

# Chapter 6

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## A guideline for developing bankable water reuse models

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## Guidelines at a glance

To develop a bankable water reuse model, these guidelines suggest a stepwise approach consisting of five main phases:

- Step 1: Identify potential water reuse options
- Step 2: Develop a business model for the water reuse option
- Step 3: Identify innovative partnership and financing options
- Step 4: Identify risks and opportunities
- Step 5: Develop an implementation plan

### 6.1. Introduction

In the MENA region, the existing imbalance between available water supply and demand is expected to widen due to population growth, greater urbanization and higher water consumption. The largest use of water in MENA countries is for agriculture, which forms the foundation of the economies of many of the countries. For example, Egypt uses 86% of its total renewable water for agriculture, while Jordan and Lebanon use 65% and 60% of the total renewable water for agriculture, respectively (Qadir et al. 2009).

We need alternatives such as circular economy (CE) approaches to supply water in view of the water scarcity and climate change challenges and the need to ensure water security in urban and rural areas. One of the essential dimensions of a CE is the creation and capture of value remaining in waste materials and maximizing that value to promote sustainable development. Recovering the water, energy, nutrients and other materials embedded in wastewater is a key opportunity. This notion of wastewater recovery is gaining more attention in water-scarce countries as a way to meet the demand as non-conventional water resources can be used for irrigation in agriculture, industrial use and groundwater recharge.

Despite the prevalent water scarcity in the MENA region, the adoption of water reuse technologies has been uneven and slow (see Chapter 2). For example, in Egypt there has been significant progress in water reuse for afforestation. However, the institutional and regulatory set-up and missing incentives impede the implementation of water reuse (Otoo and Dreschel 2018). In Jordan, fruits and other cash crops are grown through the reuse of water in the Jordan Valley where about 80% of the agricultural water consumption depends on blended wastewater (World Bank 2016).

In general, the development and implementation of water reuse strategies across the MENA region is challenged by factors such as a lack of water reuse cost recovery mechanisms, low pricing of irrigation water, need for creating financial incentives for safe water reuse and lack of understanding among the public about the perceived environmental benefits of wastewater treatment and reuse (Otoo and Dreschel 2018; World Bank 2011).

Wastewater treatment projects have historically been established as a means to maintain health and environmental standards with no potential for financial or monetary rewards. Central and local governments have perceived them as liabilities rather than assets. Water reuse projects, if adequately planned and properly implemented, can provide opportunities for sound investments and financial rewards (see Chapter 4). However, the perceptions of the public, investors and decision-makers must be changed. To ensure sustainability of water reuse, we need to develop bankable water reuse models by instituting cost recovery or revenue generation mechanisms. This can be achieved through the recovery of different resources but also through innovative financing, cost recovery and partnership approaches.

These guidelines present an outline that can be used to develop bankable water reuse models in the MENA region. It supports the public and private sectors such as wastewater treatment operators, water utilities, ministries of agriculture, ministries of water and irrigation, and forestry commissions as well as investors and donors interested in developing water reuse models in a particular location and context. The guidelines are developed based on a plethora of research such as Dreschel et al. (2015) and Otoo and Dreschel (2018) on water reuse and business model development work done by IWMI in several other projects.

### 6.1.1. Who should use this guideline

- *Investors and financiers*: Public and private investors; water users associations and agricultural cooperatives; donors and lending agencies
- *Planners, designers and decision-makers*: Policy-makers; ministries such as irrigation/ water; agriculture; industry
- *Water reuse systems implementers and operators*: Water and wastewater systems operators; relevant public bodies such the local government, metropolitan assemblies and their waste management departments
- *Beneficiaries and end-users*: End-users of various reuse products and services such as farming, industries, cooling and recreation

### 6.1.2. Concepts and principles

In the context of water reuse, the term *bankable* should not be confused with the more traditional use of the term *bankable*, which refers to projects that have sufficient collateral, future cash flow and a high probability of success to be acceptable to commercial lenders (World Bank 2019). Bankable, in the context of water reuse, should be understood as wastewater projects that demonstrate a high likelihood of receiving public or private financing based on their value propositions<sup>1</sup> and other factors that indicate that the wastewater project is likely to be sustainable. While it is important that the water reuse project should be sustainable, sustainability in this context does not necessarily imply profit maximization but could imply a cost recovery target, especially given that the wastewater sector offers many opportunities for social business models aiming at improved living conditions or reduced environmental pollution (Otoo et al. 2016).

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<sup>1</sup>Value proposition is the added value that end- or target users derive from the products and services offered.

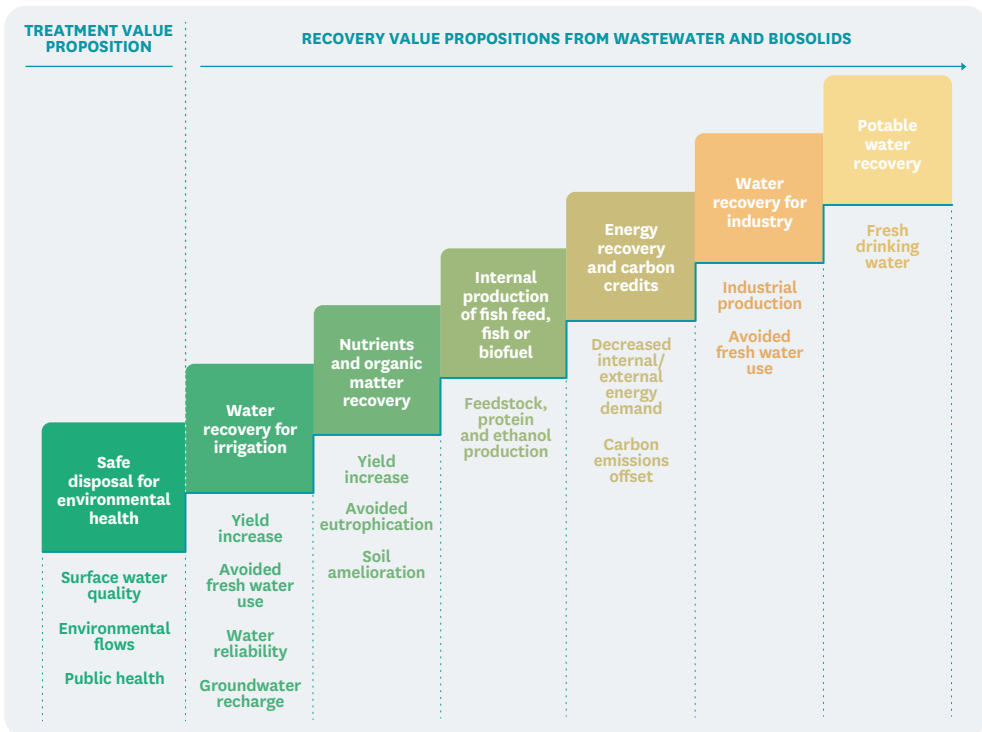
## 6.2. Practical steps to develop a bankable water reuse model

Wastewater offers a variety of options for recovering resources. Studies on developing bankable water reuse models, and on the potential of implementing water reuse models, must first identify and set priorities in terms of the target area. This priority setting is essential to identify potential water reuse models that have high relevance and a likelihood of success for the local context. To develop a bankable water reuse model, this guideline suggests a step-wise approach consisting of five main phases:

- Step 1: Identify potential water reuse options
- Step 2: Develop a business model for the water reuse option
- Step 3: Identify innovative partnership and financing options
- Step 4: Identify risks and opportunities
- Step 5: Develop the implementation plan

### Step 1: Identify potential water reuse options

The treatment and reuse of water offers not only environmental and public health benefits but also a range of opportunities for transforming wastewater into multiple value propositions. A variety of value propositions and options for cost recovery from wastewater treatment and reuse to the recovery of water for irrigation to potable water can be developed (Figure 6.1).



**FIGURE 6.1** Ladder of increasing value propositions related to wastewater treatment based on increasing investments in water quality and/or the value chain (Drechsel et al. 2015).

Even if there is no reuse, wastewater treatment has an economic value for safeguarding environmental and public health, but no direct financial value. The recovery of other resources can add new value streams to the proposition (GWI 2010).

Water reuse implementers can select from a wide range of options depending on the existing wastewater collection and treatment infrastructure, the technology used for treatment, the available financing and the target end-use (Box 6.1). Several MENA countries have sewerage systems with more coverage in urban areas than rural. For example, 74% of households in urban areas of Egypt are connected to sewerage system while only 18% of households in rural areas are. Similarly, in Jordan the coverage is 67% in urban and 4% in rural areas. Thus, the first step for implementing a water reuse model is to identify which reuse pathway will be most suitable given the local context and target end-users.

There are various technical options and business models for implementing a water reuse model. A key step is to narrow the option down to those with the highest probability of success and buy-in by the local stakeholders. Stakeholder participation in this process is imperative to understand which water reuse options resonate best with them (Otoo et al. 2017). Thus, from a planning perspective, the implementation of water reuse projects should be demand driven. For example, in Morocco, a partnership was developed between the golf courses of Agadir and the water agencies who supply them with continuous treated wastewater based on the demand expressed by the golf courses (World Bank 2011).

#### **BOX 6.1 Basic questions to guide in identifying potential reuse models**

- How much wastewater is generated in the specific locality?
- What treatment technologies are in place?
- Given the local context, what resources could be potentially derived from wastewater?
- Is there demand for the wastewater-derived resources?
- How much are different users willing to pay for treated wastewater?
- Are there any legislations/regulations that could prevent a water reuse model?
- Are there any institutions (public, private) that could qualify as business owners and partners and be interested?

### **Step 2: Develop a business model for the water reuse option**

Having identified the water reuse option that has potential given the local context, we move on to developing a water reuse business model. A business model describes the rationale of how an organization creates, delivers and captures value in economic, social, cultural or other contexts (Osterwalder and Pigneur 2010). It consists of four core elements, which describe an organization's:

- *value proposition* that distinguishes it from other competitors through the products and services it offers to meet its customers' needs;
- *customer segment(s)* that the firm is targeting, which are the channels a firm uses to deliver its value proposition and the customer relationship strategy;
- *infrastructure* which contains the key activities, resources and the partnership network that are necessary to create value for the customer; and
- *financial aspects* (costs and revenues) which ultimately determine a firm's ability to capture value from its activities and break even or earn profit.

The business model is a simple tool that enables implementers to think through the different building blocks and how they relate to each other. It provides a breakdown of major considerations impacting a business.

As noted in the introduction, the term 'business' does not necessarily imply that the water reuse models are profit oriented or able to achieve full cost recovery through their value proposition. This is more relevant in the case of water reuse in agriculture since revenues from selling treated wastewater are small, given that freshwater prices are often highly subsidized. However, additional value propositions could be added to improve cost recovery (Box 6.2).

### **BOX 6.2 Cost recovery through water reuse for fruit trees in Tunisia**

The Ouradanine wastewater treatment plant, managed by the National Sanitation Utility (ONAS), treats domestic wastewater from about 3,400 households. The secondary treated wastewater is used by nearby tree plantations managed by 40–46 private farmers producing olives, peaches and pomegranates.

Another public institution, Commissariat Regional de Development Agricole (CRDA), manages downstream irrigation infrastructure. CRDA receives the water from ONAS free of charge and sells it to the farmers at a subsidized price as an incentive for reuse of the treated wastewater. The treatment plant also supplies biosolids on demand as soil conditioner free of charge. Through this reuse model, ONAS recovers 40% of the operation and management cost of the treatment plant.

## **Step 3: Identify innovative partnership and financing options**

### **Innovative partnership options**

The promotion of water reuse models requires innovative business models, which are embedded in innovative partnership and financing schemes. Various types of partnerships can be formed among different types of organizations. Similarly, value creation in the water reuse sector can go beyond the traditional focus on private sector value creation toward models where private entities, government entities, civil society, NGOs and other types of entities can work together in cross-sector alliances to create new products and services, improve the quality of existing products and services, and create economic and social values.

Innovative cross-sector partnership formats are the vehicles through which new business models are developed and new products and services are generated (Dehan et al. 2010).

The public-private partnership (PPP) is the most common type of partnership in which government and private companies assume co-ownership and co-responsibility for the delivery of services. Through these partnerships, the advantages of the private sector such as access to finance, knowledge of technologies, managerial efficiency and entrepreneurial spirit are combined with the social responsibility and environmental awareness aspects of the public sector. Based on the social and environmental benefits of wastewater treatment, most water utilities in the MENA region are publicly financed and operated. Private finance models such as build-own-operate-transfer (BOOT) and build-own-operate (BOO) are also used (Otto and Drechsel 2018). For example, in Tunisia, several partnerships have been established with the private sector in the operation and maintenance of wastewater treatment plants, which contributed to the increase in the number of treatment plants. In 2009, the private sector operated 17 WWTPs in Tunisia (World Bank 2011).

One of the key factors that determines the success of a partnership is the partners' motivations. Differences in motives between the partners are believed to derail the collaboration especially during the formation of the partnership. Thus, the first step for designing a business model that leverages resources and expertise of the partners is to define the business objectives for partnering (Chesbrough and Schwartz 2007). Moreover, the extent to which each partner's business models are aligned is essential in choosing partners and in designing partnership models (Box 6.3). Aligned business models are complementary, are more likely to benefit each partner and can be sustained in the long term (Chesbrough and Schwartz 2007).

#### **BOX 6.3 Steps to consider when establishing partnerships**

- Clearly define the motives and business objectives for partnering
- Assess the resources and capabilities required and what each partner is bringing
- Determine the degree of business model alignment with partner

#### **Financing options**

Project financing is a means of obtaining funds for industrial projects, long-term infrastructure and public services. The main sources of finance include equity, debt and government grants. Financing from these alternative sources have important implications on the project's overall cost, cash flow, ultimate liability and claims to project incomes and assets. One of the main challenges for the sustainability of public projects in general, and water and water reuse projects in particular, is the inadequate and/or the interrupted inflow of funds and revenues received during the project's operational years. Consequently, a critical challenge for water reuse projects is the ability to cover operational costs and achieve cost recovery. Figure 6.2 and Box 6.4 show pathways or approaches for improving cost recovery in water reuse.



**FIGURE 6.2** Approaches for improving the cost recovery of water reuse models.

SOURCE: Lazurko et al. 2018.

Community contributions such as user fees, household investments, community-based savings and cost sharing are some of the major sources for financing sustainable sanitation and water management products and services. Cost sharing is becoming one of the most applied techniques to ease financial burdens in water and water reuse management (Table 6.1). Cost sharing is a mechanism for deciding which agents should be served by a public project and how much each of them should pay. It includes all contributions, including cash

**TABLE 6.1** Advantages and disadvantages of a cost-sharing mechanism.

Advantage	Disadvantage
Effective since different stakeholders are involved making different contributions	Time consuming for collecting information on all stakeholders and their contributions
Improves the sense of community ownership and thus improving sustainability of project	Requires constant control of the stakeholders fulfilling their tasks
Benefits local communities	The issue of further operation and maintenance after completion of the project
Increases assurance of commitment and dedication for the project by various stakeholders	Conflicting self-interests amongst stakeholders
Increases the project transparency	Problems of 'Free Riders'



#### **BOX 6.4 Financing options**

*Collect smart fees:* In order to achieve cost recovery, water reuse projects should set water tariffs, user fees or taxes based on the local context. The water tariff can be set on the volume of water used or based on the type of users such as for agriculture, landscaping or industry.

*Diversify revenue streams:* Water reuse projects have the potential to achieve cost recovery by offering multiple value propositions such as reuse of water for agriculture, aquaculture and energy production. Furthermore, carbon offsets present opportunities for greenhouse gas emission reductions, bringing in revenue from carbon markets.

*Improve cost effectiveness:* In addition to diversifying of revenue streams and collection of smart fees, it is important to examine the daily operations of the water reuse project to optimize value and reduce costs.

*Focus on value chains:* Water reuse relies on an upstream supply of wastewater and downstream reuse of wastewater. Cost recovery of water reuse models can be improved by effectively managing the entire value chain from collection, treatment and final reuse. This calls for considering the entire wastewater value chain as a system to be managed holistically rather than managing each stage of the value chain in a silo.

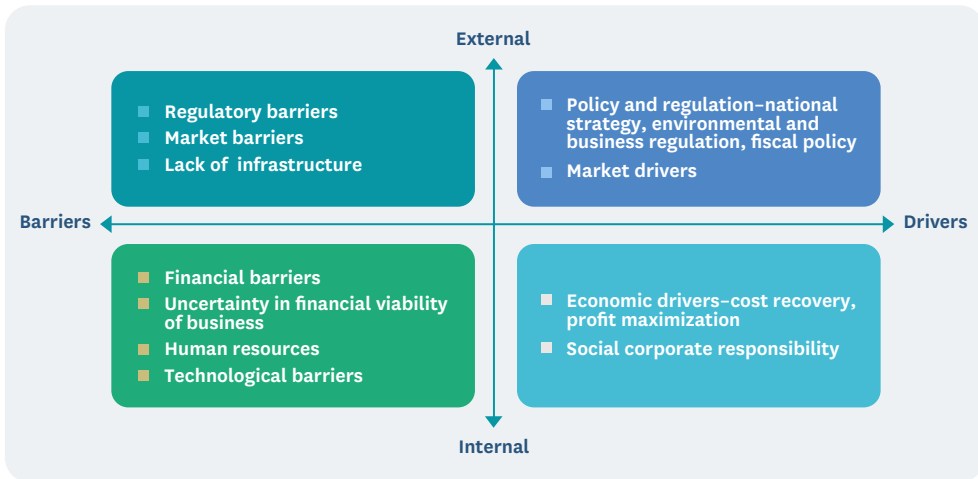
*Government support:* Governments can also support water reuse projects through favorable fiscal policies such as tax incentives or holidays to incentivize private sector participation and create intersectoral collaborations among public and private entities. Thus, implementers of water reuse projects should be aware of and benefit from such incentive mechanisms in the region where they operate.

and in-kind, that a recipient makes to an award. Different types of expenses can be allocated among different stakeholders (such as labor cost, material cost and cost of using equipment).

#### **Step 4: Identify risks and opportunities**

Public and private entities/entrepreneurs in the water reuse sector that explore opportunities of creating and capturing value from wastewater are driven by both external and internal factors. External factors that drive public and private entities include regulatory and market pressures while internal driving factors include new profit opportunities or cost recovery mechanisms and environmental sustainability (Figure 6.3).

Policies, regulations and institutions play important roles in the deployment of water reuse projects. Different instruments such as fiscal incentives and industrial and product quality standards can be implemented. The presence of a policy framework on its own, while sufficient, is not adequate to provide an enabling environment that promotes water reuse. A conflicting policy environment, an inadequate policy or an adequate policy environment but without enforcement mechanisms can all act as negative drivers to the development of



**FIGURE 6.3** Internal and external drivers and barriers to water reuse models.

water reuse sectors that operate under such frameworks. Thus, it is important to understand existing institutional, legal and policy frameworks to identify opportunities and risks as well as mitigation measures.

Water reuse models should seek to identify, analyze and minimize other risks such as market risks, competition risks in input and output markets, as well as technology performance risks. While these risks are context or location specific, they must be analyzed and minimized. For example, for market risks, the key factors that could be considered are changes in supply and demand, as well as likely sources of competition. Technological performance risks are related to whether the technology is commercially proven and if there are anticipated challenges with local repair and maintenance. One of the simplest ways to understand the internal and external risks and opportunities of a business model is through the SWOT analysis.

### The SWOT analysis

The SWOT analysis performs an assessment of internal (strengths and weakness) and external (opportunities and threats) factors of the business model. The SWOT analysis:

- assesses a business's strengths (S) and weaknesses (W) for achieving business objectives;
- assesses the business environment's opportunities (O) and threats (T) for achieving business objectives;
- assesses the current position and imagine possible future positions; and
- informs business objectives and action plans.

Once the SWOT analysis is completed, you can highlight key findings and then develop a strategy to mitigate risks and take advantage of opportunities (Box 6.5).

### BOX 6.5 From SWOT analysis to strategy

- **S-O** strategy: How can you use your strengths to take advantage of the opportunities?
- **W-O** strategy: How can you use your opportunities to overcome the weaknesses?
- **S-T** strategy: How can you take advantage of your strengths to avoid real and potential threats?
- **W-T** strategy: How can you minimize your weaknesses and avoid threats?

SOURCE: Based on Otoo et al. 2018.

## Step 5: Develop an implementation plan

Wastewater offers a variety of options for recovering resources (Figure 6.2, above), so a detailed feasibility study should precede the development of an implementation plan. The feasibility study will seek to determine which water reuse option has the highest probability of success in the local context. The feasibility study will inform the development of an implementation or business plan<sup>2</sup> for the most promising water reuse model. However, if the feasibility study ends with a choice of options, local stakeholders must set priorities and choose, according to their objectives, the most preferred option and location.

A business model provides a snapshot of a business idea, whereas a business plan is a finely tuned business model for the planned investment size and local opportunities or constraints. A business plan is more detailed and sets objectives, defines budgets, engages partners and anticipates problems before they occur. It helps you start and keep the project on a successful path. Key investors or financial institutions will want to look at the business/implementation plan before providing capital. To make the most of the planning, a water reuse project should give careful thought to the strengths and weaknesses of its water reuse model and the opportunities and threats in the business environment, and develop strategies to improve its potential for cost recovery and improve overall performance.

The key components of a business plan include:

- *The Business Concept*: Describes the business, including its products and services.
- *The Marketing Plan*: Describes the target market for your product and explains how you will reach that market.
- *The Financial Management Plan*: Details the costs associated with operating your business and explains how you will pay for those costs, including the amount of financing you may need.
- *The Operations and Management Plan*: Describes how you will manage the core processes of your business, including the use of human resources.

<sup>2</sup>Implementation plan and business plan are used interchangeably in this report.

You should ask the following key questions when developing business plan:

Business concept: Vision and mission	What is the vision of the water reuse model? What is your purpose? How will your reuse model look in next one, two and three years?
Objectives and goals	What are your most important goals? What is your value proposition? And how do you measure success?
Marketing plan	Who is your target end-user? How are you going to position your products or services?
Operations and management plan	How will you manage the core processes of your business, including use of human resources – organizational structure, expertise/skills needed, personnel plan/ staffing requirement.
Financial plan	How do we define success in measurable terms? What should be the target for cost recovery or breakeven?
Risks and mitigation	Identify risks – market, technical, political, regulatory and other risks and put mitigation measures

### 6.3. Conclusion and recommendation for adoption

A sound and adequate policy, legal and institutional framework is essential in providing an enabling environment for public and private sector investments in the wastewater sector. Regulatory frameworks can be important drivers but also significant barriers in water reuse business development. Thus, for the effective adoption of this guideline, there is a need for a conducive policy and institutional framework to enable public and private sector investment in water reuse sector. Furthermore, there is a need to be aware of any conflicting interests between public and private interests.

Conflicts between public and private sectors (including end-users) may exist for different reasons. For example, conflicts may relate to who are the losers and winners of the proposed change. In addition to these, traditions, norms and religious constraints and awareness levels are factors that need to be considered when designing and promoting water reuse projects. This is especially important since most people in the MENA region may have a negative perception toward reuse of wastewater.

Stakeholder engagement, awareness creation among relevant stakeholders and developing effective incentive mechanisms are some of the strategies and means to mitigate such constraints and bring in a common view and objectives for successful adoption of water reuse models.

## References

- Chesbrough, H.; Schwartz, K. 2007. Innovating business models with co-development partnerships. *Research Technology Management* 50: 55.
- Dehan, N.M.; Doh, J.P.; Oetzel, J.; Yaziji, M. 2010. Corporate-NGO collaboration: Co-creating new business models for developing markets. *Long Range Planning* 43: 326–342.
- Drechsel, P.; Qadir, M.; Wichelns, D. (eds.) 2015. *Wastewater: An economic asset in an urbanizing world*. Springer Dordrecht. 282p. <https://doi.org/10.1007/978-94-017-9545-6>
- GWI (Global Water Intelligence). 2010. *Municipal water reuse markets 2010*. Oxford: Media Analytics Ltd.
- Lazurko, A.; Drechsel, P.; Hanjra, M.A. 2018. *Financing resource recovery and reuse in developing and emerging economies: enabling environment, financing sources and cost recovery*. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Research Program on Water, Land and Ecosystems (WLE). 39p. (Resource Recovery and Reuse Series 11). doi: 10.5337/2018.220
- Osterwalder, A.; Pigneur, Y. 2010. *Business model generation – a handbook for visionaries, game changers and challengers*. Hoboken, New Jersey, USA: John Wiley and Sons, Inc.
- Otoo, M.; Drechsel, P.; Danso, G.; Gebrezgabher, S.; Rao, K.; Madurangí, G. 2016. *Testing the implementation potential of resource recovery and reuse business models: From baseline surveys to feasibility studies and business plans*. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Research Program on Water, Land and Ecosystems (WLE). 59p. (Resource Recovery and Reuse Series 10). doi: 10.5337/2016.206
- Otoo, M.; Drechsel, P. (eds.) 2018. *Resource recovery from waste. Business models for energy, nutrient and water reuse in low- and middle-income countries*. International Water Management Institute (IWMI). Oxon, UK: Routledge – Earthscan. 816p. <https://hdl.handle.net/10568/93011>
- Otoo, M.; Erlmann, T.; Wafler, M.; Hermann-Friede, J. 2018. *University curriculum on business development in resource recovery and reuse (RRR)*. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Research Program on Water, Land and Ecosystems (WLE).
- Qadir, M.; Bahri, A.; Sato, T.; al-Karadsheh, E. 2009. Wastewater production, treatment and irrigation in Middle East and North Africa. *Irrigation Drainage Systems* 24: 37.
- World Bank. 2011. *Water reuse in the Arab world: From principle to practice. A summary of proceedings: Expert consultation*. Dubai, UAE.
- World Bank. 2019. *Financing climate change adaptation in transboundary basins: Preparing bankable projects*. Water global practice. Discussion paper.
- WPP (Water Partnership Program). 2010. *Guidelines for user fees and cost recovery for rural, non-networked, water and sanitation delivery*. Tunis, Tunisia: Water Partnership Program of African Development Bank (AfDB). 100p.