Nature of Village Boundaries and Functionality of Community Boreholes in Zimbabwe: The Case of Sengwe Communal Lands, Chiredzi District

Bowora John
Mukamuri Billy
Gwenje Douglas

Centre for Applied Social Science
University of Zimbabwe

Abstract

This paper analyses relationship between nature of village boundaries and functional status of community boreholes in Sengwe communal lands in Chiredzi District, Zimbabwe. The area is characterized by low rainfall and access to water challenges. The study methodologies included qualitative and quantitative research approaches. Qualitative methods utilized included key informant interviews, focus group discussions and quantitative questionnaire which was administered (N=120) to borehole users across the study area. Results from analysed data show that village boundaries are semi to porous which allows unrestricted access to borehole water by outsiders within reach. This semi to porous nature of boundaries undermines both collective action in maintaining and repairing boreholes therefore reducing the number of functioning boreholes. The study recommends the establishment of strong institution that unites and encourages all borehole users to work together for continued functionality of boreholes.

Key words: Community boreholes; collective management; boundaries; functionality; user group

1. Introduction and Background

The Sengwe Community in Zimbabwe's South-East Lowveld (SEL) lives in a typical post-colonial communal settlement characterized by porous or undefined village boundaries. All village boundaries in Sengwe, like in any other village in rural Zimbabwe, are porous, meaning that locals can access community resources such as grazing, timber, non-timber forest products, health and education services across administrative village and ward boundaries. Water scarcity is a perennial problem in Sengwe because of its location in agro-ecological Natural Region V, characterized by low rainfall of less than 500mm per annum (Mutizwa- Mangiza 1990). Major rivers such as the Limpopo, Bubi and Mwenezi only act as reliable sources of domestic water for non-consumption activities to households living adjacent to them. Households located further away from the two rivers heavily depend on both artificial and communally owned water sources such as dams, wells, and boreholes. Private water sources (boreholes and wells) are present but few to make significance impact on the water security of the majority of residents. Porous nature of village boundaries and community ownership of boreholes in Sengwe we described above set good ground for a scientific investigation of common property and collective action (Steins and Edwards1999). In addition, the dry nature of the study area makes water undoubtedly a key resource to all people residing in the study area, regardless of livelihood strategies being pursued. Common Property Resources (CPRs) literature reports that clearly defined boundaries and users of the resource in question are essential ingredients of collective (North 1990). In addition to well defined boundaries and user groups, proponents of collective action in CPRs also argue the resource in question must be sufficient or scarce enough in order for it to generate users' interest in its sustainable management (Ostrom et al 2007; 2009).

Boreholes are vertical or horizontal shafts used to collect underground water developed over two centuries ago by Chinese and Egyptians and later on by westerners (Adesiyun et al 1999). In Zimbabwe, most of community owned boreholes are hand-operated and are mostly vertical and narrow shafts drilled and fitted with a metal casing to avoid soil falling back into the hole. A pump is often placed at the top of the shaft and is used to draw water out of the shaft using a long metal rod.

While the boreholes; system is robust and durable overuse by various users result in early breakages that are both complicated and expensive to repair. Therefore, a robust and effective borehole management system is needed at the community level to ensure continuous functioning of the technology. Several socio-economic factors militate against continuous use and functionality of community boreholes in Zimbabwe. These factors include some of the following: technical design, frequency of use, maintenance regimes and knowledge as well as ownership (Hoko 2005).This paper presents findings of a study that investigated the relationship between porosity of village boundaries and functional status of community owned boreholes in Sengwe Communal Lands. Functional status of the community borehole is used in this paper as a proxy or indicator of functional status. Three features describe the nature of village boundaries that is porous, semi-porous, and impeccable (closed). These features indicate graduated accessibility of the borehole, the assumption being that semi-porous and impeccable are indicators of less and more users, respectively.

2. Literature Review

Community boreholes or water points represent one of the most critical Common Property Resource (CPR) in Sengwe Communal Land. Hence, reviewing literature on CPRs is appropriate for this paper and also shades light on documented dynamics associated with common property resources. For our literature review, we draw examples from natural resources management.

Key features or principles likely to influence collective management of Common Property Resources (CPRs) introduced a set of features that are central in effective management of common property resources. The features include the resource that is clearly defined, resource users, and the presence of clearly defined rules that governs the usage of the resource (Steins and Edwards1999; Pandey and Yadama 1990). Common property proponents argue thatall the features are important in influencing the outcome of any cooperation (Blau 1964). Recent contributions by scholars suggest that the nature of boundaries of users influence the level of participation by user groups in management of CPR (Potete and Ostrom 2001). The resource being shared by the community must be clearly defined in terms of its boundaries, usually referred to as resource units (North 1990; Ostrom 2007; 2009), in our case the resource unit or utility being a borehole. Literature derived from water management studies in communal areas show the need for multiple approaches in managing communal water points (Boss 2004). Defined tenure rights are an important ingredient of collective management in communal areas when dealing with a highly fraudulent resource such as wildlife, elephants to be specific mobile (Murombedzi 1994). Studies have shown that open access resources such as pools, dams, and grazing areas shared by people, domestic animals and wildlife are common sources of zoonotic being passed from one to the other.

3. Study Area

Sengwe Communal Lands are located in Chiredzi District in Zimbabwe's South East Lowveld. It is about 120 km south-east of ChiredziTown, on the east bank of the River Bubi. Three ethnical groups that are dominant across the study area are Shangaan Ndebele and Karanga's (Zim-Stats 2012). The study area is located in agro-ecological Natural Region V, characterized by low rainfall of 500mm per year and very high diurnal temperatures of 32 degrees (Mutizwa- Mangiza 1990). Dry- land and irrigation based crop production and livestock rearing (mostly cattle and goats) are the major agricultural activities and potential sources of income. Due to its proximity to South Africa and Mozambique, cross boarder migration and trading is high across the three administrative wards under study (Scoones and Wolmer, 2003). Wildlife-based livelihoods are generated through the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) which is organized around hunting areas has also assisted locals to repair and maintain water sources (Scoones and Wolmer 2003).

3. Conceptual Framework

We build our conceptual framework on key elements of the Design Principles (North 1990) and the Socio-Ecological Systems (Ostrom 2007; 2009). In this case our paper only analyses data focusing on nature of village boundaries and the functional status of the community borehole. Literature also tells us that boundaries can be analyzed as falling in the three following categories; porous, semi-porous and closed. Collective action is the willingness or ability of people to invest their time, resources, and energy towards maintenance or management of a common good. In this paper, collective action was categorized as either low or moderate or high (Ostrom, 2007).

4. Meterials and Methods

A combination of quantitative and qualitative data collection methods were utilized in this study. Key Informant Interviews were carried out with senior technical and administrative officials from the Rural District Council (RDC), District Development Fund (DDF). At the community level, key informant interviews were conducted with ward councilors, village heads, borehole management committee members, and ordinary villagers. Focus Group Discussions (FDGs) were conducted with villagers who are the main users of the borehole. Questionnaires were administered to randomly selected users of boreholes in the three administrative wards, 13, 14 and 15. Qualitative data was analyzed using the thematic approach while SPSS was used to analyzed quantitative data.

5. Results

5.1 Nature of village boundaries versus borehole functional status

Study findings indicate that the nature of village boundaries whether porous and non-porous increases or decreases the number of functioning boreholes. The Chi- square test indicates that there is a significant association (Test statistic X=15.780, p-value=0.000) between village boundaries and borehole functional status. The table below shows that all boreholes enumerated in the survey are located in villages with either porous or semi – porous boundaries, with none in non – porous. A slightly significant percentage (50%)of functional boreholes and less significant percentage of partially functional boreholes are located in villages with semi-porous and porous boundaries, respectively. Interesting enough, a very significant percentage of non-functional boreholes (74 %) are located in villages with porous boundaries and less so in semi–porous. Table 1 summaries the nature of village boundaries and the number of functioning boreholes.

Results generated from focus group discussions and key informant interviews indicate that the more a village boundary is porous the lesser is the level of collective action among its users. Limited co-operation, respect, and sense of ownership among borehole users who live in different villages have been pointed out as the major hindrances to collective action particularly in porous boundary villages. Evidence from interviews with Ward Councilors, point out that on paper, they were village boundaries but in reality, such boundaries are non-existent. As a result of this porosity in boundaries, it is always a challenge for collective action to be effected particularly in the maintenance and repairing of boreholes. In addition, interviewed village heads indicated that it was a challenge for all village heads to unity and craft rules for collective action to be enforced across all borehole users. The study found conflict of interest in the usage of borehole water as a hindrance to collective action across the study site. From interviews and discussions with borehole users, it emerged that the most common conflict was between cattle owners who uses the borehole as a source of water for the cattle and villagers who believed that the boreholes was solely established for domestic use. During the visit to one of the water points in Muhlekwani village, a dispute was witnessed between cattle owners and villages. Cattle owners were accused by non-cattle owners for taking more time to water their cattle.

The villagers also complained about some of the users who were overusing the borehole by taking more water using big drums. These conflicts resulted in the formation of factions which vowed not to co-operate whenever a challenge arises. A Chi-square test of association was performed to check the significance of association between both semi and porous village boundaries and collective action among borehole users. The Chi-square test indicate that there is a significant association (Test statistic X=18.981, p-value=0.000) between the level of boundary porosity and collective action. Such findings are in line with qualitative findings explained above.Table, 2 below present the calculated chi-square on the association between the porosity of boundary and collective action.

5.2 Boundaries and borehole functionality

The major finding of this study shows that the porosity nature of boundaries has an effect on the functionality of boreholes across the study area. Results generated from focus group discussion indicate high level of dysfunctional boreholes in villages with porous boundaries as compared to villages with semi-porous boundaries. For the former, participants highlighted that in villages with porous boundaries it is difficult to implement rules and regulations that can be adhered by all users mainly because they do not reside in the same village. In sharp contrast, borehole users in semi-porous boundaries attributed high numbers of functional boreholes to clearly defined rules, responsibilities and sanctions for non- compliance. It further emerged from focus group discussion that semi - porous boundaries of user groups allow effective monitoring and enforcing of rules since individuals or households will have the knowledge of location of all the users of the borehole and this will assist in making follow- ups of users who will not have contributed money for repairs and maintenance.

8. Summary and Conclusion

The study demonstrated that unclearly boundaries of user groups do pose challenges for groups to collectively manage their water points. Furthermore, the study showed that collective action in management of boreholes became more difficult when users came from a settlement other than where the borehole is physically located. In light of the above conclusions, it is recommended that policy- makers and planners should develop databases on various aspects of ward or village, such as names of village residents, population density of a village, boundaries of user groups of CRP for each village and locations of residential stands. The databases will increase knowledge of an area as well as assist local leaders in planning and decision making regarding management of water points. Clearly marked boundaries of user groups assist individuals and households to effectively develop rules for management of their boreholes.

Reference List

Adesiyun, A. A., Alayande, A and Adekeye, J (1999). Studies on borehole water and possible risks in Kaduna. Nigeria Journal of Hygiene. 96:149-160

Blau, (1964). Exchange and Power in Social Life. New York: John Wiley and Sons.

Boss, R (2004). Water for People, Water for Life, United Nations World Water Development Report. 102- 117.

Murombedzi, J.C (1991). Decentralising Common Property Resource Management. A Case study of the CAMPFIRE project; Occasional paper NRM series, Harare, Centre for Applied Social Science Publications, University of Zimbabwe.

Mutizwa-Mangize, N.D (1990). Public administration and development. Vol 10 pages 423-435

North, D (1990). Institutions. Institutional change and economic performance.New York: Cambridge University Press.

Ostrom, E (2007). .A diagnostic approach for going beyond panaceas.Proceeding of the National Academy of Science 104(39)

Ostrom, E (2009). A general framework for analyzing sustainability of social – ecological system: science 325: 419 – 422.

Pandey, S and Yadama, G (1990). Conditions for local level community forestry action: A theoretical explanation. Mountain Research and Development 10 (1): 88 - 95

Potete, A. R and Ostrom, E (2002). "In pursuit of comparable concepts and data about collective action" CAPR: Working Paper No 29.

Scoones, I and Wolmer, W (2003). End piece: The Politics of Livelihood Opportunities. IDS Bulletin Volume 34. 112 – 115.

Steins, N and Edwards, V (1991). Platforms for Collective action in Multiple use – common pool resources. Agriculture and human Values 16 (3): 241 – 255.

Table 1: Village boundaries and borehole functional status

		Borehole functionality status			
		Not functional	Partially functional	Functional	Total
Nature of village boundaries	*Porous*	14	2	6	22
	Semi- porous	5	2	29	36
	Non –porous	0	0	0	0
Total		19	4	35	58

Pearson Chi-Square	*15.780*	*2*	*.000*

Table 2: Association between porosity of village boundaries and collective action

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.981	2	.000
Likelihood Ratio	19.916	2	.000
Linear-by-Linear Association	18.618	1	.000
N of Valid Cases	58		