrients are reintroduced into the system by using artificial fertilizer** causing soil degradation, the depletion of finite phosphorus reserves<sup>3</sup> as well as costly and energy inefficient extraction of nitrogen.

The idea of recycling waste was already promoted in the 1988 United Nations’ “Our Common Future” report on sustainable development<sup>4</sup>. Circular economy is an action-oriented approach for achieving global sustainable development and is gaining momentum as policy frameworks are designed and implemented, such as the European Union’s Circular Economy Action Plan rolled out in 2016 and China’s Circular Economy Promotion Law released in 2009<sup>5</sup>. **Circular economy has started to catch on around solid waste management** in many countries. With the REDISA Plan South Africa has been collecting 200’000 tons of tyres within 2.5 years and recycling 63% of those into saleable products. South Africa is now scaling this plan up to apply to all forms of solid waste.<sup>6</sup>

Recycling waste in the water and sanitation sector is in most cases still in its infancy. There are many **innovative and successful small-scale models** being applied and promoted for the recycling of waste (i.e. wastewater, faecal sludge, urine) but there is vast potential and **need for scaling up**. Singapore’s NEWater water reuse programme that covers 30% of Singapore’s current water needs<sup>7</sup> and stands out as a progressive example of treating wastewater to produce high grade reclaimed water for drinking use. Other opportunities include reusing wastewater in agriculture for irrigation, in industry as process or cooling water, and in households for watering gardens. Other valuable materials that can be recovered from the waste stream include biomass, nutrients, plastic, wood, paper, metal and glass, which can be ploughed back into the production cycle as secondary raw materials.<sup>8</sup> Wastewater can also be used for energy generation (through hydraulic potential or heat recovery).

Circular economy has **great potential to drive the Water and Sanitation 2030 Agenda** forward because it aligns directly with the Sustainable Development Goal (SDG) 6.3 of improving water quality and substantially increasing recycling and safe reuse globally and SDG 6.4 of substantially increasing water-use efficiency across all sectors and ensuring sustainable withdrawals.

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<sup>1</sup> UN DESA (2016): World Population projected to reach 9.7 billion by 2050

<sup>2</sup> OECD Development Centre Working Paper No.285 (2010): the emerging middle class in developing countries.

<sup>3</sup> UNESCO (2015). UN Water Development Report. 2015. Water for a Sustainable World.

<sup>4</sup> United Nations (1988) Our Common Future.

<sup>5</sup> World Economic Forum (2013). Favourable Alignment enablers.

<sup>6</sup> REDISA (n.y.) REDISA Performance Statistics.  
<http://www.redisa.org.za/Satellite/REDISA%20PERFORMANCE%20STATISTICS.html>

<sup>7</sup> NEWater (n.y.). PUB Singapore’s National Water Agency. <https://www.pub.gov.sg/watersupply/fournationaltaps/newater>

<sup>8</sup> Bywater (2016). What the circular economy means for our water resources. Imperial College London.  
[http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/naturalsciences/environmentalpolicy/newssummary/news\\_3-6-2016-9-59-4](http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/naturalsciences/environmentalpolicy/newssummary/news_3-6-2016-9-59-4)

## Target audience

The AGUASAN Workshop 2017 is open to public administration officers, donor agencies, NGO field staff and desk officers, consultants, researchers, entrepreneurs, and other specialists in water and sanitation in development cooperation and humanitarian aid as well as agriculture, **particularly those working with wastewater, faecal sludge or urine that could potentially be reused as resources.**

## Expected outcomes

The topic outlined above will frame the 2017 AGUASAN Workshop. The overall objective of the event is to **exchange and generate knowledge to assist practitioners and policy makers in transitioning towards circular water and sanitation models.** The expected outcomes of the workshop are:

- ✓ Participants have a common understanding of the relation between circular economy and the water and nutrient cycles.
- ✓ Participants have identified drivers and barriers in transitioning to circular economy.
- ✓ Participants have learnt from successful and failed circular economy approaches in the water and sanitation sector.
- ✓ Participants have identified and prioritized entry points and courses of action for the transition at operational and policy level.
- ✓ Participants have strengthened their networks and built partnerships with practitioners across sectors for a transition to circular economy.

## Key questions and issues

Based on the topic presented above, the 2017 AGUASAN Workshop will focus on analysing successful and failed approaches for transitioning from linear to circular water and sanitation models. The topic discussed includes (but is not limited to) the following key questions and issues.

### ***What does the circular economy concept entail?***

There is a growing recognition within the water and sanitation sector that there are great opportunities to sustainably use the water, nutrients and energy contained in wastewater, faecal sludge, urine and other waste streams. These can be ploughed back into the system and safely recovered and productively reused as valuable resources. The question will focus on the various concepts and normative frameworks that support the paradigm shift of moving towards closing water and nutrient cycles, such as the SDG 6.3 which calls directly for improving water quality and substantially increasing recycling and safe reuse globally<sup>9</sup> or the European Union's Circular Economy Action Plan.

### ***Which flows are relevant?***

To move towards resource efficiency using the circular economy concept, significant change is required in terms of how we deal with wastewater, faecal sludge, urine and other waste streams. Understanding the many waste streams and how they flow is crucial as well as understanding how materials that are predominately viewed as waste can become inputs to a productive process. This also involves looking at the financial flows that are linked to the flow of materials. For the water and sanitation sector this means that recovered waste, such as urine that had no financial value previously, can create financial flows when being processed to be reused as fertilizer. This requires an understanding of the water, nutrient and financial flows between sanitation and food production.<sup>10</sup>

### ***Which stakeholders need to be involved and how?***

There are key roles to be played by policy makers to enable the right framework conditions for water utilities and businesses – to name just a few – to seek and create opportunities to transition towards circular models. There is also a key role to play for other organisations such as universities,

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<sup>9</sup> UNEP (2016). "Water, Sanitation, and Sustainability. From Waste Disposal to Resource Recovery."

<sup>10</sup> UNEP (2016). "Water, Sanitation, and Sustainability. From Waste Disposal to Resource Recovery."

non-profits and donor agencies to support, facilitate, and participate in local initiatives and assist developing countries in assessing their potential for the circular economy<sup>11</sup>. Apart from the obvious opportunities that the circular economy concept presents to stakeholders (like recovering costs for faecal sludge management) it also entails risks that need to be assessed and addressed. The role of multi-stakeholder partnerships for mobilizing stakeholder engagement is equally important and the approach to fostering collective action between stakeholders from different sectors.

### ***How can demand for recovered products be created?***

Creating public demand for goods that produce less waste and creating more resource- and energy-efficient markets is essential for circular economy to thrive. The market value of recovered products (such as soil conditioner, fuel briquettes, fertilizer, irrigation water, etc.) will determine the success and failure of a transition towards a circular economy. This process will need to assess how much potential customers are willing and able to pay and what competing products exist on the market that satisfy the same customer need (i.e. artificial fertilizer). Recovered products are often novel in a local market and there may be resistance to adopting use and creating demand for the product due to deeply rooted cultural norms. Social marketing campaigns in the form of trainings, women empowerment, and public awareness raising will thus need to accompany any transition towards circular models. Demand creation will equally need to be incentivized in the regulatory framework. By creating and enforcing regulations and providing subsidies, demand for recovered products will be stimulated and the approach will gain momentum. For the financial sector, new financial product offerings such as the pay-per-use models will be required<sup>12</sup>.

### ***In which context do these stakeholders act?***

Although, the circular economy concept addresses global issues of greenhouse gas emissions and better management of resources and energy, the solution for global challenges will be found at a local level<sup>13</sup>. There are no “one size fits all” solutions and management systems must be designed to meet the needs and constraints of specific local conditions. A framework that can assist with analysing the most relevant dimensions to be considered for a transition towards circular water and sanitation models is the “Blue Diamond” framework developed by the AGUASAN CoP. It uses the basic value of water as a human right and water as a common good to inform action across the six interdependent strategic areas: social, economic and environmental as well as the technological, institutional and knowledge/ culture<sup>14</sup>.

### ***What are the drivers and barriers influencing the transition towards a circular economy?***

Drivers and barriers to the transition towards circular water and sanitation models need to be analysed and addressed. In the political sphere, the concept of a circular economy requires essential changes in regulatory and institutional frameworks to enable the reuse of waste products. On the economic side, there are many potential economic benefits that are driving interest in the concept, such as alleviating the pressure on limited resources and opening new resources streams at a lower cost than obtaining new resources.<sup>15</sup> Lessons from China show that the recognition of limited natural resources and the subsequent economic risks can be a driver to implementing taxation, fiscal and industrial policy instruments incentivizing circular economy<sup>16</sup>. To achieve this however, long term investments are needed for creating and designing technologies for the circular economy that are complementary and that can be harmonised. While the concept provides opportunities to reduce negative externalities such as water scarcity, pollution, greenhouse gas emissions and congestion in cities<sup>17</sup>, rooted cultural barriers towards e.g. using sludge or wastewater as fertiliser for growing food must be addressed to enable a transition.

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<sup>11</sup> Ellen MacArthur Foundation (2016) “Circular Economy in India: Rethinking Growth for Long-Term Prosperity”

<sup>12</sup> Working Group Finance (2016). Money Makes the World Go Around (and will it help make the economy circular as well?)

<sup>13</sup> Association Orée (2015). Circular Economy for the preservation of resources and the climate.

<sup>14</sup> Bern (2014): Strategic Framework 2013–2017. Global Programme Water Initiatives.

<sup>15</sup> Hurato and Nolasco (2016). “Managing Wastewater as a Resource in Latin America and the Caribbean. Towards a Circular Economy Approach.”

<sup>16</sup> Nature (2016): Circular Economy: Lesson Learned from China. URL: <http://www.nature.com/news/circular-economy-lessons-from-china-1.19593>

<sup>17</sup> Ellen MacArthur Foundation (2016), “Circular Economy in India: Rethinking Growth for Long-Term Prosperity”

### ***Which circular economy approaches can we learn from for overcoming the identified barriers and making use of the drivers?***

For a paradigm shift to occur, systematic choices must be made and innovative approaches adopted to make use of the drivers and overcome the barriers<sup>18</sup>. One example of a successful circular model is in the city of Durban, South Africa which has limited water resources. A local utility company formed a framework for public-private-partnership in 2001 and built a water recycling plant that supplies the city's industries with recycled water from the city's wastewater.<sup>19</sup> This and many other examples hold valuable insights into how the transition to circular models was made.

### ***How should change from linear to circular water and sanitation be managed?***

The process for shaping a transition will require collective action and strategy building through multiple stakeholders including local authorities, financiers, businesses and households. They will need to work towards integrating different sectors and material flows (wastewater, faecal sludge, urine) to identify regionally applicable potential for synergies. They will need to analyse where resources, facilities and services can be shared and where resources can be recovered from a waste stream and substitute an input somewhere else. New participative options such as shared vision planning or participative mapping may be required to identify opportunities not visible under current models. New potentials will also need to be researched and identified such as better design, or more sustainable logistic or recycling at various scales.<sup>20</sup>

### ***How can health risks be managed?***

With opportunities opening for the recycling of waste streams, the water and sanitation sector will need to develop approaches for managing health risks. New project management and administration processes have been developed for managing health risks such as health impact assessments and water and sanitation safety planning. They address critical health risks while identifying opportunities for wastewater, faecal sludge or urine reuse (particularly in agriculture)<sup>21</sup>.

### ***How to address public perceptions associated with recycling and reusing of human waste?***

To safeguard health, traditionally, health education has framed public perception by portraying faeces and wastewater as hazardous materials. If health risks can be managed by properly handling and treating the wastewater and faeces, these messages are no longer relevant. When transitioning towards circular water and sanitation models public understanding and fact-based knowledge needs to be built up and perception needs to be shifted towards considering resources from wastewater and faecal sludge being valuable.

## **Resources and features**

### ***Participants***

As mutual learning with joint elaboration of practical recommendations, tools and take-home messages for all is the basic concept of AGUASAN Workshops, the **participants themselves will constitute the main knowledge resource for the event** in the form of case study presentations, posters or contributions during the discussions and group work. The workshop is open to everybody strongly interested in the topic and closely connected with it in his/her personal work. A well-balanced mix regarding the participants' expertise and gender as well as their thematic, organisational as well as geographic background is aimed at.

To optimise the working environment, the number of participants is limited to about 46 and all candidates must undergo a selection procedure handled by the workshop steering committee. Participants that are **willing to prepare and present a relevant case study, poster or similar are given priority in the selection procedure**. A full application therefore must be submitted within the pre-registration deadline of **March 19<sup>th</sup> 2017** by means of the respective form provided. Late applications cannot be considered.

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<sup>18</sup> Ellen MacArthur Foundation (2016). "Circular Economy in India: Rethinking Growth for Long Term Prosperity"

<sup>19</sup> Orée Association (2015). "Circular Economy for the Preservation of Resources and the Climate"

<sup>20</sup> Working Group Finance (2016). Money Makes the World Go Around (and will it help make the economy circular as well?)

<sup>21</sup> World Health Organisation (2010): "Sanitation Safety Plans. A vehicle for guideline implementation."

Workshop participation does not involve any registration fee, but you must count on **costs of approx. 1'070 CHF** (approx. 1'000 EUR or 1'080 USD) **for full board, lodging, facilities and field trip** (excluding transport to and from the venue, drinks and all personal expenses) to be settled by you on the spot or by your sponsoring organisation. The workshop convenor does not provide any financial support to participants.

### ***Resource persons and case studies***

For providing the base upon which the topic will be addressed and developed in a structured way, the workshop will feature thematic key inputs and selected case studies from different contexts – among those case studies brought in by the participants. Local and international resource persons as well as case study presenters being highly knowledgeable and directly involved in the issues addressed will bring in this knowledge resource.

### ***Facilitation and reporting***

A professional team will facilitate the workshop process and its outcomes, while a rapporteur will be responsible for collecting the outputs and compiling the workshop report.

### ***Steering committee***

Throughout the months preceding the workshop, a steering committee carefully prepares the event and its topic. Given the nature and purpose of the event, the committee only defines the programme of the workshop, but does not anticipate its outcomes. This allows the committee to have flexibility in steering the workshop process, to adopt continuous planning and to react effectively on the workshop dynamics.

### ***Other workshop features***

- Alternate working in plenary and small groups, whilst proceeding in a stimulating and participatory manner by using a variety of visual aids and innovative working methods.
- A mid-week excursion (half-day) for illustrating the workshop topic in the Swiss context.
- An experience fair where the participants may present their specific experiences or challenges in a market or storytelling setting.
- English as the workshop language - work groups may exchange ad-hoc in a language understood by the others, but inputs and feedbacks in plenary are always in English.
- A cocktail dinner for networking with Swiss water and sanitation experts from SDC, the private sector, NGOs, etc.
- A venue ([www.abzspiez.ch](http://www.abzspiez.ch)) ideal for a retreat and sufficient time for informal exchanges in a friendly setting.