Chapter 4

Effects of Irrigation Management Practices on Water Allocation Among Farmers in Kiladeda Sub-Catchment, Tanzania

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ABSTRACT

Kiladeda River in Pangani Basin, Tanzania, plays a vital role of providing water for agricultural activities of the sub catchment. However, it is experiencing a problem of inequitable distribution of irrigation water among farmers. Cross-sectional data was collected from farmers both in upstream and downstream using questionnaires, while river discharge measurements were conducted in referenced spot gauging stations. WEAP model was used to analyze water demand and allocation among farmers. Furrow irrigation (94%) and plastic buckets (6%) were the main irrigation water management practices. The results of WEAP model revealed a water shortage of about 53.6% of the total irrigation water required. The annual irrigation water

DOI: 10.4018/978-1-5225-2719-0.ch004

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demand and unmet demand were 13.93Mm³ and 7.47Mm³ respectively, and are both expected to increase twice in 2020. This high water demand for irrigation could be the main cause of excessive water abstraction. A partnering approach is recommended to improve irrigation water management; reviewing of laws, regulations and water rights.

INTRODUCTION

The global water demand for irrigation farming has already been exceeded due to an uneven distribution of water resources and population densities (Qadirn et al., 2010). Among the uses of water in several sectors, agricultural water has been considered as a powerful factor for providing food security and providing countless opportunity for crop diversification to feed the growing population in the world (Hussain et al., 2011). Nonetheless, it is clear that worldwide irrigation farming is the most important off stream water uses and placing an ever increasing pressure on the available water resources (Booker, et al., 2012). It consumes more than 70% of the total water withdrawn for human activities (WWAP, 2012) and recent studies show that global agricultural water demand will increase by 5% from 2,743 km³ in 2008 to 3,858 km³ in 2050 (FAO, 2011; WWAP, 2012). Similarly, irrigated agriculture contributes significantly to the most Sub Saharan African countries’ economies, employments, and food supplies (FAO, 2011; IFAD, 2012). It contributes an average of 30% of GDP and 67% of employment in the region, thus, it is essential for accelerating agricultural growth and stabilizing the livelihoods of the region. However, the proportion of water going to irrigated agriculture is often much higher. It accounts for more than 90% of the total water withdrawal (FAO, 2011). Still, water availability for irrigation in these countries is already limited, and water is distributed inequitably among farmers in the upstream and downstream of the rivers. Irrigated agriculture is the backbone of most of the East African countries. For example, it contributes 25% of the GDP and 51% of total employment in Kenya (Ntale and Litondo, 2013). It also contributes 40% of GDP and 80% of employment in Tanzania (URT, 2009). However, the demand for irrigation water is increasing alongside rapidly increasing populations. For instance, agriculture consumes 92.9% of the total water withdrawn in Tanzania and 88.7% of this water is consumed by irrigation farming. Water availability for irrigation is a growing challenge in most countries in Africa (UN, 2013). This situation has been attributed to insufficient and inappropriate irrigation infrastructure leading to low water use efficiency and water losses of about 85% of water (MOWI, 2010). In Pangani Basin, Tanzania, irrigation farming is commonly practised by smallholder farmers, consuming 400
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