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August 2011

Water Integrity Brief

Providing a concise overview of different themes related to water integrity

Irrigation

Challenges and priorities for water integrity in the irrigation sector

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BACKGROUND

During the last decades, the increasing scarcity of our world's water resources has been stressed as a key challenge by decision makers and scientists. As the effects of climate change emerge and the world population continues to grow, a global water crisis is looming. In this light, good water governance will be of increased importance to safeguard our scarce water resources. However, corruption has been identified as one of the largest challenges to achieve good governance and further complicates reliable water supply to cities, industries and agriculture (Transparency International 2008). Tackling corruption risks in the water sector is essential to guarantee responsible and sustainable use of our water resources now and in the future.

The mission of the Water Integrity Network (WIN) is to reduce corruption in the water sector through a pro-poor focus. Water for food is one of the most important water uses for the world's poor. Therefore, the corruption challenges faced by the irrigation sector are a thematic priority for WIN. The objective of this brief is to identify the main corruption risks and governance challenges in irrigation, particularly those which hinder water access for the poor. Based on the identified risks, recommendations are made for strategies which prevent corruption and target reliable water supply for the poor.

INTRODUCTION

As a vital resource for life water has a wide range of uses. Water is used for drinking and sanitation purposes, for industrial processes and for agricultural food production. Of all those water users, the agricultural sector is by the far the largest, accounting for 70% of the world's total freshwater withdrawal. Water supply for agriculture is essential to maintain world food security, as 40% of our food is produced by irrigated agriculture. Besides being essential for our global food production, irrigation water is an important element to secure rural livelihoods in developing countries.

Improved access to water for irrigation is widely seen as a powerful tool to alleviate rural poverty. Access to irrigation water increases direct food supply; increases crop production and income generation; and reduces vulnerability to droughts caused by seasonal variability or climatic change (Hussain 2003). Whilst the poor are the ones who can benefit the most from effective irrigation management, they have also been identified as the ones who mainly suffer from poor governance and corruption in the water sector (Plummer 2007). Lacking formal education, and/or being excluded from political networks, the poor usually do not have the capacity to defend their rights and thus have to withstand corrupt practices.

Many studies show how the allocation of irrigation water has reproduced existing inequalities, disregarding water use by women and prioritising large scale or upstream located farmers[1]. This brief discusses how mismanagement and corruption are related to the sector's poor performance and the persisting inequalities in rural societies.

1 See for instance: Chambers (1988);Van Koppen and others (2002); Zwarteveen (1994).

THE IRRIGATION SECTOR

The irrigation sector is a complex and diverse sector. Irrigation governance is shaped by many different factors that include: the type of irrigation technique; the agricultural system and; the socio-political conditions of a country. This brief highlights canal irrigation, tubewell irrigation and wastewater irrigation as three distinct irrigation systems which face particular corruption risks. The three irrigation systems can be typified according to the irrigation technique used, but are more importantly characterised by the institutional setting and governance (see Table 1). The corruption risk areas are related to this characteristic institutional setting and governance.

Why are these systems highlighted? First, they present the diversity of the irrigation sector. Second, these irrigation systems made an important contribution to the world's expansion of irrigated land over the last century. Worldwide an approximate area of 2.6 million km² is irrigated annually. About 40% of this area is supplied with water through state-owned canal irrigation (Vuren and Mastebroek 2000). A similar area is currently under groundwater irrigation, this area rose from 0.3 million km² in the 1950s to 1 million km² by 2000 (Shah and others 2007). Whereas it can be assumed that the area under wastewater irrigation in urban areas is significantly lower, it is estimated that about a fifth of the world's food is produced in these areas (Armar-Klemesu 2000). Moreover, the wastewater irrigation sector is becoming more and more important due to the rapid urbanisation of developing countries.

TABLE 1 Irrigation systems

SYSTEM	IRRIGATION TECHNIQUE	DOMINANT GOVERNANCE SYSTEM
Canal irrigation	Surface water led through canals after capture by dams and river diversion	Public, centrally managed by water bureaucracy
		Public, locally managed by farm communities
Tubewell irrigation	Groundwater pumped up through tubewells	Private, managed by water users
Wastewater irrigation	Wastewater directly abstracted from city drains	Informal, managed by water users

Tubewell irrigation in North China
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CANAL IRRIGATION

Political decisions on irrigation development often favour large scale, capital intensive projects, for which large sums of money directly flow into the construction sector (Repetto 1986). These costs are usually very high: investments may range between tens to hundreds of millions US $. During the procurement and construction phase, such capital-intensive irrigation projects often face a risk of inflated costs and underperformance of construction companies.

In numerous cases states or donors make large investments without ensuring adequate and timely construction. The construction of a 150 million dollar irrigation system in the Philippines is an example of such a scandalous case (Africa 2008). The irrigation system was designed in the mid 1990s and was meant to be built in parallel with the construction of a large hydropower dam. Whereas the dam arose within five years, the irrigation system was not even completed or functioning after ten years.

Originally, operation of most state-owned systems is centrally organised through government agencies. In such centrally managed irrigation systems, water users have little to say about water distribution up to farm level. This has been identified as one of the main corruption causes in large scale irrigation systems. As early as 1982 a well-known study on corruption in India's canal irrigation described how state officials from the irrigation department abused their power by accepting bribes in form of money or harvest shares (Wade 1982). The farmers were largely kept uninformed about the water availability in the dry season and relied on the auspices of the system's operators. Today, as well as in the past, similar conditions hinder participation of water users, who do not have any means to keep irrigation officials accountable for equal water distribution and maintenance activities.

North China
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TABLE 2 Main corruption risks in public canal irrigation (based on Gonzáles de Asís and others 2009)

PRINCIPLE ACTORS	RISK AREA	CORRUPTION RISKS
Public actors (and donors)	» policy making » regulation » planning and budgeting » donor financing	» Distortion in decision making on irrigation projects (bias towards capital intensive projects) » Weak formulation of anti-corruption measures in institutional reform
Public and private actors	» management and project design » tendering and procurement » construction	» Distortion in design of infrastructure (such as material and site selection) » Inflated estimates of construction costs » Underperformance of construction companies
Public actors and water users	» operation and maintenance » payment for services	» Poor access to information on water distribution » Bribery to influence water distribution, elite capture » Embezzlement of funds for infrastructure maintenance

TUBEWELL IRRIGATION

Groundwater irrigation has mainly developed through private investments of individual farmers or groups of farmers. In some countries, the government invested in tubewell drilling, but even here groundwater abstraction and distribution is hardly controlled by the state.

Easy access to groundwater has enabled households to increase their income, especially in Asia where 75% of the global groundwater irrigated area is located (Shah and others 2007). Besides the use of new crop varieties and (subsidised) pesticides, the boost of groundwater irrigation through affordable motor pumps played a major role in increasing crop yields and income. However, some claim that inequalities in rural societies have been enhanced with the intensification of groundwater use. In South Asia the development of groundwater irrigation often led to the formation of informal water markets and tubewell owners sell water to other farmers. Under these conditions tubewell owners can easily exclude marginalised farmers or over-price the marketed water (Prakash 2005). The largely uncontrolled, excessive groundwater use can lead to falling water tables, causing pumping costs to rise, and risking land subsidence or salt water intrusion in coastal areas. Since the 1990s many governments took notice of the threats posed by groundwater overexploitation and started to include groundwater management in national water policies.

However, attempts to regulate groundwater use through policy measures, such as permit systems, frequently failed. In many cases this can be linked to corruption.Permit systems are most of the time implemented when groundwater use has matured and reached the state of overexploitation. At this stage, the lack of accurate data on the use of groundwater by numerous private users makes the implementation procedure susceptible to the falsification of documents. For example in Mexico, water users were able to falsify the registration of primary water rights by overestimating their water use (Kemper 2007). Moreover, experts assume that un-official payments disturb the distribution of groundwater permits. However, little data is available to estimate the actual scale at which this practice takes place.

Food production in China
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TABLE 3 Main corruption risks in private tubewell irrigation (based on Gonzáles de Asís and others 2009)

PRINCIPLE ACTORS	RISK AREA	CORRUPTION RISKS
Public actors (and donors)	» policy making » regulation » planning and budgeting	» Distortion in decision making on groundwater management by local politicians (bias towards short-term benefits)
Public and private actors	» construction	» Drilling of illegal tubewells
Public actors and water users	» payment for services » implementation of regulation	» Over-pricing of water by tubewell owners » Avoiding compliance with regulations on groundwater use » Falsification of documents to conceal tubewell connections

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WASTEWATER IRRIGATION

More and more urban dwellers have started to cultivate crops on open spaces in the cities they live in. In West African cities, 60 to 100% of the fresh vegetable consumption is produced within the city boundaries (Drechsel and others 2006). In some of those cities urban farmers earn up to 300 US $ per month with vegetable production. Most of the urban crops are irrigated with water which is directly or indirectly extracted from the city's drainage system. This practice is known as "wastewater irrigation".

Wastewater usually contains high concentrations of nitrate and phosphate, and can thus be seen as a free fertiliser. Despite this advantage, untreated water is generally of low quality, as it contains high amounts of pathogens[2]. These contaminants regularly cause sicknesses such as skin irritations and diarrhoea infections. In addition, wastewater is likely to be polluted by chemicals and heavy metals from industries located in and around the city.

Despite being so widespread, wastewater irrigation is generally an informal and unauthorised activity. As such, organisations or institutions addressing issues of wastewater use are often found to be completely absent (Robinson and others 2010). While this doesn't directly indicate corruption concerns, it does expose a lack of good governance. Due to poor wastewater governance, marginalised city dwellers, who are substantially dependent on wastewater use, are essentially denied the right to sanitation[3].

Recognition of this problem is under way. In 2006, the World Health Organisation (WHO) published new international guidelines on wastewater irrigation, which focus on hands-on solutions[4]. The guidelines claim that health risks can be reduced significantly when farmers and consumers are aware of those risks and of the measures they can take to reduce them. Wastewater irrigation is considered an important sector supporting poor people's livelihoods and increasing food security. Consequently, the new guidelines favour the integration of wastewater irrigation in water management policies rather than strict compliance with a ban on unauthorised use.

The government of Ghana is the first African state to have acknowledged the practice of wastewater irrigation in its national irrigation policies (Government of Ghana, Food and Agriculture Ministry 2010). As the governance of wastewater irrigation is about to be formalised and new institutions will be created, new risk areas for corruption (like the ones in canal irrigation and tubewell irrigation) may appear. Therefore, the formalisation process should be carried out in a participatory manner and include anti-corruption measures.

CONCLUSION

Corruption in the irrigation sector can have different impacts which go far beyond the misallocation of public funds. Corruption exacerbates unequal water distribution, environmental degradation and public health risks. All these consequences disproportionally harm the poor, who have little opportunity to escape from poverty and who are denied of their human rights. By preventing and curbing corruption in the irrigation sector the income and food security of both urban and rural poor can be improved. Therefore, corruption in the irrigation sector needs to be addressed with real and effective anti-corruption strategies.

Although corruption is a complex and sensitive issue, much can be done to create irrigation systems which are more integer and resistant to corruption. Possible solutions to increase integrity in the irrigation sector can be derived from methods developed for other water sub-sectors and from more general anti-corruption tools (see example textbox 1). Basic principles, such as transparency, accountability and participation, need to be adopted and turned into practice to fight corruption in the irrigation sector (see examples textbox 2).

BOX 1 The integrity pact

A good tool to avoid corruption during the procurement phase and prevent the inflation of construction costs is to implement an integrity pact. The integrity pact is simply an agreement between all actors involved in the contracting process to avert corruption. This tool was originally developed by Transparency International and used in several public procurement processes. Whereas the impact of the integrity pact is hard to measure, previous experiences show that it can prevent conflicts during the procurement process; reduce project implementation costs; and assure accurate fulfilment of contracts. In cooperation with the Water Integrity Network, an Integrity Pact Manual specifically adapted to the water sector was developed in 2010 (Transparency International 2010).

2 A pathogen is a bacterium, virus or other microorganism that can cause disease.

3 In 2010 the UN Human Rights Council recognised drinking water and sanitation as human rights (see: www.rightowater.info). The practice of unprotected wastewater irrigation inflicts the right to sanitation.

4 In 2006 the WHO published the "Guidelines for the Safe Use of Wastewater, Excreta and Greywater in Agriculture and Aquaculture".

As argued in this paper, there are no blueprints which apply to canal irrigation, tubewell irrigation and wastewater irrigation. The irrigation sector is very divers and each type of irrigation system runs different risks. These risks need to be analysed in order to address integrity issues adequately. Moreover, the use of anti-corruption measures in the irrigation sector should be thoroughly examined against the effect it might have on the poor. To avoid such paradoxical outcomes, anti-corruption strategies need to empower the poor to defend their own interests.

BOX 2 Practical measures to prevent corruption in the irrigation sector

- Inclusion of informal irrigation practices in the national irrigation policy is a step forward to keep urban water managers accountable for reducing health risks in wastewater irrigation.
- A computerised system of card readers at pumping installations can improve the transparency of groundwater withdrawal and water fee payments for tubewell irrigation.
- The foundation of WUAs and the election of WUA leaders offer water users a platform to participate in the management of large scale canal irrigation systems.

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