

Towards an Analytical Framework for Assessing Property Rights to Water Sources in Farming Areas of Zimbabwe: A theoretical perspective

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ASBSTRACT

Property right issues in developing countries such as Zimbabwe have received a lot of attention as scholars, among them economists and sociologists, have increasingly recognized the importance of property rights on natural resource management and sustainability. This has resulted in widespread agreement on the importance of property rights to common pool resources like water. However, this has also resulted in varied perceptions and descriptions of property rights. This has led to some confusion with regards to structures of incentives associated with various property ownership regimes and how they (property regimes) have changed over time. For example, some researchers argue that natural resources ideal type property rights (namely open access, common property, state and private property) are too simple to fit the complexities of the many types of rights found in reality. In reality common pool resources such as water are rarely managed within one property regime. One can also argue that the historical confusion over 'common property' and 'open access' was largely caused by the failure of some researchers to characterize levels of exclusiveness between the two.

There is lack of a flexible framework that can be used to effectively explain most of the property rights arrangements found in real situations and how tenure has evolved in response to changes in various factors. The paper presents and discusses a framework that can be used to identify and analyze fundamental attributes that influence access to water by smallholder farmers in Zimbabwe. Water rights in farming areas of Zimbabwe are influenced by some of the following characteristics; social/cultural values, commercialization, exclusiveness, use designation, duration, allotment type, alienation and security.

Key words: common property, common pool resources, property rights, water, analytical framework

INTRODUCTION

The classification of natural resources into open access, common property, state property and private property is ideal and serves as an analytical tool. In reality, natural resources are utilized in overlapping mixtures of namely open access, common property, state property and private property.

In most cases, natural resources such as water are rarely managed within one property regime but are held under overlapping combinations of the four groups and there are various variants for each group (Murphree, 1991; Berkes, 1996; Derman, 1998). At times the combinations are in conflict (Murombedzi, 1994). There are several factors that cause this. For example, the involvement of local leaders in common property regimes might make it difficult to tell whether these leaders are representing the community or they will be at the lowest echelon of government administration (Banks, 2001). This implies that the management regime might not be true common property regime. In Zimbabwe, safari operators may lease hunting concession areas from the state, communal/rural district or private lands and use the areas for consumptive use of wildlife (Hasler, 1993). These types of arrangements often result in rights nested within other rights resulting in overlapping resource regime types.

Brief review of some analytical frameworks

Until recently economists thought that common pool resources management could be well analyzed and understood using a three pillar framework, namely, resource endowments (land, labor, capital and other important aspects of the resource), preferences and technology (Feeny, 1994). The approach ignored the fact that common pool resource management is a result of other factors such as property rights accorded to each of the economic agents besides resource endowment, preferences and technology. In an attempt to include property rights arrangements in explaining common pool resource management, a fourth pillar, institutions was added to the framework (Feeny, 1994; Folke and Berkes, 1995). However, the framework does not capture the institutional dynamics in common pool water resources.

Oakerson, (1984) developed a four-component model for analyzing common pool resources management. The components of the model are namely, technical/physical attributes, decision-making arrangements, patterns of interaction and outcomes. The framework is also not effective in explaining common pool resource management as it does not capture the influence of socio-economic factors on resource management. In order to address this weakness Oakerson (1992), Thomson (1992) and Feeny (1994) came up with improved versions of the framework by adding the nature and the social and economic context to complement information on the technical/physical attributes. The framework was further improved by Folke and Berkes (1995) to capture local knowledge. This enhanced the usefulness of the general framework in describing common pool resource management at a given point in time and can identify elements in the system that might result in unfavorable outcomes such as conflicts among common pool resource users. However, the framework cannot effectively capture the processes involved in the crafting and evolution of institutions in response to pressures exerted on a common pool resource such as water.

Basing on the assumption that common pool resource management is a socio-cultural and economic system that changes with time and is context based (Matowanyika, 1990) the paper is going to propose a framework which will put emphasis on economic, religious/spiritual, aesthetic, historical, local knowledge and myths aspects in seeking to understand institutional arrangements in water allocation.

Contextual background

Water is one of the major essential requirements in life. People depend on the resource for the continual replacement of body fluids, domestic and industrial use and agricultural activities. The resource also plays a critical function in the eco-system. Because of its fundamental roles in sustaining life, water allocation by economic and political institutions is of major concern to many people. It is important to understand water allocation in the past and what needs to be done to improve its allocation in the future.

There are two main water sources, which are surface water and ground water. Surface water consists of the fresh water in riverine areas, rivers, springs, shallow wells and other reservoirs that collect flowing water on the earth's surface. Ground water is found in porous layers of underground rock known as aquifers. Most of the ground water was accumulated over geologic time. Some ground water is renewed by percolation of rain or melted snow. However, of the total extractable groundwater about 2,5% only is available on a renewable basis (Tietenberg, 2000). Hence, most of ground water is depletable.

Significance and objective of the paper

Local water management (allocation systems) is one of the least studied and understood common pool resources in Zimbabwe yet it is among the critical resources especially in farming areas of the country. In depth understanding of how common pool water resource institutional arrangements evolve in communal and resettlement areas is critical for the formulation of relevant common pool water resource policies. The current analytical frame works presented in literature cannot be used to effectively characterize water rights in the farming areas of Zimbabwe.

The objective of the paper is to present and discuss an analytical framework (based on theory and literature) that can be used to characterize water rights in farming areas of Zimbabwe beyond the commonly referred to property regimes. The framework is meant to serve as a starting point from which a generalized framework can be produced after thorough empirical testing and modifications of the presented framework.

ZIMBABWE'S FARMING SECTOR

Zimbabwe is classified into five broad Natural Regions² basing on climate as the dominant natural phenomenon affecting agricultural production. On average the country is normally characterized by a 7-month dry season per year that stretches from mid-April to mid-October.

The country's agricultural sector is composed of three groups of farmers who are namely commercial (large scale and small scale), resettlement and communal area farmers. The majority of communal and resettlement farmers are found in Natural Regions IV and V which are low rain fall regions, whilst the majority of large scale commercial farmers are located in Natural Regions I and II which are high rainfall areas. Communal and resettlement areas have always been characterized by accelerated runoff due to deforestation causing rivers and other water sources to dry up during the dry season, veld fires, soil erosion and siltation resulting in water shortage (Government of Zimbabwe, 1998). Most of these water sources dry up during the dry season (Moyo *et al*, 1991).

The farmers of each sub-sector have access to land through different land tenure systems. Some Large and Small-scale commercial farms are owned by the state, which leases them to farmers while others are owned by farmers who have freehold titles to the land. Resettlement schemes came into existence after independence (1980) when the government started acquiring land from mainly large scale commercial farmers in order to resettle the landless and people from overpopulated communal areas. Resettlement area land belongs to the state and the land is farmed on permits bases.

² Natural Region I (covering 2 % of the country) is characterized by 1 050 mm plus rainfall per annum with some rain falling in all months of the year and relatively low temperatures. Natural Region II (covering 15 % of the country) is characterized by 700 – 1 050 mm rainfall per annum which is confined to summer. Natural Region III (covering 18 % of the country) is characterized by 500- 700 mm rainfall per annum with relatively high temperatures and infrequent, heavy falls of rain and prone to seasonal droughts. Natural Region IV (covering 38 % of the country) receives 450 – 600 mm rainfall per annum and is prone to frequent seasonal droughts. Natural Region V (covering 27 % of the country) normally receives less than 500 mm rainfall per annum and is erratic (Muir-Leresche, 1994; Ministry of lands and Agriculture, 2000).

Access to natural resources in communal and resettlement areas is mainly governed by common property regimes. Under this regime, access to the resource and use patterns are influenced by local institutional arrangements. The communal tenure comprises of arable and residential land that is held under a traditional freehold tenure with rights to sub-divide for family members and to bequeath or inherit and communal tenure for water, grazing, forests and other resources. The land is state land, which is held in trust by the President.

CLASSIFICATION OF NATURAL RESOURCES

Natural resources can be grouped into two main groups, which are stocks (non-renewable) and flows (renewable resources). Utilization of renewable resources at rates higher than natural growth rate will eventually lead to their extinction while utilization of non-renewable resources must be at a rate that allows the development of technology to replace the use of the resource in order to address the issue of inter-generational equity.

Natural resources can also be classified according to exclusion and subtractability characteristics. When a resource is characterized by indivisibilities and non-excludability it is called a Public Good. Public Goods represent a complex category of environmental resources. Consumption is indivisible when one person's consumption of a good does not diminish the amount available for others.

Some natural resources are characterized by subtractability and exclusion problems thus making them prone to depletion and degradation. These resources are referred to as Common pool resources in this paper. Some of the resources that belong to this class include fish, wildlife, forests, grazing lands, irrigation and groundwater (Berkes, 1996; Becker and Ostrom, 1995 and Mckean and Ostrom, 1995).

Common pool resources can be used/accessed under open access, common property, private property and state property or through a combination of these property regimes.

PROPERTY RIGHTS

The way in which farmers use components of the natural capital base such as water is dependent on the property rights governing utilization of that resource. Property right refers to a set of entitlements that define the owner's rights, privileges and the associated limitations of the specific resource utilization. Property rights may be invested in individuals, a group of people or the state. It is of importance to note that the definitions of property rights, appropriate uses and users are likely to vary from place to place as they (definitions) are embedded in specific historical sets of cultural, political and economic structures (Peters, 1987). Murombezi (1994), states that property is a dynamic institution that responds to changes in both the resource itself and in the demographic, social, political and economic climate in which utilization of the natural resource takes place. This shows that thorough investigation of property rights (tenure) must adopt a holistic approach;

“Viewed holistically a tenure system is in effect a dynamic resource system consisting of a diversity of resource processes (use, distribution and management), regulations, rights and obligations that define the relationship between the resource users as well as between themselves and the resources in question.” Murombezi (1994:58).

This means for one to be able to fully understand and explain property rights arrangements for any community there is need to understand the social, political and economic environment and how property rights evolve in response to changes in the whole environment.

PROPERTY REGIMES

Open access property regime (*Res nullius*)

Under this type of regime, no individual or group has the legal power to restrict access to the resource. This results in the exploitation of the resource on first come, first served basis. Common pool resources that are under open access regimes will eventually be depleted or the rent will eventually be dissipated as they are characterized by non-exclusivity and divisibility (Tietenberg, 2000). Non-exclusivity implies that the resource can be exploited by anyone and divisibility means that the capture of part of the resource by one group reduces the amount available to other groups.

On the other hand, for example, in Zimbabwe breathing air can be viewed as one of the natural resources being accessed/used under open access regime. However, the resource is not, in the near future threatened by depletion or rent dissipation as it is a public good. In this case, breathing air can be viewed as being characterized by indivisibility as the eco-system is still able to produce a lot of oxygen, thus ensuring that the amount of air used by an individual has insignificant effect on the amount available to others. However, it is possible, though not very likely that this might change for example, due to a combination of factors such as high population growth coupled with the confinement of many people within a small space.

Private property

Private property regime is when the resource is owned by one economic entity which might be an individual, household or a company. Private property regime is characterized by exclusivity, transferability and enforceability. However, this is true in a well-functioning economic environment resulting in private property.

An owner of a resource with a well-defined property right, that is, exhibiting transferability, exclusivity and enforceability is highly motivated to use that resource efficiently. This is because a decline in the value of that resource represents an economic loss to the owner.

In the economic field resource allocation should aim to achieve optimal outcomes. The aim should be to maximize net benefits (static efficiency) when time is not put into consideration and the present net value when time is put into consideration. In order to achieve optimal resource allocation there must be Efficient Property Right Structures in a well-functioning market economy. An efficient structure has three main characteristics namely, 1) Exclusivity – All benefits and costs whether direct or indirectly from the resource must accrue to the owner only 2) Transferability – The set of property rights must be transferable from one owner to another in a voluntary exchange in full and 3) Enforceability – The set of rights must be secure from seizure or encroachment.

However, in reality private property regimes may not be characterized by efficiency as markets are not well functioning in most cases. Utilization of natural resources under private regimes may also be not sustainable depending on factors like interest rates which affects discount rates and prices. Private property regimes might also not be desirable because of equity considerations and this is most likely so for resources like water for primary use.

State property (*res publica*)

State property regimes are found in almost every country in varying degrees. Some of the resources that are under ownership of the state are national parks, forests and some water bodies. Efficiency and sustainability problems can arise under state property regimes when the state resource use objectives are different from collective interests.

Common property resources (*res communes*)

Common property resources are owned by a group of people. Entitlements to use maybe through formal arrangements that are protected by specific legal rules, may be through informal arrangements that are protected by tradition or custom or a combination of both. The regime is characterized by varying degrees of efficiency and sustainability depending on rules and regulations that emerge from collective decision making processes by the

group. Common property status alone may not be necessary nor sufficient explanation for the depletion of a resource (McCay and Acheson, 1987).

Utilization of resources under common property regimes can be sustainable but this may not be the case because various factors, among them, increased demand of the resource due to population pressure. Infusion of outsiders may also compound the problem by undermining the collective cohesion resulting in the community failing to enforce traditional rules that would usually govern exploitation of the resource.

CHARACTERISTICS OF WATER RIGHTS IN ZIMBABWE

The characteristics discussed in this section can be used as components of an analytical framework for assessing access to water in farming areas of Zimbabwe. It is hoped that the framework can be applied to assess access to water in small scale commercial, resettlement and communal farming areas of Zimbabwe.

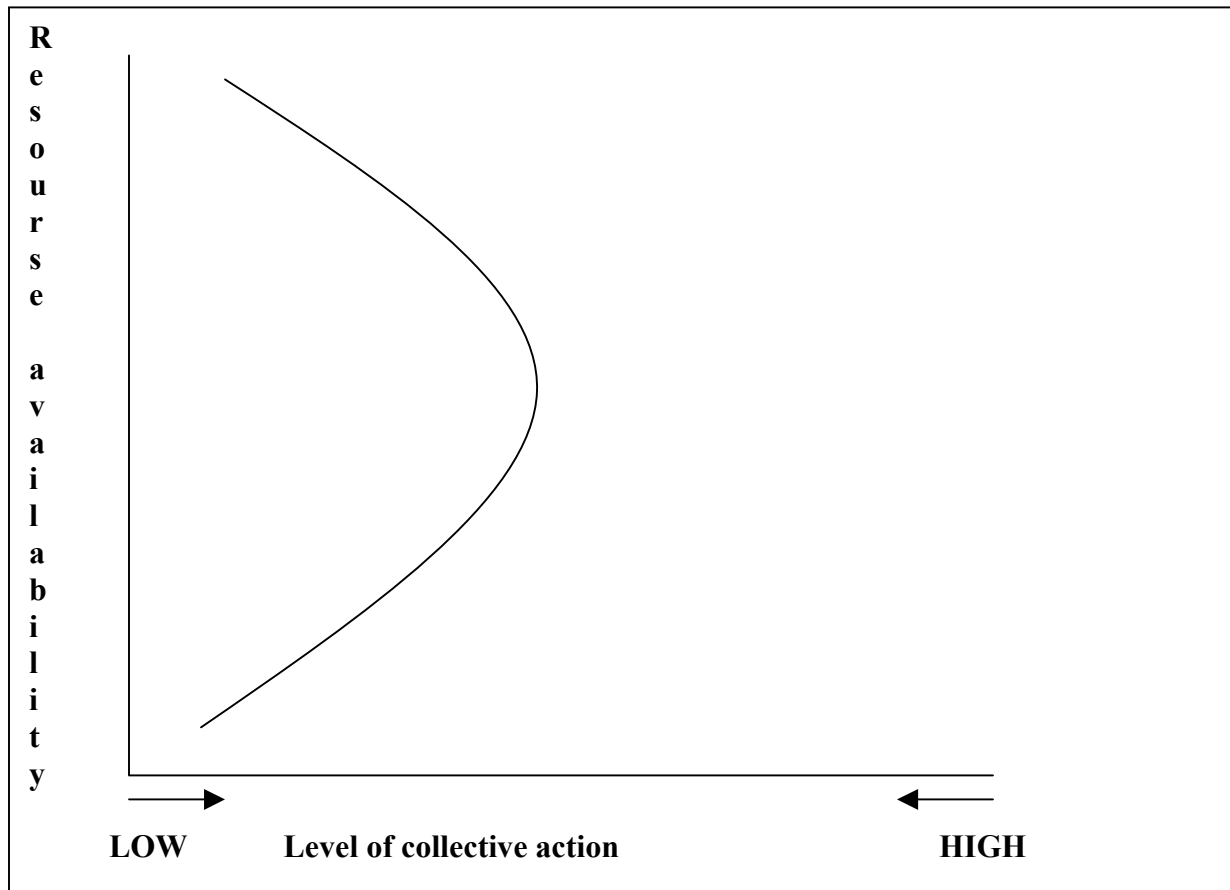
Resource Availability

It seems as water rights are absent when the resource is in abundance. Banks (2001) argues that there seems to be a positive correlation between resource scarcity and exclusion. This relationship might be more evident during seasonal variation of resource availability when monitoring and enforcement is intensified when the resource is scarce.

When a resource is in abundance the resource users will see no reason for collective management. Platteau (Forthcoming) argues that when a resource is abundant, that is, when there is no competition well defined property rights are not useful nor economically justified. It is argued that under such cases when externalities are of minor significance creating well defined property rights in that resource does not produce positive results to the society. For, example breathing air is very vital to life but does not have an economic value in most countries because it is not scarce (Muir-Leresche, 1999).

The need to put in place mechanisms to govern resource allocation becomes justifiable as the resource become scarce. As the resource becomes scarce or as competition for the resource increases because of either increase in uses of the resource or number of users the need for collective action grows (Meinzen-Dick et al, 2001). This maybe up to a stage when the resource becomes very scarce propelling users to opt for self-interest objectives thus, weakening collective action management (ibid; Campbell et al, 2000). The relationship is summarized in diagram 1. The vertical axis represents water availability whilst the horizontal axis represents level of collective action.

Diagram 1: The relationship between water availability and level of collective action



However, Platteau (forth coming) admits that even when a resource is in abundance there are some social and political factors that influence utilization of the resource resulting in a situation which is not open.

Number of resource users (in relative terms)

Being able to predict each other's behaviour and the presence of multiple social relationships enhances the chances of cooperation when the number of people using a common pool resource is small. However, Platteau (forthcoming) points out that human population growth is one of the negative externalities that affect common property regimes and in most cases there is no conscious attempts made to control the externalities except in a few cases like in some Japanese villages and in Canton in Switzerland.

Attributes of the water source

Property rights governing access to water is likely to be influenced by the type of the water source. Water sources range from rivers/streams, springs, sponges, lakes/dams, deep and shallow wells and boreholes.

Ownership of water points among some African pastoralists depends on type of the water point. For example, the Borana people of southern Ethiopia classify natural ponds into 'lola' or rainy season ponds with access to all unless if they (the lola) are close to settlements and 'hala' or larger ponds with potential to hold water into the next dry season belonging to the clan (FAO, 1990).

Level of commercialization

A priori it is difficult to determine the effects of commercialization of water sources and water on rights to the sources. When a water source assumes a commercial value its users might be motivated to tighten their rights so that they can optimize their economic benefits accruing from the water source. Depending on tenure arrangements, commercialization of natural resources might contribute towards promotion of sustained use of the resource as resource users will seek to ensure a prolonged flow of financial benefits.

Alternatively, commercialization might actually result in the breakdown of existing institutions. Campbell et al (2000), argue that commercialization tend to contribute towards the collapse of local rules that govern utilization of common pool resources.

Social/cultural values of the water source

Water allocation is usually not based on economic considerations alone as the resource is very vital to life. Because of that equity and environmental considerations tend to dominate over economic efficiency (Muir-Leresche, 1999).

Rights to some water sources are influenced or determined by religious/spiritual and historical values and beliefs in some communities. This result in access to some water

points being restricted to certain groups of the community. For example, access to some natural springs and grooves might be restricted to spirit mediums or selected old women. Other members of the community can use water from these sources during drought periods only. Water from such sources may also under normal circumstances not be used for other purposes other than for drinking, cooking and for brewing beer for ritual purposes only.

Exclusiveness

Exclusiveness means that all direct and indirect benefits and costs from rights to a water source only accrue to the owner(s) of those rights. The system minimizes chances of free riding by non-water rights owners (Randall, 1987; Meinzen-Dick and Knox, 2001). Exclusiveness can be at individual, household or community level. However, at the community level, community might fail to regulate utilization of the specific water source by community members. This will result in the property regime portraying characteristics of open access. Heltberg (2001), presents cases where the community is able to exclude non-community members but fails to enforce conservation rules. She labels this as ‘unregulated common property’. She labels the other scenario where both exclusivity and conservation rules are in place and being enforced as ‘regulated common property’.

Use designation

Farmers might have some limitations on activities they might use water for, depending on the water source (Randall, 1987). Users might be discouraged to use communal borehole or deep well water for brick making or for gardening. However, the restriction might be relaxed during periods of water shortage.

Duration

Depending on the type of farming water rights might be for a given timeframe for some water sources (Shui Yan Tang, 1992). For example access to water for irrigation purposes might be directly linked to access to land. If the land is being leased access to water will cease when the lease comes to an end. According to the requirements of the new Water

Act of Zimbabwe, farmers who need to use water from the country's major rivers for commercial purposes must apply for water rights. The rights have a time frame after which farmers are expected to reapply for water rights if they still need to use the water. However, in some instances access to some water sources is guaranteed for as long as the farmer is still a member of the community. This might be so in communal and resettlement farming areas where by access can only be threatened by major events such as introduction of a major project by the government which might result in some households being relocated.

Allotment type

Allotment type specifies volume of water that can be abstracted by the household per given water source at specific times (Meinzen-Dick and Knox, 2001; Shui Yan Tang, 1992). This might be achieved by specifying for example equipment to be used such as scotch carts, drums and other water containers.

Alienation/Transferability

Alienation refers to the ability to transfer water rights to someone else (Randall, 1987; Meinzen-Dick and Knox, 2001). This might be through selling or at no charge (inheritance or as a gift). Some households might sell water or rights to have access to some water bodies. It is also possible that non-owners might be granted the rights on a temporary basis for example during droughts after which the rights will be withdrawn.

Operational requirements

A community or household might require users of some water sources to adhere to some regulations when abstracting water. Such regulations may be designed to ensure that utilization of the water source is consistent with the community's goals (Shui Yan Tang, 1992; Kundhlande and Luckert, undated). For example this might be done to ensure that drinking water sources are not polluted.

Monitoring and enforcement systems

Offenders can be sanctioned through exclusion from social goods like mutual aid in times of stress, participation in religious rituals and social events (Platteau, forthcoming; Randall, 1987; Ostrom, 1994).

Security

Security to water rights is influenced by factors which are external to the community or household. At household level rights are secure if they are recognized and respected by other households in the community. The household must get support from the other households when its water rights are infringed on. The macro socio-political environment must be able to protect the community from encroachment by other communities (Ostrom, 1994).

CONCLUSION

A review of literature indicates that using common property, private property, state property and open access property regimes as a way of characterizing property rights does not adequately explain the rights that govern access to water sources by the various groups of Zimbabwean farmers. The framework presented in this paper can be used to compare and contrast water rights applicable to the three groups of farmers discussed in the paper. The framework also allows some degree of flexibility as some of characteristics can be left out depending on the situation being analyzed. However, the framework serves as a starting point. It needs rigorous testing and enrichment through additions/subtractions and modifications of some characteristics.

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