Tanzania Journal of Development Studies, Vol. 18, No. 1, 2020: 17-28

'Milking the Cow Without Feeding It': Perceptions of Communities on Water-user Fees for Smallholder Irrigation in Ruaha Sub-Basin, Tanzania

Joseph Kahimba,[*] Stephen Maluka[**] & Esther W. Dungumaro[§]

Abstract

Water-user fees in Tanzania, like in other low-income countries, have been introduced mainly as a response to neo-liberal thinking which, among other things, believes that water has an economic value and should be recognized as an economic good. The objective of this study was to understand perceptions on water-user fees among smallholder farmers in the Ruaha Sub-basin, Tanzania. It employed qualitative and quantitative tools, including in-depth interviews, focus group discussions, and questionnaires. Qualitative data were analysed using a thematic approach, while quantitative data were analysed using SPSS Version 20. The findings revealed that most smallholder irrigators were dissatisfied with the payment, amount, and the use of water fees. There were three major reasons for the high level of dissatisfaction. First, owners of private water-use permits did not see why they should pay for water that had no (physical) investment on it. Second, some owners of group water-use permits were unwilling to pay for water because they felt that they did not get adequate support from the government since all irrigation water-related operational costs, including the constructions and maintenance of irrigation canals, were undertaken by themselves. The lack of community participation in determining the amount of water-user fees and ad-hoc changes of the amount of the fees was another reason for the dissatisfaction. This paper proposes some recommendations for effective management of water resources at a community level.

Keywords: *water-user fees, water resources, smallholder irrigators, Ruaha sub-basin, Tanzania*

Introduction

The concerns on water crisis—i.e., water scarcity and water related violent conflicts due to high increasing demand—have a long history (Falkenmark et al., 1990; Clarke, 1991; Postel, 1992; Chikozho & Mapedza, 2017). One positive element with early concerns on water crisis is that it was highlighted together with the concept of the '*right to water',* specifically during the UN's Conference on Water in 1977 at Mar del Plata (UN, 1977; Chikozho & Mapedza, 2017). The convergence point in the course of analysing water as a vulnerable and finite resource in one hand, and the concept of the right to water on other hand, led to the agreement that

[*] Institute of Development Studies, University of Dodoma, Dodoma, Tanzania: josephkahimba5@gmail.com
[**] Institute of Development Studies, University of Dar es Salaam
[§] Institute of Development Studies, University of Dar es Salaam

water, especially freshwater, should be 'governed better' (Lein & Tagseth, 2009; Gupta, 2011). However, the big questions that remained unsolved were: What does 'better/good governance' of water really mean; and how should it be carried out in practice? (Lein & Tagseth, 2009).

In an attempt to address the above questions, a new international consensus emerged from the late 1980s of what has been described as key principles for sound water management (Lein & Tagseth, 2009), or what some scholars call "the new water management paradigm" (Chikozho & Mapedza, 2017). The report of the World Commission on Environment and Development (1987), the Dublin principles (1992), and the so-called Agenda 21 (1992), for example, signifies such a fact. The new paradigm for water management that manifested in the framework of the Integrated Water Resources Management (IWRM) challenged the traditional water development and governance system, which to a large extent relied almost exclusively on centralized infrastructure and decision-making (Chikozho & Mapedza, 2017; Chikozho, 2008; GWP, 2012), and also ignored the informal traditional systems that had for several years guided the day-to-day water-related interactions in local communities in most developing countries (Odgaard & Maganga, 1995; Maganga, 2003; Sokile & Van Koppen, 2004).

It is pertinent to make it clear here that to a large extent the new international consensus on key principles for sound water management was underpinned by neo-liberal approaches that emphasize, *inter alia*, a *"rolling back of the state from the frontiers of development planning"* and treating water supply services as an *'economic'* product that needs to be paid for (Chikozho & Mapedza, 2017: 53). Principle No. 4 of the Agenda 21 of the UN Conference on Environment and Development of 1992, for example, states that "Water has an economic value in all its competing uses and should be recognized as an economic good" (UN, 1992). The IWRM, which is a cornerstone of current water policies and laws in most developing countries, was also underpinned by neo-liberal approaches that, among others, perceives water as an economic good that needs to be paid for (GWP, 2000; Chikozho & Mapedza, 2017).

Currently, neo-liberal approaches to water governance have been promoted in many low- and middle-income countries (LMICs) by various international players such as the Global Water Partnership (GWP), World Water Council, and the World Bank (WB) as important ways for achieving better governance of water resources (ibid.). In response to this, most LMICs have adopted extensive reforms in the water sector as part of the implementation of neo-liberal approaches for water governance (Boelens & Bustamante, 2005; Meinzen-Dick, 2007; Chikozho & Kujinga, 2017). The reforms involve the adoption of new water policies and laws of which, among others, insist on the use of formal water-use permits, water-user charges, and Water-user Associations (WUAs), especially at the community level (URT, 2002; Maganga, 2003; Boelens & Bustamante, 2005; Meinzen-Dick, 2007).

Tanzania, for example, adopted a new water policy in 2002 (URT, 2002), and thereafter enacted a new Water Resources Management Act No. 11 in 2009 (URT, 2009). The new water policy clearly acknowledges the international consensus on key principles for water management, especially the Dublin statement, and Agenda 21 (URT, 2002: 15). For example, the water policy affirms that all water-uses, especially for economic purposes, will be charged to realize the objective of water resources management (URT, 2002: 29). Similarly, the Water Resources Management Act No. 11 of 2009 clearly states that the Basin Water Board may, by notice in the *Gazette,* announce charges to be levied in respect of water abstraction, effluent discharge, payment for environmental services, granting of permits, and any other matter for which the Board considers charges should all be made (URT, 2009: 406). Furthermore, the Water Resources Management Act creates a room for trading of water-use permits by stating that a water-use permit holder may, with the consent of the Basin Water Board, trade her/his right to use water to any one, and for any duration, provided that the duration of the permit is not exceeded (ibid: 383). The aim of this paper, therefore, is to show experiences and local communities' perceptions on water-user fees in the Ruaha sub-basin, Tanzania.

The Concept of Water-user Fees

Water-user fees are the charges levied on the amount of water used or on the rights to use water regardless of the amount used (Hoggan et al., 1977). Revenue-sufficiency is the primary objective of pricing water utilities (Tiger et al., 2014). In fact, different scholars of water resources agree that economically viable water systems, such as irrigation systems, contribute to the wider economy (Perret & Geyser, 2007), hence water utilities must be financially self-sufficient to recover not only the cost of daily operations, but also fund capital improvements (Cosgrove & Rijberman, 2000; Tiger et al., 2014). In this regard, water-user fees may be charged where there is additional investment on water through supply, diversion or storage that assures long-term viability and sustainability of the services (GWP, 2000; Tardieu, 2005). Sometimes, charges may be levied for the privilege of utilizing a public resource unrelated to development costs, and/or indirectly levied on products or services related to water resources (Hoggan et al., 1977). Apart from such primary objectives, there are also secondary objectives of water-user fees, which are: conservation promotion, affordability, and economic development (Tiger et al., 2014).

According to Hoggan et al. (1977), there are five criteria that are important to consider from the early stages of designing water-user fees to make water-user fees effective. These include equity, economic efficiency, allocation effectiveness, administrative simplicity, and revenue generating potential. The equity principle is about fairness, which requires equal treatment of equals. In competitive markets, the economic efficiency principle requires that prices (water charges rates) respond to automatic and impersonal market mechanisms that balance the quantity of goods supplied with the quantity of goods demanded. The administrative simplicity principle stipulates that the more a uniform fee structure, the simpler it becomes to

administer. Finally, the revenue generating potential principle for the design of water-user fees press calls on revenues generated or collected be used to pay for operations, maintenance, debt services, and so forth (Hoggan et al., 1977).

Methodology

Data for this article was obtained from a study conducted in three sub-catchments of the Ruaha sub-basin, which constitutes the upper part of the Rufiji Basin in Tanzania. The three sub-catchments were: Kimani sub-catchment (Mbarali district, Mbeya region), Tungamalenga sub-catchment (Iringa district, Iringa region), and Lukosi sub-catchment (Kilolo district, Iringa region). The three sub-catchments were purposively selected to capture geographical representation of the upper, middle, and lower sub-catchments of the Ruaha sub-basin. These three were considered to be important because the nature and intensity of concerns over water resources (conflicts) among and between different water stakeholders in the Ruaha sub-basin in general vary between up-stream, middle-stream, and the lower-stream users (Magayane & Mdemu, 2005). Two villages were purposively selected from each sub-catchment based on the criteria of representing upstream and downstream water-users (in the case of Kimani and Lukosi sub-catchments); and/or shared sources of water (off-take), particularly for irrigation activities (in the case of Tungamalenga sub-catchments). In addition, the villages had to be hosting at least one of the water-user associations (WUAs). The villages were Mbuyuni and Itamba villages for the Kimani sub-catchment; Tungamalenga and Makifu villages for the Tungamalenga sub-catchment; and Ruaha Mbuyuni and Mtandika villages for the Lukosi sub-catchment.

A total of 361 questionnaires were administered to the community members who were randomly selected. In addition, 39 in-depth interviews and 6 focused group discussions (FGDs) were conducted. In-depth interviews were conducted with leaders of WUAs, village and ward leaders, traditional leaders (elders), and representatives of the Rufiji Basin Water officers. Respondents were purposively selected based on their roles in water management in the Ruaha sub-basin. The recruitment of participants for FGDs was done with the facilitation of leaders of WUAs and village executive officers (VEOs).

Data obtained from questionnaires were analysed statistically using the Statistical Package for Social Sciences (SPSS) software, Version 20. Simple descriptive statistics were used to calculate totals, frequencies and percentages that were further cross-tabulated for the purpose of comparison, contrast, and interpretation. The results are presented in charts and graphs. Qualitative data collected through in-depth interviews and focus group discussions were analyzed using the thematic framework approach in which data were classified and organized according to key themes, concepts, and emergent patterns (Braun & Clarke, 2006). Thereafter, data were summarized and synthesized, retaining as much as possible key terms, phrases, and expressions of the respondents. Quotations are used for more narratives that provide important insights.

Findings

This section presents key findings of the study. The findings are organized into two themes, namely: water-user fees in the Ruaha sub-basin; and community satisfaction and perception on water-user fees.

Water-user Fees in Ruaha Sub-basin: The Case Studies

In all areas involved in this study, two types of water charges were commonly used: water abstraction charges, and the charges associated with the granting of water-use permits. During the conduct of this study, the valid amount of charges associated with the granting of water-use permit (water-use permit application charges) amounted to TZS40,000 (US$20). It was charged at a flat rate to all applicants, i.e., group water-use permits and private water-use permits. Water abstraction charges were levied annually per water-use permit. Charges levied to private water-use permits (abstraction through water pumps) were uniform to all permits; and amounted to TZS150,000 (US$70). Charges levied to group water-use permits (abstraction through canals) varied from one water-use permit to another. Table 1 gives a summary of water charges levied to group water-use permits in relation to the annual fees paid by individual members as per 2015.

Table 1: Water Charges Levied to Group Water-use Permits and Individual Members as per 2015

Name of WUAs	Annual Water Fees (in TZS)	
	Per Group	*Per Person per Acre*
Ruaha Mbuyuni WUA	434,000	20,000
Mgambalenga WUA (Mtandika)	350,000	5,000
Tungamalenga WUA	578,150	10,000
Makifu WUA	600,000	5,000
Mbuyuni WUA	7,000,000	20,000
Isenyela WUA (Itamba village)	1,980, 000	20,000

Source: Field Survey (2015)

Community Satisfaction and Perception on Water-user Fees

This study found that out of 334 respondents, 177 (53%) were not satisfied with the payment of water fees, while 127 (38.02%) were satisfied with it. The major reason for the high level of dissatisfaction was that most respondents, especially holders of private water-use permits (those who abstracted water through water pumps) did not see any reason of paying for water. Similar views were expressed by respondents during interviews as exemplified by one respondent:

> *"Why should we pay for water from the river? The river has been here for years, and we were getting water for free. Telling people to pay for water which has been given by God is unacceptable" (*KI_06, Village 1).

Furthermore, people were unwilling to pay for water because they did not get any help from the government in meeting the expenses of water pumps and all related operational costs, such as buying fuel and maintenance costs, which were all met by themselves. A similar concern was raised by some members of WUAs, especially those with traditional irrigation canals such as the Mgambalenga

irrigation scheme in Mtandika village, Isenyela irrigation scheme in Itamba village, and in Makifu and Tungamalenga irrigation schemes. In these schemes, almost all water works such as construction and maintenance of canals were done through voluntary labour, known as *maendeleo.* Respondents felt that collecting water fees from water-users was like *'milking a cow without feeding it'.*

Figure 1 summarises respondents' levels of satisfaction in the payment of water fees, showing that about 31.44% of the respondents were strongly dissatisfied with the payment of water fees, while 21.56% were dissatisfied with the payment of water fees. Only 7.78% of the respondents were strongly satisfied with the payment of water fees, and 30.24% were satisfied with the payment of water fees.

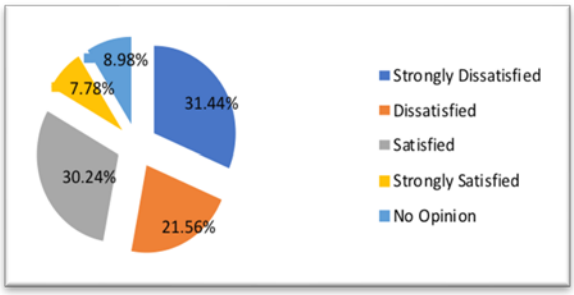

Figure 1: ***The Levels of Satisfaction with the Payment of Water Fees***
Source: Field Survey (2015)

The findings of this study also revealed that there was a high level of dissatisfaction among the people concerning the amount of water fees. Out of 332 respondents, 221 (66.56%) respondents were not satisfied with the amount of water fees. Only 69 (20.88%) respondents were satisfied with the amount of water fees. Figure 2 gives a summary of the respondents' level of satisfaction on the amount of water fees.

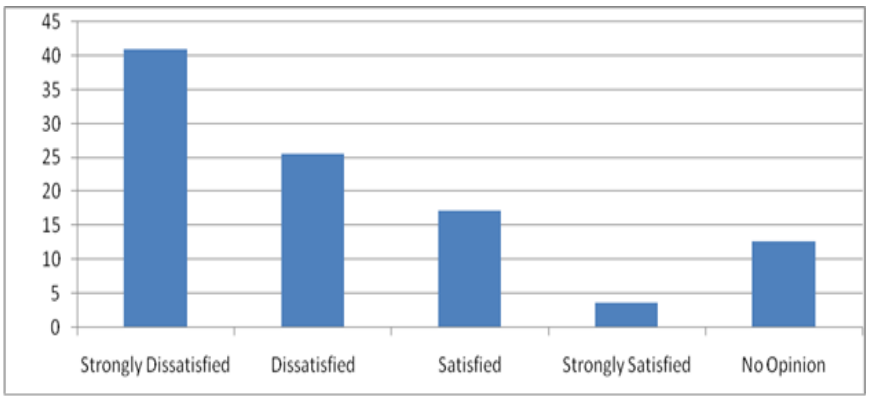

Figure 2: ***The Level of Satisfaction on the Amount of Water Fees***
Source: Field Survey (2015)

The amount of water fees and the way it was communicated to water-users were the major sources of dissatisfaction. This created serious tensions not only between officers of the Rufiji Basin Water and owners of water-use permits -- both private and group owners -- but also between members of WUAs and their leaders. To the private holders of water-use permits, for example, the lowest rates before 2014 was TZS35,000, but after a periodic review in 2014 the rates skyrocketed to TZS150,000. This change created serious conflicts between the Rufiji Basin Water authorities and private owners of water-use permits, especially in Ruaha Mbuyuni and Mtandika villages. The owners resisted against the new amount for three major reasons: (i) the amount of TZS150,000 was unaffordable to most of them; (ii) they did not see the justification of the big difference between the former and the new rates; and (iii) the new rates were brought to them without a prior notice.

Similarly, most of the WUAs blamed the Rufiji Basin Water authorities for not involving them in decisions concerning changes of water-user fees. In addition, WUAs were not even given a prior notice on the changes of water-user fees. Key informants reported that in most cases they only saw the new rates of water-user fees when they received invoices. The lack of participation and ad hoc changes of the amount of water-use charges were also a source of tension between members of WUAs against their leaders, as exemplified by one respondent:

> *"We got huge resistance as we proposed the change of water fees to our members from TZS5,000 to TZS8,000, and we got more resistance as we proposed the change of water fees from TZS8000 to TZS20,000. Now, we don't know how we are going to convince them to pay more than TZS20,000"* (A leader of WUA, Ruaha Mbuyuni village).

One of the mechanisms opted by some of the WUAs in the struggles of avoiding big water charges was to request for a new water-use permit. The aim was to change from having an annual water-use permit to a seasonal water-use permit in the hope that water charges would go down by having a seasonal water-use permit, as noted by one of the leaders of Mbuyuni Water-user Association:

> *"We pay TZS7,000,000 as the annual water fee. This is a very big challenge because every day water fees go up. We have decided to pay just for one season... therefore, we have decided to apply for a new water-use permit of which we will be paying only for one season instead of paying annually."* (A leader of WUA, Mbuyuni village).

For some people, the high increase of water charges was associated with the perspective that water-use permits were mainly meant to mint money: that it was just a project created by Rufiji Basin Water authorities to generate more money. Some people also viewed water-user fees as an obstacle to dry-season agriculture (gardening):

> *"We started using these water permits since 1992, but they were more environmental oriented. Nowadays, water-use permits are business oriented. We started with TZS8,000 as water fee but now we are paying TZS7,000,000. The Rufiji Basin Water officers take a lot of money from us, but we don't see their help to us. Nowadays, all type of water-use in this area requires payments (money). We are wondering why we are being forced to pay for water which has been granted free by God. This has contributed to the loss of the dry season agriculture (gardening). We are now depending on rain agriculture alone."* (Interview with a female elder, Mbuyuni village).

The study findings revealed that only 16.21% of the respondents were satisfied with the usage of water charges. However, a big number of respondents had the perception that water charges were mainly meant for the construction and maintenance of water infrastructures, such as water off-takes and canals. Thus, 66.36% of the respondents were dissatisfied with the usage of water charges as most of water infrastructures were constructed and maintained through voluntary labour, famously known as *maendeleo.* Therefore, they saw that they were paying for water only because they were forced by the law since if they did not pay, they there could be water cut-offs, and/or the destruction of water pumps. Figure 3 summarizes the level of respondents' satisfaction with the use of water fees.

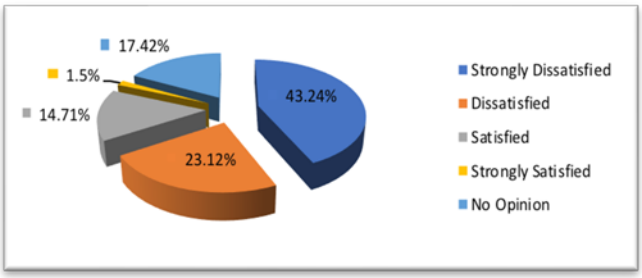

Figure 3: ***The Level of Satisfaction with the Use of Water Fees***
Source: Field Survey (2015)

Despite grievances on the rates and use of water fees, most of the respondents were satisfied with the period of paying water fees. The time of paying for water fees was relatively long, ranging from January to July. During this period, most peasants had revenues obtained from selling harvests, and therefore could afford payments. Figure 4 shows that out of 334 respondents, 188 (56.3%) were satisfied with the period of paying water fees, while 32 (10%) were strongly satisfied. In contrast, only 31 (9%) were strongly dissatisfied, 24 (7%) were dissatisfied, and 59 (18%) had no opinion.

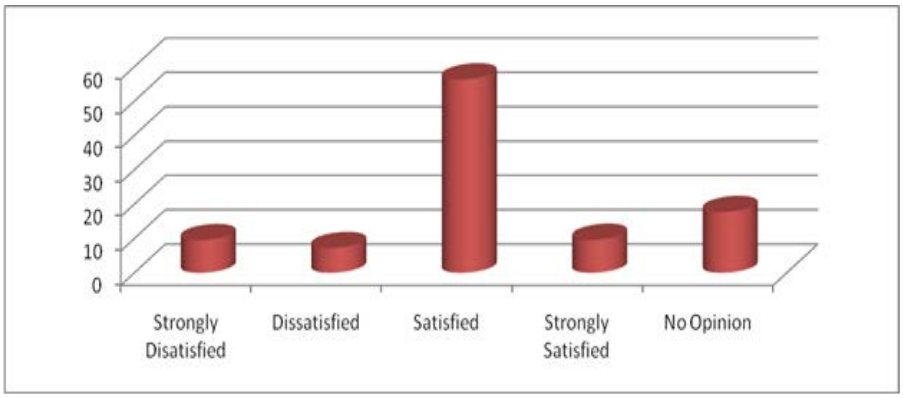

Figure 4: ***The Level of Satisfaction with the Period of Paying Water Fees***
Source: Field Survey (2015)

Discussion of Findings

Water-user fees in the Ruaha sub-basin, like in other parts of Tanzania, were introduced mainly as a response to the neo-liberal thinking, which, among other things, advocates that water has an economic value in all its competing uses; and should be recognized as an economic good. This was done in the hope that water-user fees would mitigate the growing water scarcity in the sub-basin. However, the findings of the study revealed that most local communities, especially smallholder irrigators, were dissatisfied with the payment of water fees, amount of water fees, and the use of water fees. Those who paid, did so only to avoid water cut-offs, and/or the destruction of water pumps in the case of holders of private water-use permits.

The high level of unwillingness of local communities to pay for water could be due to a gap in the understanding of the priorities of the use of water charges between local communities and the Basin Water authorities. Most of the local people perceived that water charges could be used to invest on water infrastructures (irrigation infrastructures) such as the construction or improvement of irrigation canals. The Water Resources Management Act No. 11 of 2009, which also gives the Basin Water authority the mandate of overseeing the management of water resources in the basin, stipulates that the charges collected shall be used for financing water resource management, including costs of gathering information, monitoring water resources and their use, controlling water resources, and protecting water resources, including controlling the discharge of waste water. The second use of water charges was to fund water resources development and construction of waterworks. Therefore, giving water resources development the second priority as far as the use of water fees is concerned was like giving it no priority at all. This is because, given the low income of most people, especially in rural areas, the cost recovery of most public services—including water services—tends to be low. The WHO/UNICEF (2000) confirms this argument by highlighting that in the public water sector, tariffs and fees—either in domestic or irrigation schemes—seldom cover even basic operational costs, let alone capital costs.

In providing quality water services, including irrigation water, a big challenge is related to financial recovery of operation and maintenance costs (Tardieu, 2005; Perret & Geyser, 2007), which affect the quality of services, community members' trust in water committees, willingness to pay for water services, and consequently water committees' decisions about the governance, management and improvement of the quality of water services (Tinoco, 2012). In line with this argument, most respondents—both private and group owners (WUAs) of water-use permits—had the opinion that collected water charges should be retained for the construction, modification, maintenance, and expansion of water infrastructures (irrigation systems), instead of a big share being collected and used by the Basin Water authority, and for other priorities. Van Koppen et al. (2006) have a similar view: that a higher willingness and ability to pay for water schemes that better meet one's needs can be harnessed to attain a better level of—or even full—cost-recovery; and hence higher financial and technical scheme sustainability.

Furthermore, as some scholars (e.g., Savage, 2003; Kouassi-Komlan & Fonseca 2004) argue, instead of basin authorities relying on water fees, well-targeted subsidies and

cross-subsidies are needed to make water available to the poor in poorest areas where income from water-related production is low. In fact, in subsistence irrigation agriculture, subsidization by government is usually justified by adjustments for societal objectives (Perret & Geyser, 2007 in Rogers et al., 1998), such as food security and positive impact on rural development, and poverty eradication in general.

Conclusion and Recommendations

The system of water-user fees as currently administered in the Ruaha sub-basin is not clearly understood by most members of the local communities. Most have negative perceptions on the payment of water fees, the amount paid, and the use of water fees. The general perception is that water fees is a project created by the Basin Water authority for the mere purpose of generating revenue to the Basin, with no help to the local communities. With this perspective, water fees have turned into source of tension and mistrust not only between local communities and the Basin authorities, but also between members of WUAs and their leaders.

Therefore, this paper recommends the following for effective management of water resources, and specifically water-user fees.

- The Rufiji Basin Water authority should involve local communities—through representatives of WUAs and other groups of water-users—in the process of designing water-user fees structures, and establish proper and predictable channels of communication in case of any changes of water-user fees, including the provision of prior notice.
- The Rufiji Basin Water authority should provide education to the local communities on the justifications and importance of water-user fees by frequently organizing sensitization programmes.
- The Water Resources Management Act No.11 of 2009 should set special criteria for one to be liable for water-use permits and water-user fees. Among others, the criteria should be based on the production level, which also translates into water abstraction amounts. In this regard, water-use permits, and their related water-user fees, should be for medium- and large-scale water-users who normally use large quantities of water and make profit from water-dependent activities.

References

Boelens, R. & R. Bustamante (2005). Formal Law and Local Water Control in the Andean Region: A Field of Fierce Contestation. Paper Presented at International Workshop on African Water Laws: Plural Legislative Framework for Rural Water Management in Africa, 26-28 January, 2005, Johannesburg, South Africa.

Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology, *Qualitative Research in Psychology*, 3 (2), Taylor & Francis.

Chikozho, C. & K. Kujinga, (2017). Managing Water Supply Systems Using Free-Market Economy Approaches: A Detailed Review of the Implications for Developing Countries. *Physics and Chemistry of the Earth*, 100: 363 – 370, Elsevier.

Chikozho, C. & E. Mapedza, (2017). Free-Market Economics and Development Statism as Political Paradigms: Implications for Water Governance Theory and Practice in Developing Countries. In: E. Karar (ed.). *Freshwater Governance for the 21st Century*. Springer Open.

Chikozho, C. (2010). *The Realities and Challenges of Reforming the Water Sector in Zimbabwe.* Berlin: VDM Verlag Publishers.

Chikozho, C. (2008). Globalizing Integrated Water Resources Management: A Complicated Option in South Africa. *Water Resources Management*, 22: 1241 – 1257.

Clarke, R. (1991). *Water - The International Crisis.* London: Earthscan.

Cosgrove, W. & F. Rijberman, (2000). *A Water Secure World*. World Water Vision Commission Report: The Hague, The Netherlands.

Falkenmark, M., J. Lundqvist & C. Windstrand, (1990). *Water Scarcity: An Ultimate Constraint in Third Word Development: A Reader on a Forgotten Dimension in Dry Climate Tropics and Subtropics.* Linkoping: University of Linkoping.

Global Water Partnership (GWP). (2000). Integrated Water Resources Management. TEC Background Paper No. 4, Stockholm: Global Water Partnership.

Global Water Partnership (GWP). (2012). *The Handbook for Integrated Water Resources Management in Transboundary Basins of Rivers, Lakes and Aquifers*. Geneva: GWP.

Gupta, J. (2011). An Essay on Global Water Governance and Research Challenges. In: M. Van der Valk & P. Keenan (eds.). *Principles of Good Governance at Different Water Governance Levels,* UNESCO.

Hoggan, D. H. O. W. Asplund, J. C. Anderson & D. G. Houston, (1977). A Study of Feasibility of State Water-user Fees for Financing Water Development. Report Paper 412.

International Conference on Water and the Environment (ICWE). (1992). Dublin Statement on Water and Sustainable Development. Dublin, Ireland.

Kouassi-Komlan, E. & C. Fonseca. (2004). Micro Finance for Water and Sanitation in West Africa. In: *Proceedings of the 30th WEDC International Conference*, *Vientiane, Lao PDR*, *2004*, on People-centred approaches to water and environmental sanitation: doi: http:// www.irc.nl/page/459, (Accessed on 15th May 2014).

Lein, H. & M. Tagseth, (2009). Tanzania Water Policy Reforms: Between Principles and Practical Applications. *Water Policy*, 11(02): 203 – 220.

Maganga, F.P. (2003). Incorporating Customary Laws in Implementation of IWRM: Some Insights from Rufiji River Basin. *Physics and Chemistry of the Earth*, 28: 995 – 1000, Elsevier.

Magayane, M. D. & Mdemu, V. M. (2005). Conflict of Water-use Between Hydropower and Irrigation in Tanzania: The Conundrum of Sectoral Policy Approaches to Water Resources Development, doi: http://www.tzonline.org/pdf/conflictofwater.

Meinzen-Dick, R. (2007). Beyond Panaceas in Water Institutions. In: *Proceedings of the National Academy of Sciences of the U.S.A., 104(39*): National Academy of Sciences.

Nyarko, K.B., S. Oduru-Kwarteng & I. Adama. (2007). Cost Recovery of Community-managed Piped Water Systems in Ashanti Region, Ghana. *Water and Environmental Journal,* 21: 92-99.

Odgaard, R. & F.P. Maganga. (1995). Local Informal Land and Water Management Systems in the Great Ruaha Basin, http://www.sciencedirect.com, (Retrieved, 6th June 2014).

Perret, S. & M. Geyser, (2007). The Full Financial Costs of Irrigation Services: A Discussion on Existing Guidelines and Implications for Smallholder Irrigation in South Africa. *Water SA*, 33(1).

Postel, S. (1992). *The Last Oasis*. London: Earthscan Publications Limited.

Rogers, P. Bhatia, R. & Huber, A. (1998). Water as a Social and Economic Good: How to Put the Principle into Practice, Global Water Partnership, Background papers No. 4, Sida Publishers: Stockholm, Sweden.

Savage, D. (2003). Governance and Financing of Water Supply in Ethiopia, Kenya and South Africa: A Cross-Country Synthesis. *Sector Finance Working Papers No. 5,* Nairobi, Kenya: Water and Sanitation Program-Africa Region, The World Bank.

Sokile, C.S. & B. Van Koppen, (2004). Local Water Rights and Local Water-User Entities: The Unsung Heroines to Water Resource Management in Tanzania. *Physics and Chemistry of the Earth*, 29: 1349-1356, Elsevier.

Tardieu, H. (2005). Irrigation and Drainage Services: Some Principles and Issues Towards Sustainability. *Irrigation Drain*, 54(3): 251 – 262.

Tiger, M., J. Hughes & S. Eskaf, (2014). *Designing Water Rate Structures for Conservation and Revenue Stability.* University of North Carolina: Environmental Finance Centre.

Tinoco, C. A. B. (2012). Governance of the Drinking Water Supply Service: A Case Study of Three Mexican Communities. PhD thesis, University of East Anglia.

United Republic of Tanzania (URT). (2009). The Water Resources Management Act No.11 of 2009, Dar es Salaam, Tanzania.

URT. (2002). *National Water Policy.* Ministry of Water and Livestock Development, Dar es Salaam, Tanzania.

United Nations. (UN). (1992). *The United Nations Earth Summit: The UN Conference on Environment and Development, Rio de Janeiro.* London: Regency Press.

United Nations. (1977). *Report of the United Nations Water Conference*, Mar del Plata: UN.

United Nations. (1972). *Report of the United Nations Conference on the Human Environment*. United Nations Publications.

Van Koppen, B., M. Giordano, J. Butterworth & E. Mapedza. (2007). *Community-based Water Law and Water Resource Management Reform in Developing Countries: Rationale, Contents and Key Messages*. CAB International.

Van Koppen, B., P. Moriarty & E. Boelee. (2006). *Multiple-Use Water Services to Advance the Millennium Development Goals, Research Report No. 98.* Colombo, Sri Lanka: International Water Management Institute (IWMI).

WHO/UNICEF, (2000). Global Water Supply and Sanitation Assessment 2000 report, Geneva, Switzerland: WHO/UNICEF: http://www.wssinfo.org/ pdf/ GWSSA 2000 report.pdf.

World Commission on Environment and Development (1987). *Our Common Future*. Oxford: Oxford University Press.