



## WETLAND RELATED LIVELIHOODS, INSTITUTIONS AND INCENTIVES FOR CONSERVATION IN THE GREAT RUAHA RIVER WETLAND SYSTEM

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### ABSTRACT

Wetlands are among the world's most productive environments and of tremendous economic benefits to society. Though wetland utilization for household agriculture and wetland resource extraction for household income generation may be the two most important factors driving wetland degradation in Tanzania the furtiveness of small decisions makes mitigation efforts exceedingly difficult. Like other families throughout the world, the decision that Tanzanian families make in regard to the use of wetland resources are strongly influenced by desire to improve their livelihoods. The importance of trade to household economies and as a determinant of wetland resources status prompts an examination of the potential for using market-grazing. About 95% of the population in wetland adjacent communities are involved in agricultural production. The main institutions involved in wetlands management are grouped in different categories based on the roles they play in wetlands management. These include connectors, whistle blowers, enforcement, information exchange, management, education and capacity building, lobbying, entrepreneurs, following and reinforcing, leading, rule creation, funding, wrecking and caring, spiritual. The major incentives for wetlands conservation include clear land tenure), alternative income generating activities, joint management and stakeholder participation and privatization of wetland management.

based incentives and relevant institutions to enhance household incomes while conserving wetland biodiversity. Balanced utilization of wetland ecosystems can be achieved if wetland related livelihoods, institutions and incentives for their management are well planned, in place and understood by stakeholders. This study was conducted in Malolo B and Msosa villages in the Great Ruaha River wetland system to determine the existing wetland related livelihoods, institutions and incentives for management. The major wetland based livelihoods in order of magnitude are associated with use of wetlands for agriculture, source of water for various uses, fishing, source of construction material such as for roofing, game meat, earth brick making, fodder/use of wetlands for livestock

### INTRODUCTION

Wetlands areas are under many uses since time immemorial for socio-cultural and economic benefits to society (Barnabe 1980; Dungan 1990). Collectively, wetlands are of considerable socio-economic and ecological values (Dungan 1990). Socio-economically, wetlands support family livelihoods as bases for crop production, grazing animals, fishing, and harvesting medicinal plants among others (Ogunseitan 2007). Ecologically, wetlands are instrumental in water storage, filtration and supply, flood control, perform sediment, nutrient and toxins retention functions and are also important habitats for biodiversity both flora and fauna (Kibwage *et al.* 2008).



The intergovernmental treaty known as Ramsar convention provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources (Ramsar Convention Secretariat 2006). Wetlands are among the world's most productive environments and of tremendous economic benefits to society (Ogunseitan 2007). Sustainable provision of such benefits to the community justifies the cost of wetland conservation. Nevertheless, rapid urbanization and population growth, among others, have escalated wetland degradation and put the livelihoods of local communities that directly rely on such ecosystems at risk (Duncan 1997; Kibwage *et al.* 2008). Many wetlands, especially in the river drainage basins have been degraded in many ways including drainage for agricultural purposes, dumping of waste from urban sewerage, sand mining and extraction of clays for brick making, deforestation of swamp forests, overgrazing and nutrient enrichment from agricultural land (Kibwage *et al.* 2008).

Well managed wetlands could have many benefits to the society in various ways including but not limited to reducing flood impact, regulating water flow and moderate drought effects, recharging ground water, supplying and storing drinking water (Duncan 1997). Nevertheless, well-managed wetlands require functioning institutions that do not only promote their sustainable utilization but also community livelihoods (Kibwage *et al.* 2008).

Wetlands have increasingly been facing serious problems of degradation. A decline in agricultural productivity is the result, accompanied by serious household food insecurity. As more people immigrate to wetland areas and reclaim the wetlands or distort the ecosystem balance, coupled with population increase, the problems are bound to get worse. Wetlands can be productive and balanced exploitation of the wetland resources achieved if wetland related livelihoods, institutions and incentives for wetland management are well planned, in place and well understood by different stakeholders. This is largely because conversion of wetlands to uses other than conservation is determined by household pursuit of welfare improvement.

Sustainable wetland resource use may lead into short-term impoverishment with positive long-term effect on both community livelihood and sustainable wetland resources (Kibwage *et al.* 2008).

Wetlands in Tanzania provide essential ecosystem and support people's livelihoods. They are increasingly being recognized as important natural resources because they provide a wide range of environment functions and provide a number of products that socially and economically benefit adjacent community (Adger and Luttrell 2000). They support an extensive trading and transport system, fishing grounds, agro-pastoral activities, hydrological processes and, more recently, the harnessing of river flows for irrigation and hydroelectric power and climate change mitigation. Most the people living adjacent to the wetlands depend on them for their basic needs. For sustainable provision of such benefits to the community, there is need for wetland conservation. Well-managed wetland requires functioning institutions and incentives that do not only promote their sustainable utilization but also community livelihoods.

Institutions are considered to be regulated patterns of behaviour structured by rules that have widespread use in society (Kibwage *et al.* 2008). While livelihoods comprise assets and activities, both mediated by institutions and social relations that together determine the living gained by the individual or household (Onyango and Jentoft 2007). For institutions to promote sustainable utilization of wetland resources and community livelihoods, they must guarantee rights and possession (Onyango 2000; Swanson and Göschl 1999) elsewhere Onyango and Jentoft (2007) also argued that institutions should reflect cultural values held by the local communities.

A secured livelihood is reflected in the improvement in incomes and assets, food and nutrition, education, participation, water and sanitation, primary health and reproductive health (Linderberg 2002) and therefore promoting community livelihoods. Thus institutions should enable wetland users to access wetland resources in a way that is congruent with meeting their livelihood concerns. On the other hand, a sustained wetland resource is reflected in continued



availability of wetland products. In the event that livelihoods security is not guaranteed and wetland sustainability is not being achieved, institutions are bound to change (Kibwage et al., 2008).

Wetland related livelihoods, institutions and incentives for wetland management in many parts of Tanzania are not well understood. This paper presents existing livelihood, institutions and incentives for wetland management in the Great Ruaha River system.

## MATERIALS AND METHODS

Purposive sampling was employed to select villages to be included in the study. The criteria for village selection included closeness to the wetland, extent of wetland utilization and dependence on wetland products. The assumption of this study was that stakeholders were going to provide the most and required information, though triangulation was also employed in order to reveal some information on incentives and incentive mechanisms.

We conducted a household survey to understand wetland based local livelihoods peoples' understanding on incentives for wetland conservation. Three villages namely Bumilayinga, Mgodhi and Upendo were surveyed. Individual household respondents were selected at random from village register using random numbers. We interviewed a total of ninety (90) respondents; 30 from each village. This study took the advantage of questionnaire surveys and structured questionnaires were administered to available respondents who were above 18 years. In order to elicit information, open and close-ended questions were used to collect information from the respondents. Data from the survey were coded and analyzed by Statistical Package for Social Science Software (SPSS, version. 12).

## RESULTS AND DISCUSSIONS

### General characteristic of the respondent

Origins, sex, age, education level, and occupation of the respondents were considered as general characteristics. These characteristics were used to portray the general status of the respondents and how the status influenced participation in wetland management practices in the study area.

### Education level of the respondents

Education is a crucial variable as one becomes aware of the importance and even benefits of wetlands. Education, which is a proxy for information flow, may overcome many characteristics of the local communities that act as obstacles to sustainable utilization of wetlands (Schultz 2001). Education leads to better resource allocation and is a form of human capital (Schultz 2001). A study by Lall *et al.* (2002) reported a positive association between education and adoption of conservation technology. For example, Lall *et al.* (2002) found that a household head has high school education level; his or her probability of participation is increased by nearly 6%. In this study, all respondents had only primary education (Table 1). This implies that local people will have no opportunity to access formal employment. This in turn may have serious impacts on the environment especially wetlands that are over utilized during the dry season. Intensive wetland utilization can also argued to be contributed by immigration that is mainly caused by available arable land for agriculture. This was revealed when 11 out of 16 immigrants said that they were attracted by the arable land suitable for agriculture. On the other hand, it can be said that since all respondents had primary education, sustainable wetland practices are likely to be achieved because it will be easy for them to be sensitized on natural resource conservation and understand its importance as they can read and understand any information.



**Table 1: Respondent Characteristics in communities within the great Ruaha Basin**

Characteristic	Percentage (%)
<b>Education</b>	
No formal education	0
Primary education	100
Secondary education	0
College/University	0
<b>Gender</b>	
Male	75
Female	25
<b>Age (years)</b>	
18 – 40	45
41 – 60	43
> 65	12
<b>Occupation</b>	
Farming	95
Fishing	1.7
Livestock Keeping	3.3

**Gender of the respondents**

About 75% of the respondents were males and 25% were females (Table 1). This is because in most cases, males were more readily available to engage in any discussions. A

larger proportion (45%), of respondents was in the age group of 18-40, while 43% were in the category of 41-60 age groups whereas and 12% were above 60 years old. This means that majority of the respondents had been in the area for more than 20 years, a period which sufficient to gather knowledge of the area, experience and/or witness various conservation and wetland practices within the area.

**Occupation**

It was interesting to learn that 95% of the respondents were involved in farming. Other activities included fishing and livestock keeping (Table 1). This indicates that more land is needed for agriculture which could lead into the encroachment of the wetland.

**Wetland Utilization**

The wetlands provide benefits such as water, roofing, crafting, and construction materials to local communities. During the dry season, the wetlands of Ruaha are important to down stream communities who depend on irrigated agriculture with crops such as onions (Plates 1a & b).

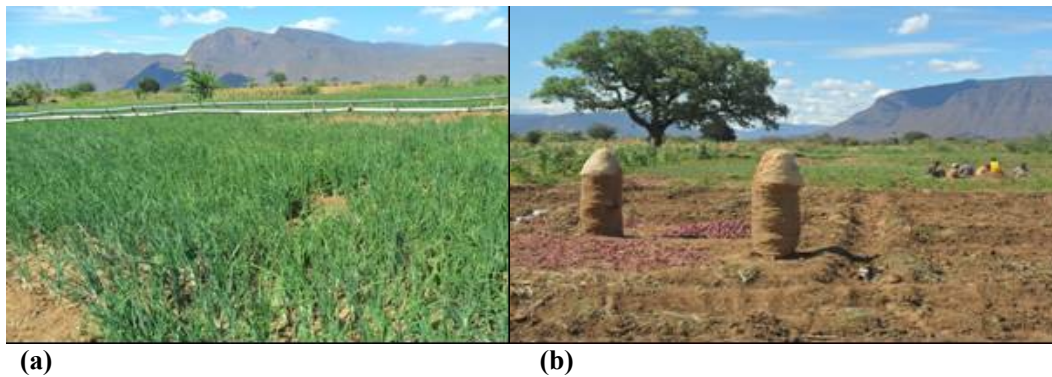


Plate 1: Wetlands Cultivation as a Socio-economic Activity in the Ruaha River Wetlands. (a) Onion farm in one of the irrigation system at Msosa village, (b) Harvested onions being processed on farm in Msosa village

It was also observed that cereals mainly maize were cultivated on the residual moisture during the dry season. Though majority of the

respondents admitted to utilize the wetlands for agricultural purposes. There were also other benefits including water for domestic consumption, fishing, roofing material, game meat, brick making and fodder (Figure 1).

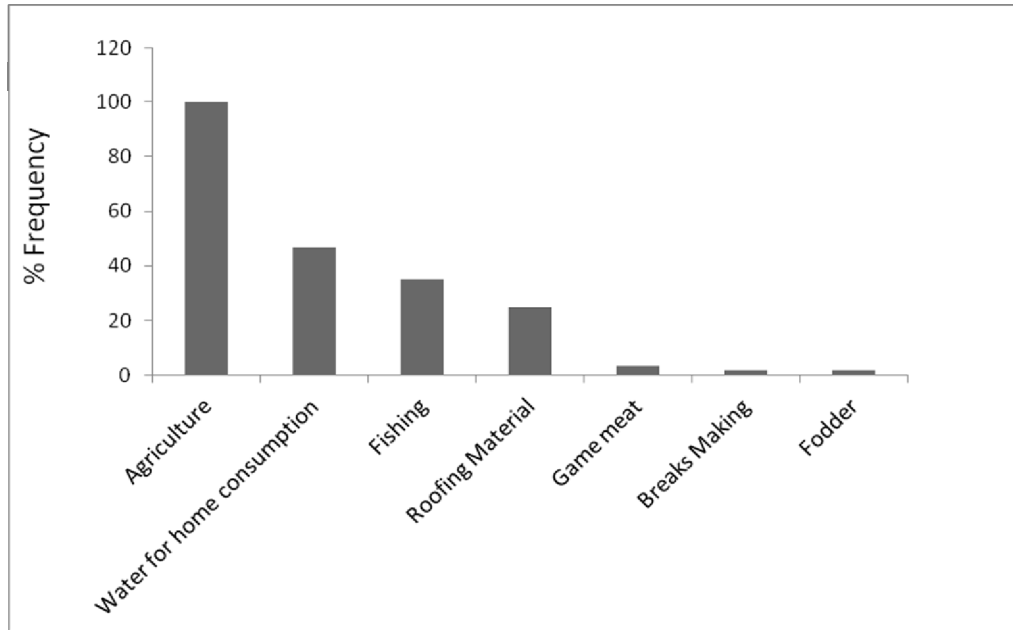


Figure 1: Major wetland utilization in Msosa and Malolo Villages Ruaha River basin

**Institutional and incentive needs for management of wetland resource use conflicts**

In this study, conflicts are considered to be a situation where actors have incompatible goals (Huggins, 2004) and that there is a clash of interests and ideas, struggle between and among individuals or groups over values and

claims to scarce wetland resources. In societies that have been affected by conflicts, there are often complex challenges in rebuilding social capital, so this have a negative achievements in management issues as recorded in this study. In Msosa and Malolo community, majority of the respondents (71.7%) acknowledged the presence of wetland resource use conflicts in their area (Table 4).

**Table 4: Assessment of presence of wetland resource use conflicts in Malolo and Msosa villages**

	%		
	Malolo B	Msosa	Overall
Presence	79	70	75
Absence	21	30	25

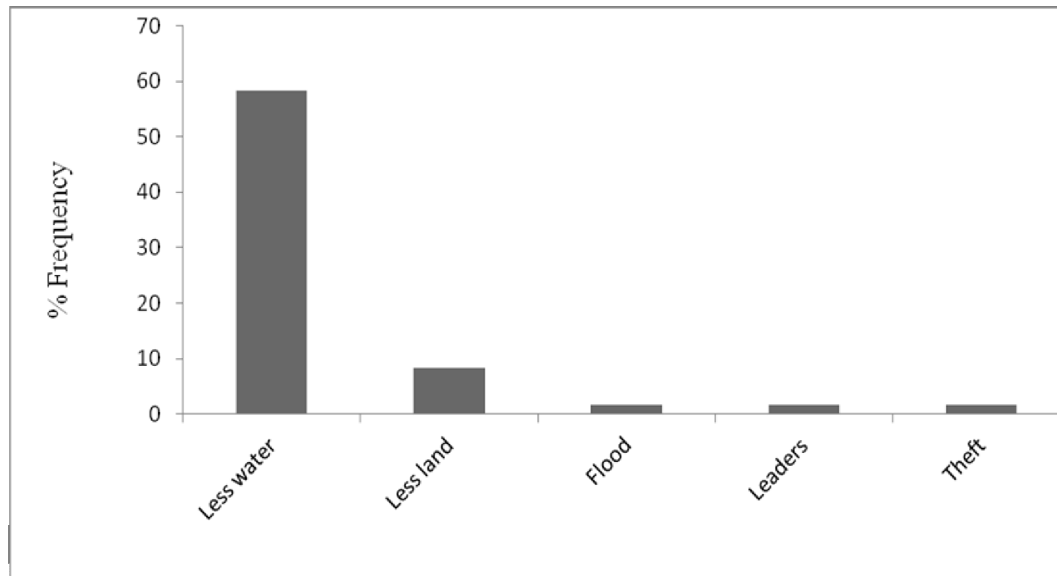
Though serious wetland related conflicts do not occur frequently, 75% of the community acknowledge presence of minor clashes every year in the dry season when wetlands are the only hope for both farmers and pastoralists. A good proportion of the population felt that conflicts ensue during planting and harvesting periods respectively. It was learnt that famers accuse pastoralists for grazing their livestock in farms when searching for green pastures in the wetlands.

Two main categories of conflicts identified included pastoralists versus farmers (43%) and up stream versus down stream farmers (27%) These conflicts are reported to peak in the dry season especially when pastoralists graze their cattle in the farms (green pastures). This is mainly because green pastures and water for livestock can only be obtained in wetlands during the dry season. Consequently, accumulation of cattle in the farms near wetland areas, not only destroy crops but also cause wetland degradation. Farmers are always in tension due to dependence on moist land in the wetlands for crop growing which has become an important element for food security



and household income in the Ruaha River basin. More frequent conflicts are due to insufficient water and land for agriculture (up

stream and down stream) and agriculture and livestock (Figure 2).



**Figure 2:** Main causes of wetland resource use conflict in the Ruaha River basin Tanzania

### **Roles of different institutions in sustainable wetlands management**

#### **Local Institutions in the Ruaha Wetlands**

Local institutions are usually rooted in community social capital, rather than external, top-down decision-making processes, hence they are dynamic, flexible and responsive to societal and environmental change, and have been regarded as important ‘buffering’ mechanisms that promote sustainability and resilience at the environment-society interface (Mazzucato and Niemeijer 2002). The local institutions and the role they play in wetlands management in the Ruaha River basin are shown in Table 2. This study revealed that about 47% of the respondents were not aware of the local institutions dealing with sustainable wetland management in the Ruaha Basin although Msosa village was the most informed on the institutions. Locally developed institutions are widely acknowledged for their contribution in sustainable resource management (Dixon and Wood 2007). Successes of local institutions are linked with the assumption that they are rooted in

community social capital rather than in external decisions and thus they are part of the community. Nevertheless, are the present local institutions today driven by top down decision making or community? This question poses likely challenge to sustainable management of wetlands and should not be overlooked. According to (Dixon and Wood 2007), majority of local institutions are important in regulating wetland utilization such as conflicts over use, yet they have, uncharacteristically, always relied on external intervention to maintain their local legitimacy. Consequently, this will have major implications for the sustainable use of wetland resources and food security throughout the region. Empowerment of local institutions have become a very key policy objective not only in CBNRM projects but also in the cortex of shifting focus on development issues such as governance.



**Table 2:** Local Institutions and roles they play in Msosa and Malolo B Villages

Roles	Village Environmental Committee	National Park Policies	CHAUMWE	Energy Policy (Kihansi HEP)	Water Policy (RBWO)
Connectors	√	√	√	√	
Whistle blowers	√	√	√		
Enforcement	√	√	√	√	
Information exchange	√	√	√	√	
Management	√	√	√	√	√
Training	√	√	√	√	
Lobbying			√		
Entrepreneurs					
Following and reinforcing	√		√		√
Lead		√	√		
Rule creation		√	√	√	
Funding		√	√		
Wrecking					
Caring		√	√		√
Spiritual					

**International Institutions and roles they play in Conservation of Ruaha Wetlands**

The results show that only 10% of the respondents (6.7% and 3.3% for Malolo B and Msosa village respectively) were aware of the international institutions involved in wetland conservation of Ruaha wetlands. These institutions included World Wide Fund for Nature (WWF) and

Japan International Cooperation Agency (JICA). Major roles of the international institutions as stated by the respondents included facilitating law enforcement, management, training and entrepreneurship (Table 8). The role of these institutions in ensuring sustainable wetland management was ranked number three (satisfactory) suggesting fair accountability, transparency, responsiveness, equity, rules of law, participation, effectiveness and efficiency.

**Table 8: International Institutions/Organizations and their roles in Wetlands Management**

Roles	WWF	JICA
Connectors	√	
Whistle blowers	√	
Enforcement		√
Information exchange		
Management		√
Training		√
Lobbying	√	
Entrepreneurs	√	
Following and reinforcing	√	
Lead	√	
Rule creation		
Funding	√	√
Caring	√	
Spiritual		

**Incentives and Willingness to Pay for Wetland Ecosystem Goods and Services**

Wetlands in Malolo B and Msosa villages render diverse benefits to the local community. This was revealed when respondents were asked whether they will incur any cost in case

wetlands vanish. All (100%) of respondents acknowledged that they will experience hardship in their life in case wetlands vanish. This is because of their strong dependence on the wetlands for agriculture whether irrigated or crop cultivation on residual moisture in soils. Regardless of appreciating values of



wetlands, when some of the respondents were asked whether paying for goods and services from the wetlands would be incentives for them to conserve, about 35% disagreed. However, it was further revealed that majority were willing to pay less than 100,000TZS (\$60) per year based on individual incomes.

About 65% were against privatization as an incentive for management of wetlands as they feared losing the freedom of access to wetland. Others felt that, few people will benefit if wetlands will be under private ownership. However, others were concerned with conflicts which are likely to occur between private sectors and community, if wetlands will be under private ownership. On the other hand a good proportion (35%) was were positive about privatization and argued that it is difficult to impose and implement rules and regulations under common property. They were convinced that, privatizing wetland will tip conservation beam since rules and regulations will be followed.

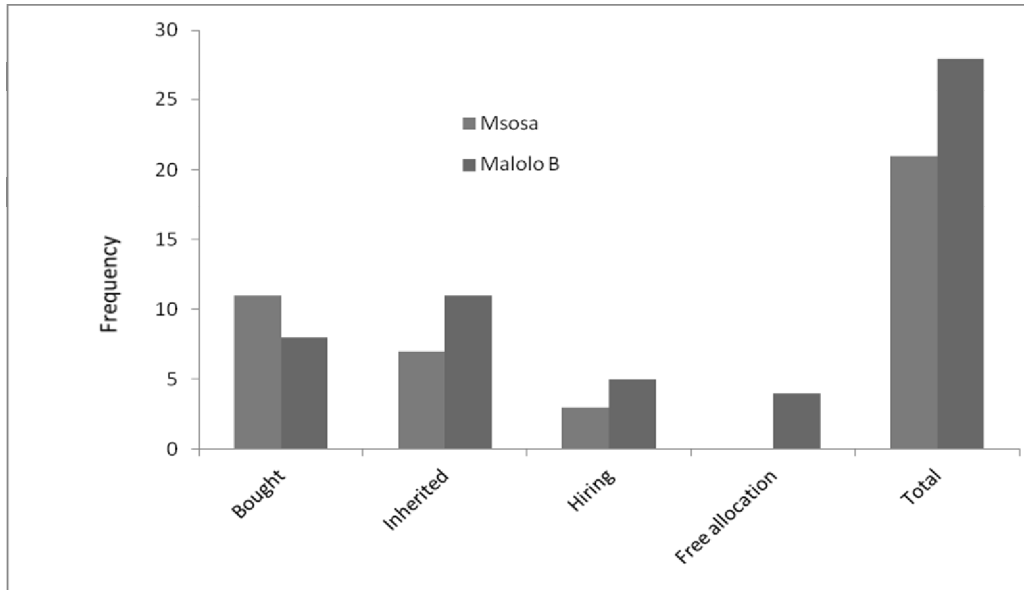
#### **Land ownership in wetland ecosystems as incentive for wetland conservation**

Promotion of the establishment of property right is the best strategy for managing land and natural resources (Adger and Luttrell, 2000; Keijiro and Frank 2001). This is because legal ownership increase value of land as people feels responsible to conserve the land they own. It is also important to note that, long term viability of natural resources like wetland ecosystems can only be achieved through effective management of wetlands and area adjacent to these ecosystems irrespective of

ownership. This study found that a good number of respondents (81.6%) in Msosa and Malolo B village own pieces of land in wetland ecosystems, majority, however had no legal ownership. This is probably because some are hiring, some inherited land with no user rights and other bought land with out being given user right. Land in wetland ecosystem was acquired through inheritance (37%), purchase (39%), hiring (16%) and free allocation by the village government (8%) (Figure 3). About 18 % of all respondents who owned land had user rights obtained from village government and district council. From these findings, this study is speculating that though land ownership is an incentive to wise management, the present situation in Malolo B and Msosa village may exacerbate miss-use of wetlands and their resources due to absence of property rights to most of the land occupants.

Munishi *et al* (2002) argue that if property rights are assigned to the environment and firms/individuals are charged for damage they cause to the environment, they have the incentive to cause less damage now and to find better, cheaper, and more productive technologies for environmental protection in the future. On the other hand it has been argued that under certain circumstances, market and land (resource) rights may increase environmental damage e.g., deforestation especially where land clearing is a means of establishing land rights (Angelsen 1996). This however is likely to happen where there are no clear regulations governing resource rights so that there is a constant fear of being deprived of a resource.

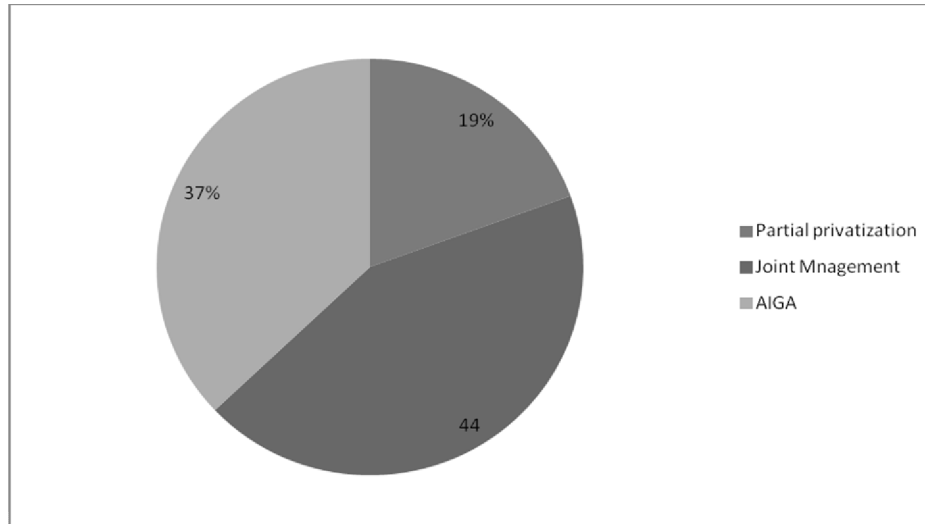




**Figure 3: Respondents means of acquiring land in wetlands at Malolo B and Msosa Village**

Apart from land ownership, joint management of wetlands was also mentioned (78.3%) as an incentive for conservation. Respondents mentioned that under joint management, community can protect wetlands while government can enforce laws and regulation. This is because government has more power when it comes to decision making and implementation of agreed decisions. Alternative income generating activities (AIGA) was also mentioned as a potential incentive for conservation (66.7%). Pooled percentages of the three incentives is represented in Figure 3 below, where joint management is the most preferred incentive mechanism, followed by AIGAs and privatization respectively.

Partial privatization being least preferred was not surprising as all respondents mentioned that they depend on wetlands for agriculture and other social economic activities, and thus privatization would fence them from their routine in wetland. The concept of market-based incentives in theory is based on private ownership of a given resource (Munishi et al 2002). The idea behind is that if a resource is privately owned, the owner has the right to decide whether to use the resource now or in the future and how to use it. If the resource has a higher value in the future then the tendency is to manage it for future value. On the other hand, in centralized planning nobody is anyhow responsible for the resources and nobody cares whether the resource is depleted or not. The tendency therefore is to use the resource to its detriment.



**Figure 3:** Pooled percentages of the preferred incentives for wetland management in the Ruaha River basin

### Conservation policy and regulations as incentives for wetland conservation

Respondents were asked whether they were aware of any conservation policy in their area and only 46.7% were aware while 53.3% were not aware of any. Respondents who were aware mentioned that these policies are in terms of regulations that are difficult to get away from and thus are motivating them willingly or unwillingly to conserve. The following were mentioned policies by the respondents; Forest Policy (23.3%), Water Policy, Environmental Policy and Agriculture Policy by 25%, 8.3% and 3.3% of the respondents respectively. The implication here is that large part of local community knows little about conservation policies and thus necessary steps to educate the community might be necessary.

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