

Egalitarian Regimes in Midst of Socio-Economic Heterogeneity: Challenges and Opportunities for Institutional Success and Conservation Outcomes: Evidence from Botswana

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Abstract

This paper examines implications of socio-economic heterogeneity to equity and collective action among groups that manage natural resources as a common property resource (CPR). Some scholars argue that heterogeneity hinders collective action. On the contrary, other scholars state evidence that many heterogeneous groups have sustained collective action without eliminating inequalities. Empirical findings from communities who manage controlled hunting area KD1 in Botswana show that equity impact is not positive as a result of heterogeneity but this does not hinder collective action. There is a need to make compromises over benefit sharing. Sharing rules that cater for all members act as an important factor contributing to successful collective action. Heterogeneity does not hinder collective action, but appears to force people to develop elaborate benefit sharing system to ensure all factions remain interested in cooperation. This seems possible when the group has developed social capital and has institutional maturity and effective leadership.

Key Words: Heterogeneity, equity, common property, collective action, communities, property rights,

Introduction

Most scholars (Agrawal, 2001; Oakerson, 1986; Ostrom, 1990, 2002; Poteete and Ostrom, 2004; Gardner et al. 1989; Bromley and Cernea, 1989; and Arnold, 1998) have emphasized community structure and its implications in the form of homogeneity and heterogeneity for the efficiency and equity outcomes in (CPR) management. They argue that for the success and sustenance of a common property regimes, the benefits derived from the collectively managed resources should flow equitably to all the members of a group. It is easier to ensure equity concerns in homogeneous groups because of similarity objectives towards the resource and socio-cultural characteristics. When the appropriators dependent on a CPR have homogeneous objectives (owing to similarity of culture, resource use pattern, and economic dependence etc.), collective

action is much easier (Jodha, 1996; Kant and Cooke, 1999; Saxena, 2000, Singleton and Taylor, 1992).

Conversely, social heterogeneity is known to contribute to disputes (Fresson, 1979; Merrey and Wolf, 1986) and may increase factionalism. It becomes difficult to enforce equity when the group is heterogeneous with members having different economic interests and use perceptions about the resource. There are diverse sources of heterogeneity that include caste, ethnicity, social grouping, economic status, enterprises, political influence, habitation pattern, physical location etc. It becomes difficult for the factions and group members having heterogeneous objectives to come to common agreement. In such situations, there is need to strike balance between the gainers and the losers. Hackett (1992) argues that those who share in the gains from the CPR management may have incentive to invest in its conservation. Conversely, the users that are made worse off relative to their earlier situation have an incentive to violate the rules of resource use. The costs of conserving CPR in such situations may be minimised by assuring that all users share equitably in the gains from successful CPR management.

There has been a trend in Botswana and other developing countries of devolving rights, or formalizing traditional rights to manage CPRs, to local users who depend on those resources for their livelihoods. However, it is still not clear how heterogeneity impacts communities' abilities to self-govern their use of CPRs. In recent years, controversy has emerged as to whether heterogeneity hinders or facilitates community conservation of resources. In discussing heterogeneity or asymmetry most authors construct two main classes of differences; those that reflect differing economic endowments among individuals (Mancur Olson 1965, Baland and Platteau 1995, Bardhan and Dayton-Johnson 2002) and those that reflect different social or cultural values (Ostrom 1990, Varughese and Ostrom, Schlager 1990, Varughese and Ostrom 2001). In the first case, we may have differences in capital, in access to credit, in resource holdings, exit options (differences in outside earning opportunities), discount rates, etc. The second case would include differences in cultural view of the resource, levels of trust, or social norms about cooperation, are generated by ethnic differences, class differences, gender differences etc. Each of these economic and socio-cultural factors may affect how desirable collective action is to a particular resource user.

Mancur Olson provides an alternative perspective in his book, "The Logic of Collective action" (1965). Olson suggests that 'privileged' individual(s) might be willing to bear the costs of providing a collective good in return for a greater share of the returns. Others may then be able to free-ride and experience the benefits of the good. However, the question of whether 'Olson effects' occur has been repeatedly cropping up in the context of CPR management in last 10 to 15 years

(Baland and Platteau 1997, Bardhan and Dayton-Johnson 2002, Schlager 1990, Varughese and Ostrom 2001). When evaluating the Olson effects, Baland and Platteau (1999) found that as the 'large parties' interest in preserving a resource grows, the 'small' parties' interest declines. Olson (1965) was primarily focused on the provision of public goods and it is a characteristic of public goods that they can be provisioned by a few, permitting the many to free-ride. In the CPR management case, the provision of institutions to manage the resources may constitute a public good and the individual compliance with regulations also yields a collective good in the form of sustained resources. In this case, the actions of the 'small' matters as well. However, Baland and Platteau (1999) emphasize the importance of exploitation technology. When the resource extraction technology is such that initial contributions of (or restraints on) effort provide large returns in terms of conservation outcomes, and a large portion of those benefits can be captured by the main contributor, then 'large' users may contribute to the collective good unilaterally. However, efforts to conserve the resource by the wealthy may yield beneficial conservation outcomes without necessarily being equitable. In the worst case scenario, there may be rich users who wish to conserve the resource by limiting exploitation by poor who are highly dependent on the resource for subsistence needs. More recently, other authors have advanced the view that the relationship between heterogeneity and any particular measure of success is U-shaped; 'success' is least likely at moderate levels of heterogeneity (Dayton-Johnson and Bardhan 2002). The theoretical basis for this argument relies in part on the assumption of a linear production function; increases in production are at all points proportional to increases in participation. The U-shaped relationship can be interpreted in the context of Baland and Platteau's model in the sense that at high levels of heterogeneity we have the situation where the 'rich' can completely supply the collective good. At very low levels of heterogeneity, common interests are great enough that individuals have the social capital necessary to solve collective action problems. Finally, at moderate levels of heterogeneity the tension between the growing interests of the rich and the declining interest of the poor is at its peak, the result being very little, if any, collective goods being provisioned.

The equity considerations are often rooted in emotional argument for providing opportunities to the socially and economically marginalized. Nevertheless, successful management of common property resources has prevailed with significant inequities (Quiggin, 1993). This may be because within the heterogeneous groups, some sections/members are able to derive greater benefits compared to others, but with the complete awareness of the other members. This implies that many heterogeneous groups have sustained collective action although without eliminating inequalities. In Botswana, community-based natural resources management (CBNRM) broke the new ground by integrating wildlife and tourism into development strategy. Communities were encouraged to establish conservation trust as legal entities and apply for the consumptive use of

wildlife through hunting quotas in controlled hunting areas which were zoned in 1989. Two communities from two regions of Botswana, involved in common property resource management are studied to understand such factors that contribute to the success of collective action under the circumstances of heterogeneity where there is a greater likelihood of inequalities within the groups. The systems of benefit distribution are being analyzed to understand how communities overcome implications of heterogeneity in order to sustain collective action necessary for CPR management.

Methods

The study was conducted in Chobe and Kgalagadi areas of Botswana. The database includes a total of 500 individual household interviews. Structured interviews were administered to selected households to solicit data on the characteristics of resource-using communities, the extent of dependency of communities on natural resources under their control, and factors that affect individual participation in common property regimes. The questionnaire used was the income, consumption and expenditure type, with modifications to fit the particular requirements of this research. The questionnaire was designed to solicit data on the characteristics of resource-using communities; the extent of dependency of communities on natural resources; and income, consumption and expenditure of households.

Institutional Analysis and Patterns of Common Property Resource Use

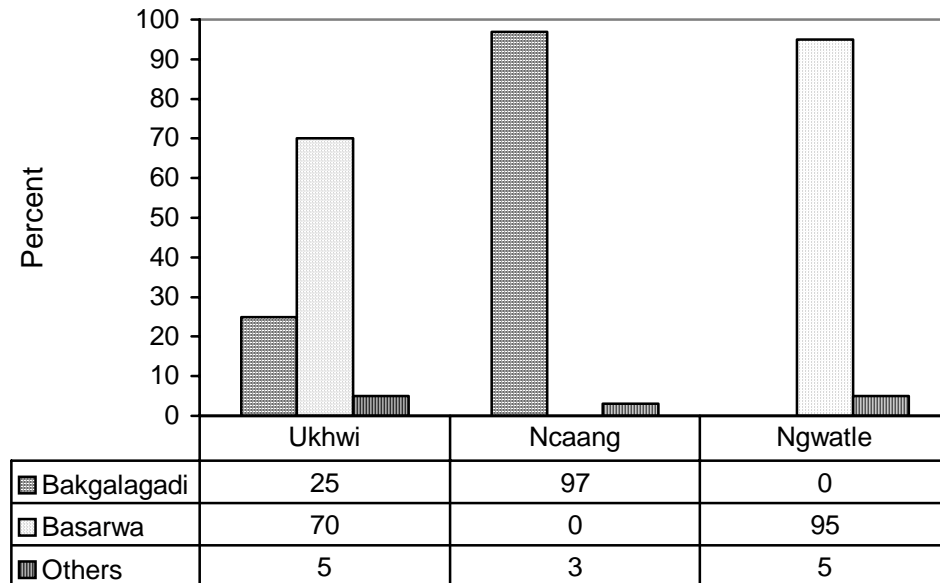
This section focuses on the rules and institutions that the communities in the study area have devised to share and conserve biological resources as common property. The communities that manage the resources under the Chobe Enclave Conservation Trust (CECT) and the Nqwaa Kobee yeya Trust Emphasis are studied. The CECT and the Nqwaa Kobee yeya Trust came about as a result of decentralization of wildlife management to communities. The CECT is characterized by high intensity of state involvement. This is mainly due to the fact that the trust was set up as pilot project while the other two organizations came about through community initiatives. A detailed institutional analysis of the trusts is presented below.

Institutional Setup of the Nqwaa Khobee Xeya Trust

The Nqwaa Khobee Xeya Trust was established in September 1996 (Nqwaa Khobee Xeya Trust, 1999) with the objective of focusing on sustainable wildlife utilization, tourism veldt product harvesting and marketing as well as craft production. However, it took a couple of years before the trust had a management structure, constitution and a land use plan. Once these were in place, the trust was registered as a legal entity in 1998. The Nqwaa Khobee Xeya Trust covers the villages of Ukhwai, Ncaang and Ngwatle, which have, are further divided into family groups. There are two major ethnic groups in that share the wildlife quota in KD1. These include *Basarwa*

and BaKgalagadi. Figure 1 below shows the distribution of ethnic groups per village. The others represent extension workers residing in the community and other members of other tribes who originate elsewhere.

Figure 1: Ethnic Group Distribution in KD1



Source: Field Study

The Basarwa are majority in the area (64%) even though they are not politically and socially prominent. Generally, Bakgalagadi are prominent socially and economically despite accounting for about 30%. Ukhwi is the largest settlement with about 500 people while Ngwatle and Ncaang each have about 200 (Nqwaa Khobee Xeya Trust, 2000).

The two groups are different in culture, language, and lifestyle. The *Basarwa* are traditionally hunters and gatherers, and associated with conservation strategies based on indigenous knowledge. In 1979, the *Basarwa* were allowed to subsist on wildlife by being issued with Special Game License (SGL) as part of the Unified Hunting Regulations (Government of Botswana, 1979). These licenses were issued to people defined as Remote Area Dwellers (RADs), majority of whom is *Basarwa*. Remote Area Dwellers were considered by the Government of Botswana (GoB) to be those people who live in rural areas outside of villages and who depended for their subsistence and income upon biological resources. By 1998, the government of Botswana had withdrawn the subsistence hunting licenses. Now, the RADs are not allowed to hunt for subsistence purposes unless they lived in a community-controlled hunting area, where hunting is controlled by legally registered community trust. This forced *Basarwa* into a situation of greater resources scarcity, which may magnify negative effects of poverty and inequality in the KD1 area.

BaKgalagadi have more diversified income sources. They keep livestock, and where possible grow crops. Livestock ownership and in particular cattle, is an important cultural and economic activity in Botswana. Because of this, many aspire to become cattle owners. Before the Nqwaa Khobee Xeya Trust was established, conflicts prevailed between the two ethnic tribes over the use of resources. The Bakgalagadi converted the land to pasture for cattle, which is the main source of wealth in this group. Cattle compete with wildlife for pasture. Predators such as lions are considered a threat to livestock, thus creating a conflict in land use. More livestock means less wildlife. Batswana general belief is that ... "it is better to keep your wealth in cattle than the bank, because when money is in the bank it is easily accessed whenever a small problem comes up. But when your money is tied up in cattle, you will be more careful in how you spend your resources." (Ukhwi Chief, 1999). Through Nqwaa Khobee Xeya Trust, the people of KD1 manage the land jointly and invest in wildlife. The community now generates incomes from management of wildlife quota, ecotourism projects and co-coordinating the use of veldt products.

The Board of the trust consists of 12 community members who are elected annually, 4 from each community or settlement committee. The Board basically has an administrative role while the actual decision-making powers concerning the use of natural resources and financial resources lie with the Family Groups. The Settlement Committees act as a liaison between the Board and the Family Groups, and are responsible for distributing resources among family groups. Ten ex-officio members sit on the Board. The district and central government officials have been involved in developing and approving the establishment of the trust and land use plans as well as in the establishment of joint ventures. The land board issued a natural resource user lease to the Trust in 1999. The Department of Wildlife and National Parks (DWNP) assist communities to get an animal quota and also provide extension service. Other actors at district and national level play an advisory role.

Given the economic and social stratification of the community, representation in the board was initially a debated issue. However, the three villages institutionalized equality through sharing of proceeds from CPR management. Board membership had to be based on Settlement Committees, which in turn are based on Family Groups. The community itself delineates the Family Groups, which consist of individuals (both kin and not) accustomed to egalitarian sharing of resources, food and decision-making. Each Family Group sends two representatives, one man and one woman, to the Settlement Committee. Each Settlement Committee sends four representatives, two men and two women (as stipulated in the constitution), to the Board of the Nqwaa Khobee Xeya Trust.

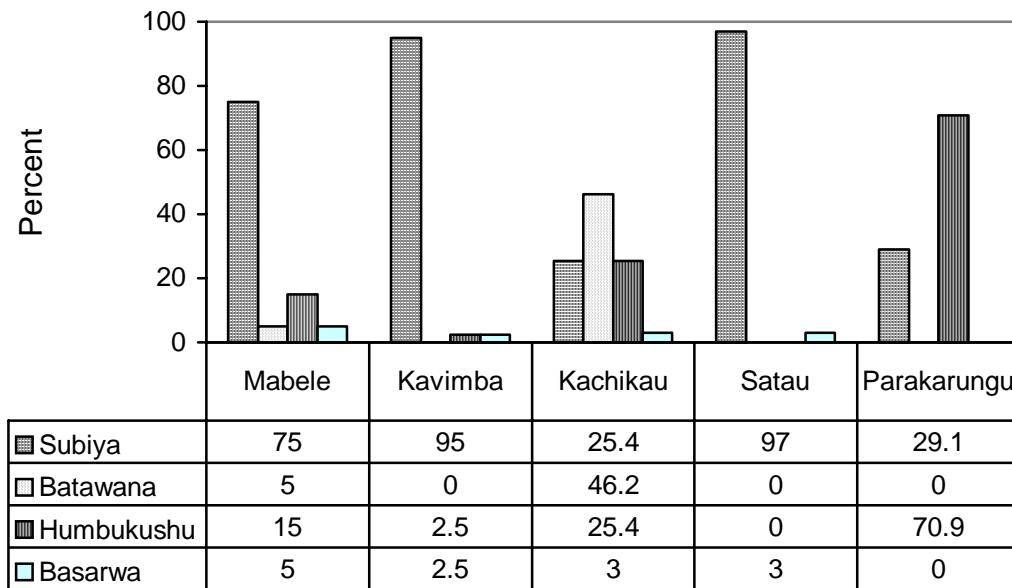
The Family Groups are organized according to ethnicity and class. This way, the decision making process is not dominated by the wealthy or socially prominent ethnic group. This system of representation falls in line with Ostrom's (1990) concept of well-defined group. By making sure that every tribe, men and women are well represented in the Board; the Nqwaa Khobee Xeya Trust resolved conflict and achieved co-operation in CPR wildlife management specifically wildlife. The community quota for KD 1 is divided amongst settlements proportionate to their group size. Within each settlement, the share of the quota is further divided over the family groups again proportionate to the number of people in the groups (Rozemeijer 2001). This is a fairly egalitarian system as long as no individual belongs to more than one family group. Once the Department of Wildlife and National Parks (DWNP) issues a quota, each group informs the settlement committee which animals it wishes to sell and which it wishes to hunt for their own subsistence needs. All animals put up for sale by the groups will be advertised as a single package by the board and sold on behalf of the family groups. The same formula is used to distribute the proceeds derived from sale of the animals. The ultimate use of the funds rests with individual settlements. Some settlements may decide to distribute these funds to the group members, invest it in a group activity, invest it in a settlement activity, or even in an overall trust activity. The division of jobs created through quota management activities in KD1 follows similar distribution criteria. Variations in income per household are through jobs, crafts, direct benefits from the quota (from both the proportion sold and the one used for subsistence), utilization level of projects, and economic status. Based on the experience of the KD1 communities, I conclude that the most effective means of promoting resource conservation and development is through equitable distribution of costs and benefits as well as equal representation in the institutional set up and decision making.

Chobe Enclave Conservation Trusts

The Chobe Enclave Conservation Trust (CECT) was established in 1992. It covers five villages of Kachikau, Kavimba, Mabele, Satau and Parakarungu. The CECT manages the annually issued wildlife quotas that it receives from the Department of Wildlife and National Parks (DWNP). The CECT manages the controlled hunting area CH1/2. There is an estimated population of 7,500 people in the Enclave. The Chobe Enclave is ethnically stratified. Ethnicity plays a very important role in the decision making and income distribution in the Chobe Enclave. The main inhabitants of Chobe Enclave are the Basubiya, although the Batawana are politically dominant. The Banabjwa, *Basarwa*, and other groups also live in the Enclave. The Basubiya are generally the largest group numerically (Figure 2). They mainly reside in Mabele, Satau and Kavimba. The Batawana, who are socially dominant, mainly live in Kachikau, which happens to be the capital town of the Enclave. Overall the Basarwa account for a small percentage of the residents of the Chobe and they are not dominant numerically in any village (Figure 2)

Although present in all villages, the Humbukushu tribe is mainly found in Parakarungu. This distribution pattern shows some form tribal homogeneity in each village except Kachikau, which is more ethnically stratified. Regardless of ethnic identification, households in Chobe Enclave have a mixed economy based on crop production, livestock production, and wage employment. These are supplemented by small-scale businesses such as beer making and natural resources (selling baskets, thatching grass, game meat).

Figure 2: Ethnic Group Distribution in Chobe Enclave (CH1/2)



Membership of the CECT comprises all residents who are 18 years or older. Each of the five major villages within the Enclave has a Village Trust Committee (VTC). The VTC members are elected at the village level. Each VTC then elects two members to serve on the executive committee of the CECT. Elections are held every two years, and there are no limits on the number of terms that a person can serve. This system allows incumbents to amass so much power and attention in office that challengers can rarely win. Therefore if inequitable system exists in the Chobe, it will persist for a long time because the more socially and economically prominent are likely to continue influencing the decisions and income distribution.

The CECT practically sell the entire quota to a Safari Company, thus leaving fewer animals for subsistence hunting. During the field study, some residents reported that they have been severely disadvantaged by the sale of the entire quota. And their hunting opportunities to meet household

food needs have been reduced. Ethnic groups like *Basarwa* usually do not have the cash to purchase meat that the CECT sell to the community. They are also the group least involved in the decision-making process. The basic formula for dividing revenues in the CECT is as follows: 85% of revenues are divided evenly among the five VTCs and 15% remains with the CECT for operating costs. All the VTCs so far do not have a formula on how to distribute the revenues. Most of them have invested the funds in on activities that provide community services or employment. The good fortune of the CECT is highlighted by several projects that have been established in the area (Table 1)

Table 1: Development Projects

Village Trust Committee	Projects	Number Employed
Mabele	3 stores	3
Kavimba	Camp site	4
Kachikau	Filling station (not yet operating) Brick making	17 on rotational basis
Satau	0	0
Parakarungu	0	0

At community trust level, employment is shared equally among VTCs. Community Escort Guides (CEGs) are hired by the CECT from the five villages on a rotational basis to accompany a hunting trip. The CECT also employs a radio operator in each village. The safari operator employs a minimum of 50 seasonal and temporary workers for the hunting camps. The CECT has plans to built and operate safari lodge. In this way the CECT can generate rural development by creating employment in the area. Other plans include salvaging of dead timber in the forest reserve and to establish a furniture factory that would employ an estimated 300 people. The experience in CECT shows there is great potential in achieving rural development through investment of funds the community generates from animal quota. Presently, it is not clear how an individual get tangible benefits from the animal quota. Selling most of the quota and subsequently game meat results in wealthier members of the community benefiting more than the poor. They also dominate decisions concerning benefit flows and how money from hunting and tourism is re-invested. Therefore, the CECT institutional structure does not take into account the ethnic make up of the community. Equitable benefit distribution takes place at village level and does take into account the direct benefits of members. Weak participation by residents in decision-making may undermine co-operation in CPR management. More attention should be given to providing opportunities to individuals and households. Members should be able to define the benefits they can get from their wildlife quota, instead of these benefits being defined by donors and other

outsiders. Facilitation should focus on decision-making processes that will lead to benefit distribution that meets the needs of the wider CECT membership.

Subsistence Use of Common Property Resources

In this section, I test for statistical difference in the use of CPRs between the income groups and ethnic groups. The hypothesis I am testing is that poor derive more income from CPRs for subsistence but the rich use CPRs more intensively for commercial purposes. The subsistence use of CPRs in study area is influenced by a no a number of factors. Subsistence agriculture is often not sufficient to satisfy the food needs. For example, most households in the study area depend on CPRs for construction pole, wood and thatch grass because alternative materials are too expensive. On the other hand, the use of some CPR products is reduced, as cheap alternatives become available to rural areas. Use of some of the resources like wild vegetables, medicinal plants and palm leaves (for making, baskets, and mats) are so intimately attached to the local culture, that most of them continue to be used, even if there is little economic rationale for their use. For example, Botswana rural society still places high importance to the traditional medicines and local healers. Even in presence of modern medical facilities, people irrespective of social status make use of the local healers and local medicines prior or during their medication with modern medical procedures. This has lead to continuing dependency medicinal plants locally found in the wilderness. Do the poor use the CPR significantly more for subsistence than the rich? I hypothesized that the poor, who comprise mainly *Basarwa*, use CPRs more intensively for subsistence than the rich. Subsistence use analyzed here is mainly consumptive, and it excludes grazing of livestock. Table 2 below presents a comparison of means for subsistence use of CPRs by different ethnic groups.

Table 2: CPR Subsistence Use by Different Income Groups

	Mean	Std. Deviation	Minimum	Maximum
Ethnicity				
Subiya	1128.20	1090.08	0	4000
Batawana	578.00	548.33	0	1840
Humbukushu	1500.00	1667.63	280	5000
Basarwa	2587.03	1943.14	1500	8000
Bakgalagadi	2542.43	3042.89	0	10000
Total	1831.12	2055.08	0	10000
F				13.08
Significance				.00

The mean comparisons show tribes that intensively use CPRs for subsistence are the *Basarwa* and Bakgalagadi. This seems to underscore the fact that there is a high incidence of poverty in Kgalagadi, with *Basarwa* being the poorest (BIDPA, 1997). On average, *Basarwa* get 2587.03 Botswana Pula from CPRs for subsistence purposes, followed by Bakgalagadi with 2542.43 Botswana Pula (Table 2). The subsistence mean value falls as social status of a tribe increase. For instance, the Batawana are the most important politically in the Chobe, and the subsistence average income from CPRs for the group is 578.00 Botswana Pula. The *Basarwa* deriving the highest mean income from CPR can be explained by the fact that they poor are the poorest among the tribes covered by the study. There is a variation in the subsistence use of CPRs by other tribes. For example, some Batawana, Subiya, and Bakgalagadi do not use CPRs at all for subsistence (a minimum of zero). *Basarwa* use CPRs intensively for subsistence, followed by Bakgalagadi, Humbukushu and Subiya (Table 2). Taking subsistence use of CPRs as indicative of economic status among the tribes, Batawana are the least poor given their low level of use of CPRs for subsistence. Socially Batawana are the most politically important in the study area. This implies that social heterogeneity is related to economic heterogeneity. Testing for the difference in CPR subsistence use between tribes gives $F=13.08$, which is statistically significant at 1% (Table 2).

Based on these findings, the null hypothesis of equal means is rejected and I conclude that the subsistence use of CPRs is statistically different among different tribes. Since the hypothesis of equal means is rejected, we need to have a procedure for determining the pattern of differences. A basic method of doing so is Fisher's protected Least Significant Difference (LSD). This is a commonly use method for paired comparison, and it represents the smallest amount by which two means can be different and still be considered significantly different. This comparison is made only because the overall F test above shows there is significant differences in mean incomes of among the tribes. Table 3 below presents the pattern of differences in CPR subsistence use among between different tribes using the LSD test. The results show that generally there is significant difference between average income from subsistence use between *Basarwa* and all the rest of the tribes, and between Bakgalagadi and Batawana and Subiya 1% (Table 3). For the Humbukushu, who are third in the highest average subsistence income from CPRs, their mean income from subsistence use of CPRs is not significantly different from that of Bakgalagadi at 10%, but different from that of *Basarwa* at 10%. This means that there is no significant difference in average income from subsistence use of CPRs between the Subiya and Batawana and Humbukushu. However, there is significant difference in average income between these tribes and *Basarwa*, and to some extent Bakgalagadi. Therefore, the poor and socially marginal tribes use CPRs more intensively for subsistence than the socially prominent and not so poor tribes.

Table 3: Pair wise Comparisons - CPR Subsistence Use (LSD)

		Mean Difference (I-J)	Std. Error	Sig.
(I) Ethnicity	(J) Ethnicity			
Subiya	Batawana	550.20	452.27	.224
	Humbukushu	-371.80	623.65	.551
	Basarwa	-1458.84	213.51	.000
	Bakagalagadi	-1414.23	233.71	.000
Batawana	Subiya	-550.20	452.27	.224
	Humbukushu	-922.00	743.76	.216
	Basarwa	-2009.03	458.07	.000
	Bakagalagadi	-1964.43	467.83	.000
Humbukushu	Subiya	371.80	623.65	.551
	Batawana	922.00	743.76	.216
	Basarwa	-1087.03	627.87	.084
	Bakagalagadi	-1042.43	635.02	.101
Basarwa	Subiya	1458.84	213.51	.000
	Batawana	2009.03	458.07	.000
	Humbukushu	1087.03	627.87	.084
	Bakagalagadi	44.60	244.74	.855
Bakagalagadi	Subiya	1414.23	233.71	.000
	Batawana	1964.43	467.83	.000
	Humbukushu	1042.43	635.02	.101
	Basarwa	-44.60	244.74	.855

* The mean difference is significant at the .05 level.

Commercial Use

The commercial use of CPRs is unequally distributed tribal groupings covered by the study. As the demand for medicinal plants such as *Sengaparile (Harpagophytum procumbens)* and other exclusive natural products are increasing in the world market, high prices are often offered. Those who benefit more are the ones who have the means to harvest large quantities. Although harvesting areas are very remote, the high value of medicinal plants makes them worth to transport them over long distances to markets. Consequently, the rich and middlemen often venture into remote areas to buy certain CPR products from the poor to sell in cities at a higher price. It was hypothesized that the tribes that are socially prominent and economically well off, are

more likely to derive higher CPR incomes from commercial use of CPRs. Table 4 presents comparison of mean incomes from commercial use of CPRs among different tribes.

Table 4: CPR Commercial Use by Different Income Groups

	Mean	Std. Deviation	Minimum	Maximum
Subiya	1533.61	1769.75	0	10000
Batawana	1246.25	1366.64	0	5000
Humbukushu	1110.00	1318.26	0	3750
Basarwa	329.83	469.91	0	2750
Bakgalagadi	327.80	377.50	0	1750
Total	1146.80	4916.99	0	100000
F	Sig.			
	6.28	.000		

Commercial use of CPRs ranges from zero to 10000 Pula among all tribes. There is reverse pattern in the use of CPRs in case of commerce, with Batawana, Subiya and Humbukushu using the CPR more intensively than the *Basarwa* and Bakgalagadi. The mean income of the Batawana from commercial use of CPRs is 1533.61 Pula, followed by Subiya with 1246.25 Pula and Humbukushu with 1110 Pula (Table 5.9). There is also high volatility of in the commercial use of CPRs among the tribes. For instance, the standard deviation of mean income from commercial use of CPRs is 1769.75 around a mean income of 1533.61 (Table 4). The difference in commercial use of CPRs among tribes is highly statistically significant at 1% level with an $F = 6.28$. Therefore, the rich and socially prominent tribes use CPRs intensively for commercial purposes. The null hypothesis of no difference in commercial and subsistence use of CPRs between the rich and poor is rejected, and conclude that the poor and socially marginal tribes mainly use CPRs for subsistence while the rich and socially prominent tribes use them for commercial purposes.

Table 5 below presents the pair wise comparison in CPR commercial use between tribes. There is a 5% significant difference in mean incomes from CPR commercial use between the Subiya and Basarwa and between Subiya and Bakgalagadi. There is no significant difference in mean income from commercial use of CPRs between the Subiya and the rest of the tribes (Table 10). There is no significant difference between the mean incomes of Batawana and any tribe. The same applies to the Humbukushu. Comparing Basarwa commercial use of CPRs with the rest of the tribes shows that there is significant difference in mean income between *Basarwa* and the

Subiya only. The p-value is 0.024, which less than the 0.05 significance level (Table 5.10). The same applies to Bakagalagadi, with a p-value of 0.038.

Table 5: Pairwise Comparisons - CPR Commercial Use (LSD)

		Mean Difference (I-J)	Std. Error	Sig.
(I) Ethnicity	(J) Ethnicity			
Subiya	Batawana	287.36	1122.87	.798
	Humbukushu	423.61	1548.38	.785
	Basarwa	1203.78	530.09	.024
	Bakgalagadi	1205.80	580.24	.038
Batawana	Subiya	-287.36	1122.87	.798
	Humbukushu	136.25	1846.58	.941
	Basarwa	916.42	1137.28	.421
	Bakgalagadi	918.45	1161.50	.429
Humbukushu	Subiya	-423.61	1548.38	.785
	Batawana	-136.25	1846.58	.941
	Basarwa	780.17	1558.85	.617
	Bakgalagadi	782.20	1576.61	.620
Basarwa	Subiya	-1203.78	530.09	.024
	Batawana	-916.42	1137.28	.421
	Humbukushu	-780.17	1558.85	.617
	Bakgalagadi	2.02	607.64	.997
Bakgalagadi	Subiya	-1205.80	580.24	.038
	Batawana	-918.45	1161.50	.429
	Humbukushu	-782.20	1576.61	.620
	Basarwa	-2.02	607.64	.997

* The mean difference is significant at the .05 level.

Exploitation of specific veldt products for commercial purposes is area specific, depicting the ecological differences of the study area. There is significant difference in mean incomes from sales of veldt products in Chobe and Kgalagadi. Communities in Chobe derive higher mean incomes from thatch grass and crafts (Table 6).

Table 6: Mean Income from Sale of Commodities from the CPR

	Mean	Std. Deviation	95% Confidence Interval for Mean	
			Upper Bound	Lower Bound
Thatch grass				
Chobe	2061.65	7037.52	1159.14	2964.17
Kgalagadi	328.98	442.00	275.41	382.54
Total	1146.80	4916.99	714.77	1578.83
<i>Sengaparile</i>				
Chobe	26.67	106.62	13.75	39.59
Kgalagadi	224.21	271.00	189.45	258.96
Total	114.09	224.02	94.40	133.77
Crafts				
Chobe	1627.12	6858.40	747.58	2506.67
Kgalagadi	1361.48	3660.24	917.92	1805.05
Total	1486.87	5406.55	1011.82	1961.91

The mean income for thatch grass sales is 2061 Botswana Pula compared to 328 Pula in Kgalagadi. The difference in mean income between groups with respect to thatch grass is significant with an F value of 15.94, which is significant at 5% level. There is no significant difference in mean income from crafts between the two regions, which implies that communities in both regions equally benefit from crafts. There is significant difference with respect to mean income from commercial exploitation of *Sengaparile* between Chobe and Kgalagadi, with the latter registering high mean income (Table 6). This is indicative of *Sengaparile* endowment between the regions. The *Sengaparile* species is generally found in the sand areas of Kgalagadi .

Table (6): Analysis of Variance

<i>Sengaparile</i>	Sum of Squares	Mean Square	F	Sig.
Between Groups	85816.51	85816.51	14.25	.000
Within Groups	2999824.29	6023.74		
Total	3085640.80			
Thatch grass				
Between Groups	374093600.63	374093600.63	15.94	.000
Within Groups	11690136279.37	23474169.24		
Total	12064229880.00			
Crafts				
Between Groups	8792784.65	8792784.65	.300	.584
Within Groups	14577343203.38	29271773.50		
Total	14586135988.02			

Commercial harvesting of *Sengaparile* is controlled by permits, which are provided by the Agricultural Resources Board (ARB). The permits specify the area and the allowed amount, but the system provides little guarantee for sustainable harvesting methods, as this is not specified, nor monitored. There is practice in Kgalagadi for Non-Governmental Organization (NGOs) to collect permits from ARB and distribute them among community members. This system treats villagers as hired laborers, and this may have great impact on the harvesting methods employed. When the villagers are paid based on the harvested volume, then there would be a tendency for random harvesting, including immature products to increase quantity harvested to get higher cash returns.

CPRs play a major role in the economic welfare of rural communities covered by the study. CPRs account for a large proportion of household income and provide inputs in production system such as livestock production. The communities in the study area use CPRs for both commercial and subsistence purposes. The findings show that the use pattern of CPRs is influenced by the socio-economic difference among community members. The following section explores the issues of socio-economic differences and assess to what extent they impact on CPR management.

Socio-Economic Heterogeneity in the Study Area

Households in developing countries adopt livelihood strategies that often rely on income from a diversity of sources. From a policy perspective it becomes important to understand the relative importance of income sources in driving inter-household inequality and poverty. This section presents finding on the prevailing socio-economic heterogeneity among communities covered by

the study. Socio-economic stratification is a property of the distribution in a population of some (presumably valued) resource such as income or wealth but also cattle, or land holding. The types of heterogeneity suggested by the literature are income, wealth, exit options, ethnic and social heterogeneity, and asymmetries in participation in decision-making

Income inequality

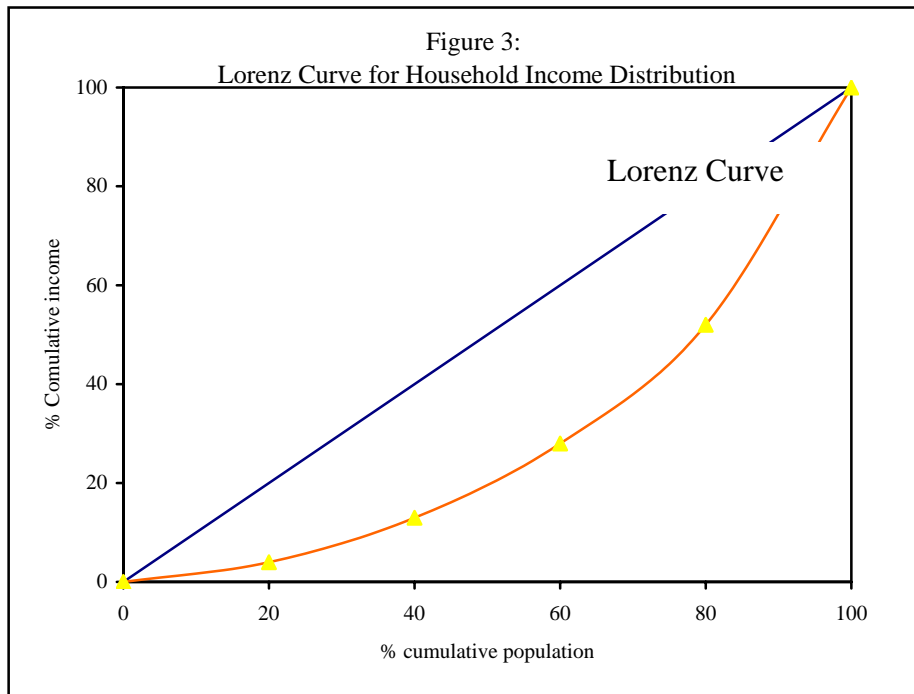
The distribution of income arises directly out of the distribution of productive factors of production: land, physical capital, and human capital, labour. A highly unequal distribution of income may pose challenges to community efforts to conserve CPRs. First analysis of inequality is made with respect to income. In Table 7, income-receiving units are ranked by income from the smallest to the largest, and the cumulative share of income accruing to each category of the populations from poorest to richest, are presented. The income distribution in the study area is highly skewed. The top quintile receives roughly 48% of total income, while the bottom quintile receives only 4% of total income (Table 7).

Table 7: Income Distribution in Study Area

Quintile	% of Population	% of Income	Cumulative % income
	0	0	0
1	20	4	4
2	40	9	13
3	60	15	28
4	80	24	52
5	100	48	100

The Lorenz Curve construction also gives us a measure of the amount of inequality in the income distribution, and allows for calculation of Gini Coefficient. To analyze the distribution of income, households are ranked according to their income and a Lorenz Curve is drawn (starting with the lowest incomes) to indicate the cumulative income received by the cumulative population up to that point. For a perfectly equal distribution, there would be no area between the 45⁰ line and the Lorenz curve, that is, a Gini coefficient of zero. For complete inequality, in which only one person has any income (if that were possible) the Lorenz curve would coincide with the straight lines at the lower and right boundaries of the curve, so the Gini coefficient would be one.

Figure 2 below shows that there some degree of inequality in the study area. The gap between the 45° line depicting perfect equality and the Lorenz curve is quite wide, reflecting the income inequality that prevails in the study area. Almost the bottom 80% of the population receives only 50% of income while the top 20% of the population enjoys 50% of the income. In a nutshell, the communities in study area are characterized by a large majority of poor and a small minority of the rich. This implies that co-operation in CPR management is bound to be difficult unless the communities establish appropriate Equal access. The Gini coefficients computed for five villages in the study area are presented in Table 8. Kavimba and Satau are two villages in the Chobe Enclave. Ukhwi and Ncaang are in the controlled hunting area KD1. A Gini



coefficient of 0 implies that income is equally distributed among the population. A value of 1 means essentially one person has all the income while everyone else has none. The Gini coefficients for income for the villages in the study area vary from vary from about 0.30 to 0.51. The Villages in Chobe Enclave display more or less the same value of the Gini coefficient. Income disparities are not that well pronounced in Chobe.

Table 8: Gini Coefficients for Income Groups in Villages of Study Area

Village/Settlement		Share of lowest 40%	Share of highest 20%	Ratio of share of top 20% to bottom 40%	Gini coef.
Chobe	Kavimba	15.7	48.8	3.11	0.42
CH1/2	Satau	14.9	50.1	3.36	0.44
KD1	Ukhwi	11.7	55.7	4.76	0.51
	Ncaang	18.7	40.4	2.16	0.34

Ukhwi is characterized by a high level of inequality, with a Gini coefficient of 0.51. This can be explained by the fact that 25% of the population in the settlement comprises Bakgalagadi, who are economically better off than the Basarwa. In settlement with homogeneous groups such as Nacaang, whose residents are mainly Bakgalagadi, inequality is relatively lower (Table 8). This shows that income inequality is therefore correlated to social heterogeneity. This issue is further explored in the next section.

Intra-group Heterogeneity in Each Region

Any community's living standards and opportunities are influenced by where they live. Vocational differences are important in the matter of exit options open to the community. In this section, comparative analysis of socio-economic intra-group heterogeneity is done. This will reveal to what extent the communities are heterogeneous, and how such heterogeneity impacts on their capacity to co-operate in sustainable use of biological resources. Since settlements that form the community that manages controlled hunting areas are located in the same area, hence there are no location disparities with respect to access to city or other services. The location difference captured here is with respect to distribution of income in the specific area.

Kgalagadi – KD1

Income distribution among the settlements in the Kgalagadi is reinforced by social heterogeneity. Three variables are used to assess the extent of resource inequality among members of the KD1 community. These are educational attainment, ownership of cattle and household income. Education is widely recognized as the gateway to economic security and economic opportunity (exit options). However, *Basarwa* are the least educated in KD1. Their lack of access to education is not related to scarcity of places in schools but mainly related to their past nomadic live. It also emerges from expectations, attitudes and biases in communities. Educational disparities between Basarwa and Bakgalagadi are large (Figure 4).

Figure 4: Educational Inequalities in KD1

Percentage of Ethnic Group with Education

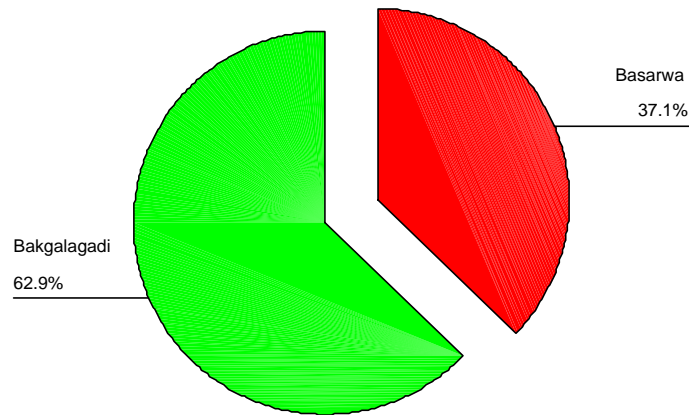


Figure.4 shows that almost 63% of Bakgalagadi have attained some education while only 37% of *Basarwa* have some form of formal education. Table 9 below also shows that the mean years of schooling among *Basarwa* is almost 5 years while on average Bakgalagadi have more than 9 years of schooling. This implies that *Basarwa* have limited exit options than Bakgalagadi. This may also limit their capacity to influence the development process and limit access and their control of resources. Disparities in terms of household income follow the same pattern. The *Basarwa* have lower mean income compared to Bakgalagadi (Table 9). However, Bakgalagadi have a large variability of household income with a standard deviation of 9852.13.

Table 9: Inequality in Resource Endowment

Resource	Ethnicity	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
Cattle	Basarwa	.00	.00	.00	.00
	Bakgalagadi	120.75	273.14	67.89	173.61
	Total	60.67	202.40	33.06	88.27
Household Income	Basarwa	5159.09	6073.07	3978.03	6340.15
	Bakgalagadi	5647.69	9852.13	3741.06	7554.32
	Total	5404.56	8176.55	4289.54	6519.57
Education	Basarwa	4.96	2.24	4.53	5.40
	Bakgalagadi	9.10	3.44	5.62	16.57
	Total	7.53	4.40	5.20	15.85
Household Income	Male	6518.84	10093.49	4473.71	8563.98
	Female	4457.90	5981.45	3343.01	5572.80
	Total	5404.56	8176.55	4289.54	6519.57

Generally the *Basarwa* do not own any cattle while Bakgalagadi on average own almost 121 cattle. The only cattle in Basarwa possession are *mafisa*¹ or cattle they are herding on someone's behalf. After some years *mafisa* cattle would be claimed back by the owner and some left with the caretaker family as a form of gratuity. The size of the gratuity depended on how well the cattle were looked after and whether they had increased in number. Although this is commendable evidence of how Batswana take care of the less privileged members, it can be exploitative between ethnic groups. Most Basarwa reported that they are paid in kind (food and clothing) and do not receive this gratuity.

Income disparities between male and female households are large in KD1. On average male headed households have household income, which is 33% larger than that of female headed households (Table 9). The 95% confidence interval for mean income of male headed and female

¹ A system in among Botswana tribes, whereby a better-off person gives some of his cattle to the poorer person to look after on his behalf. Such cattle were very useful to the beneficiary family which could use them as draught power and as a source of milk

households has a lower bound of 4473.71 Pula and 3343.01 respectively, and an upper bound of 8563.98 Pula and 5572.80 Pula for male and female headed households respectively (Table 9). This shows that there is less variability in household income for female headed households as compared to male headed households.

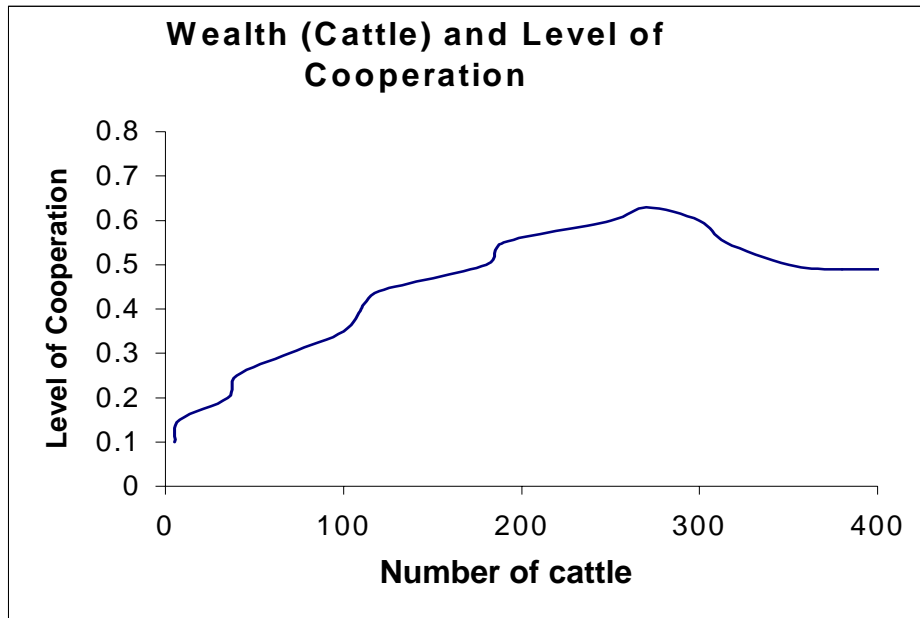
Comparison of resource endowment between *Basarwa* and Bakgalagadi shows that there is significant difference with respect to cattle ownership and educational attainment (Table 10). Differences between groups with respect to cattle ownership and education have F value of 20.33 and 12.88 respectively, which is significant at 5% level. There is also significant difference with respect to household income between male and female headed households at 10% (Table 5.10).

Table 10: Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
Cattle	Between Groups	761846.99	1	761846.99	20.33	.00
	Within Groups	7759039.56	207	37483.28		
	Total	8520886.56	208			
Income	Between Groups	12473312.77	1	12473312.77	.19	.67
	Within Groups	13893569358.85	207	67118692.55		
	Total	13906042671.62	208			
Education	Between Groups	67.22	1	67.22	12.28	.00
	Within Groups	1132.89	207	5.47		
	Total	1200.11	208			
Male /Female	Between Groups	220462409.03	1	220462409.0	3.33	.069
	Within Groups	13685580262.59	207	66113914.31		
	Total	13906042671.61	208			

Cattle ownership in Botswana is generally highly skewed, with majority owning no cattle or few cattle while a few individuals own a large percentage of the national herd. In this context, communities that have more equal distribution of wealth might exhibit higher levels of rates of resource conservation than more unequal ones. Those who have large herds of cattle are less likely to cooperate in observing the rules than those who have a few. In the Kgalagadi, the relationship between livestock holding and level of compliance with rules shows an inverted u-shape.

Figure 5: Wealth and Level of Co-operation in Kgalagadi

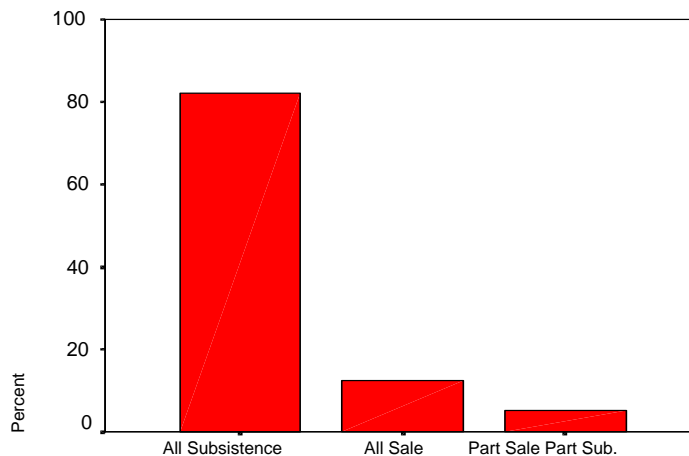


People in the area seem to cooperate with rules even at high level of cattle ownership. This means that the hypothesis that high income levels provide people with exit options, which is disincentive for co-operation does not hold in the case of Kgalagadi. This phenomenon may be explained by the fact that majority of respondents in the area were *Basarwa*, who own small herds if any. *Basarwa* hardly use the CPR for grazing animals. Therefore increase in ownership of cattle in the area is likely to increase compliance with rules. This is a very interesting economic consideration, which needs to be taken into account when introducing certain policies. For instance, people who would be most affected by introduction of grazing fees are generally the *Basarwa* and the poor, who are still in the process of wealth accumulation. Acquiring cattle as wealth accumulation will lead to a high level of dependence on the CPR. On the other hand, a high level of dependence on the resource will induce conservation up to the point where exit options effects set in (Figure 5). For this region, exit option effects set in much later at around 300 cattle as compared to Chobe where they set in as early as around 200 cattle.

Heterogeneity in terms of preference with respect to wildlife quota usage is prevalent in KD1. Generally 80.9% of the community prefer the quota being used for subsistence while 12.9% prefer the whole quota to be sold and the remaining 6.2% prefer the quota to be used both for subsistence as well as for sale (Figure 6).

This stratified preference with respect to resource use is indicative of the differences in ethnic make up of the area. Majority of those who prefer the wildlife quota to be used for subsistence is *Basarwa*, which indicates their high level of dependence on the resource. Contrary to this, all those who favour that the entire quota is sold are Bakgalagadi. Among those who favour the quota to be used partly for subsistence and part for sale comprise both *Basarwa* and Bakgalagadi.

Figure 6: Heterogeneity in Quota Usage



Ignoring the ethnic background of the community, the high percentage of preference for using the quota for subsistence shows some degree of homogeneity in the area, 80% prefer subsistence use (Figure 6).

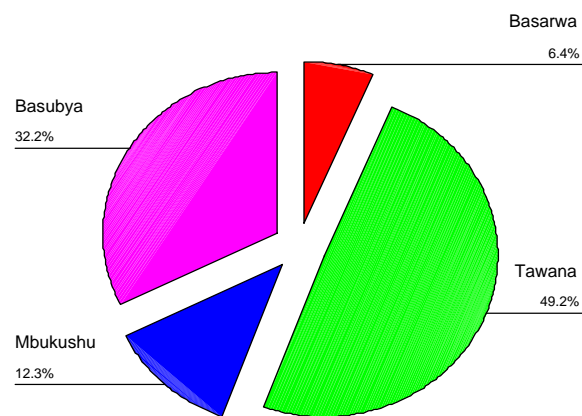
Chobe Enclave CH1/2

Communities in the Chobe Enclave are highly stratified socially and economically. As in the case of Kgalagadi, issues relating to who makes the decisions concerning CPR use; how much livestock is owned and by whom; and what other socio-economic differences exists among ethnic groups that are found in the Chobe Enclave are investigated. Generally, livestock is owned by 75% of households. Out of these, 10% of households owned 55% of the cattle. Male-headed households owned more cattle than those headed by females². About 40% of households hired labour to care for their cattle. Livestock is sold only when cash is needed and is not raised commercially. Livestock is threatened not only by lions, but also by diseases carried by wildlife. Foot and mouth disease, carried by buffalo, has occasionally devastated livestock herds and

2. Cattle herding is traditionally a man's responsibility.

restricts the ability of residents to sell beef outside of the Enclave. Less than 50% of households had a wage earner and female-headed households were the least likely to have a wage earner. Most of those with employment reside outside the Enclave. In general, 54% of households had subsidized employment through drought relief. Of those with formal employment, up to 80% are employed by the government. The remaining 20% are employed by the private sector. There is some ethnic division of CPR use owing to geographic proximity to certain resources. For instance, Basubiya sell reeds and thatching grass while the Batawana do not as their village is not near the flood plains. Male heads of household are more likely to be involved in the commercial selling of CPR commodities than their female counterparts. As in the case of KD1, there still are large educational disparities in among the tribes in Chobe Enclave. Generally, Batawana have a higher educational attainment, with 49.2% of them having some form of education. *Basarwa* are least educated, with only 6.4% of them having some form of education (Figure 7).

Figure 7: Educational Attainments by Ethnicity



This disparity underscores the findings that social heterogeneity correlates with economic heterogeneity. Those who are social minority are also likely to have few economic resources. The same pattern applies to other resources such as cattle. Batawana, Basubiya and Mbukushu on average own more cattle than *Basarwa* (Table 11). The Mbukushu on average own 217 cattle, followed by the Basubiya with 139 cattle. Actually, there is just one Basarwa household in the area, which was recorded as having cattle, the rest of the group does not own cattle. However, there is no significant difference in cattle ownership among the ethnic groups. The F-value for cattle ownership difference is 0.87, and it is not statistically significant at 5% significance level (Table 11). This implies that statistically cattle ownership is more or less equal among community members. The distribution of income among ethnic groups also depicts a pattern similar to cattle ownership. The socially prominent tribes have higher household income than those that are from socially minority tribes. On average, household income is around 12 000 Pula for all tribes except Basarwa, whose average income is 878 Pula (Table 11)

Table 11: Inequality in Resource Endowment

Resource	Ethnicity	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
Cattle	Basubiya	139.27	166.96	114.92	163.62
	Batawana	170.75	197.89	78.14	263.36
	Humbukushu	217.00	123.30	128.79	305.21
	Basarwa	144.00	.	.	.
	Others	152.86	156.11	83.65	222.08
	Total	146.52	166.79	125.13	167.91
Household Income	Basubiya	7691.12	15092.01	5489.88	9892.36
	Batawana	12924.50	17940.44	4528.12	21320.88
	Humbukushu	12135.80	25906.21	-6396.38	30667.98
	Basarwa	878.00	.	.	.
	Others	11388.18	27589.48	-844.31	23620.67
	Total	8638.73	17317.40	6417.89	10859.57
Education	Basubiya	9.70	4.84	6.00	11.71
	Tawana	16.30	6.15	3.42	15.91
	Humbukushu	5.60	4.99	2.03	9.45
	Basarwa	5.00	2.25	1.07	4.56
	Total	7.58	5.99	5.94	8.97

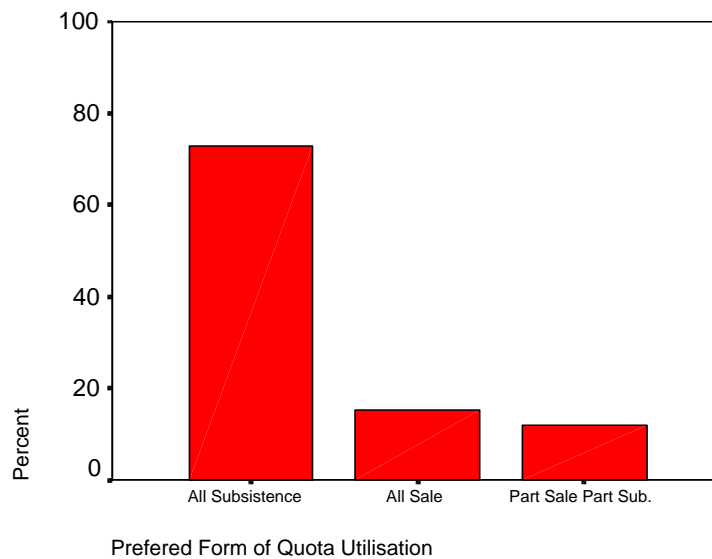
The differences in resource endowment illustrate the difference in property rights and property control. This questions the very possibility of successful CPR management. However, all the variables show that there is no significant difference between groups, which implies that income and resource distribution in the Chobe is more equitable than in Kgalagaddi (Table 12)

Table 12: Analysis of Variance Kgalagadi

		Sum of Squares	df	Mean Square	F	Sig.
Cattle	Between Groups	1409.65	4	352.41	.87	.48
Income	Between Groups	880516548.95	4	220129137.24	.73	.57
	Within Groups	69594214557.22	231	301273656.092		
	Total	70474731106.18	235			
Education	Between Groups	71918.21	4	17979.55	.64	.63
	Within Groups	6465864.68	231	27990.75		
	Total	6537782.89	235			
Household income –Male/Female						
	Between Groups	683786635.51	1	683786635.51	2.29	.13
	Within Groups	69790944470.67	234	298251899.44		
	Total	70474731106.18	235			

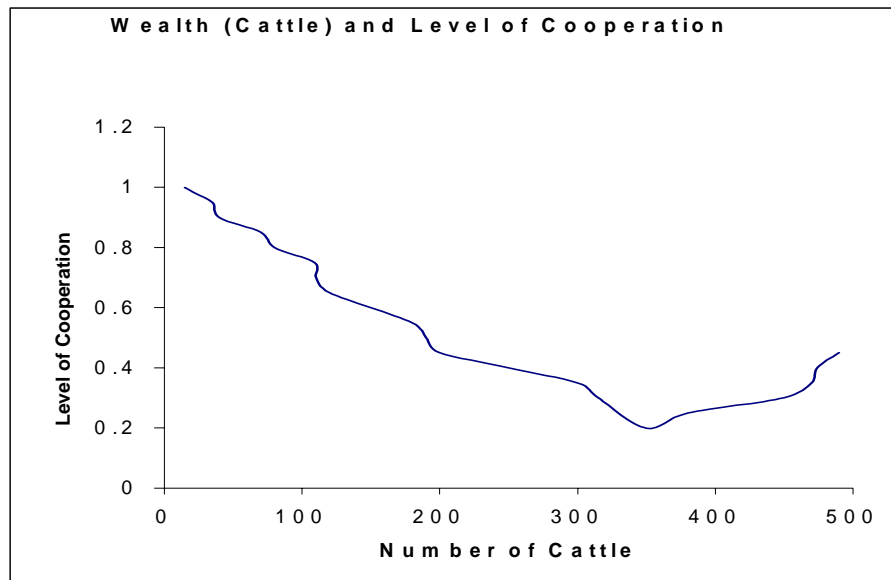
Heterogeneity with respect to use of quota follows similar pattern to the Kgalagadi case. About 75% of the community in Chobe Enclave prefer that all part of the wildlife quota be used for subsistence hunting. This shows that in Chobe, the use of the quota is not dictated by the needs of the community.

Figure 8: Preferred Ways of Quota Utilization



How does wealth inequality affect co-operation among community members in Chobe Enclave? The graph below shows a U-shape relationship between level of cooperation in observing rules and number of cattle ownership. At lower levels of wealth, there is tendency to co-operate.

Figure 9: Wealth and the Level of Co-operation



However, as wealth increases, between 200 and 400 cattle, individuals lose incentive in cooperation in CPR management, that is, the effects of exit options set in. In this context, communities that have more equal distribution of wealth might exhibit higher levels of co-operation and more balanced and conserved ecosystem than more unequal distribution of wealth.

Conclusion

From the analysis of case study villages, it becomes evident that heterogeneity of users causes many complications in collective action. The success of CPR management depends on compromises made by communities in the process of working out a negotiated agreement of resource use and benefit sharing. Economic gains from the regulated resource management act as one of the most important factors contributing to the success of community conservation. However, the share from these gains should be distributed among all the members of the community in a manner that all feel benefited compared to the previous situation. This is fairly exemplified by the KD1 communities. Kgalagadi. This falls in line with Hackett (1992) suggestion that to provide share in the gains from successful CPR management to all the appropriators, relatively large appropriation rights might be accorded to those who make relatively large non-cooperative appropriations. Even if this may result into relatively inequitable distribution of

benefits, this is likely to involve all the appropriators for sustaining collective management, at least in the beginning.

The functioning of community institutions matures with experience, although conflicts are often inevitable in the process. There is an incremental learning in the process and each successful resolution of conflicts builds greater confidence of the community. Though once a system of working is established, the prevailing inequalities may persist such as widespread exclusion of marginalized groups. The institutional maturity is high in Kgalagadi while in the Chobe this has not occurred because of several factors including dependence on the government to tell them what to do and the lack of efforts made for promoting self-reliance in the community institutional.

It is needless to emphasize that the level of awareness and concern for converting an open access to a common property is the most crucial aspect for sustaining collective action. The people should feel convinced about the need for sustainable use of the resource. They should be able to realize that such a practice would be advantageous to all in the long run, rather than allowing unregulated extraction in which there may be more advantage to a few in the short run. This would require a regular process of extension and sensitization of community members, along with the support from the government. The lack of awareness and concern among all the factions and members is quite apparent in Chobe. The lesson that can be learnt here is that the implementation process should be such that it does not create dependence on the government and communities gradually become self-reliant.

The KD1 communities have developed an understanding of the rules and learn how to make them work. This knowledge is part of the social capital that develops over time. The formation of social capital is more crucial in heterogeneous communities to effectively implement the commonly agreed norms and procedures and build trust among the members. The KD1 communities have successfully developed this social capital. These communities are more likely to use this capital even for other issues because a group that learns to cooperate effectively together in one type of tasks can learn to take similar other tasks with much less time and effort.

In the two case studies of Botswana there is success of CPR management in KD1 and failure in CH1/2 though with a varying degree. In KD1, the formation of social capital, emergence of effective leadership, better enforcement of equal distribution of benefits and rise in economic gains to all the factions of the community have contributed to the success. In CH1/2, there is a need for increasing the efforts for enhancing the level of awareness and concern among community members through sensitization and promoting leadership through making them more self-reliant in the decision making process. Where some factions are feeling disadvantaged, the

efforts would be required to provide alternatives to them. This would apply to all villages in the Chobe Enclave.

It is apparent from the examples of Kgalagadi that if economic stakes are higher and people become sensitive enough for the common good, heterogeneity of the appropriators may not hinder the process of collective action. It rather appears that heterogeneity forces people to develop elaborate systems of equity to ensure all the factions remain interested in cooperation. However, it is apparent that this becomes possible only when the other factors discussed above remain favorable, which appear like a prerequisite of success, e.g. economic gains. It also appears that with appropriate efforts for sensitization and promotion of self-reliance or in other words social capital, the systems of equitable opportunities could be adequate in sustaining collective action. This not only provides freedom to those who have labour and time (generally the poorer sections) to take advantage of the situation but also creates an economic stake among them. Heterogeneity undoubtedly creates a situation in which sustaining collective action is more difficult. Nevertheless, it becomes an inevitable situation wherever it exists. It is more important to find the common factors that motivate people to cooperate and strengthen the capacity of the community institution for collective action. The system of benefit distribution remains one of the important factors but the level of equity necessary to sustain the interests of a community varies. The higher the economic stakes, the higher would be precision required in developing the systems of equitable distribution.

Reference:

- Agrawal A. 2001. Common property institutions and sustainable governance of resources. *World Development* 29(10):1649–1672.
- Arnold, J.E.M. 1990. Common Property Management and Sustainable Development in India. Working Paper No. 9. Forestry for Sustainable Development Program, Univ. of Minnesota, St. Paul, Minnesota 55108.
- Arnold, J.E.M. 1998. Managing Forests as Common Property. FAO Forestry paper 136, Rome 1998.
- Baland J-M. and Platteau J-P. 1999. The ambiguous impact of inequality on local resource management. *World Development* 27(5): 773–788.
- Bromley, D.W. and M.M. Cernea. (1989). The Management of Common Property Natural Resources: Some Common Conceptual and Operational Fallacies. World Bank Discussion paper 57. Washington, DC: The World Bank.

- Dayton-Johnson, J and Bardhan, P. (2002). "Inequality And Conservation On The Local Commons: A Theoretical Exercise," *Economic Journal, Royal Economic Society*, vol. 112(127), pages 577-602.
- Fresson, S. (1979). '*Public Participation in Village Level Irrigation Perimeters in the Matam Region of Senegal*'. In: D. Miller (ed.) *Self-help and Popular Participation in Rural Water Systems. (Paris: Development Centre, Organization for Economic Cooperation and Development)*.
- Gardner, R., Ostrom, E. and Walker, J. (1989). The nature of common-pool resource problems. Paper presented at the Choice Society meetings, Orlando, Florida. March 17-19, 1989. Bloomington, IN: Indiana University.
- Hackett, S.C. (1992). "Heterogeneity and the Provision of Governance for Common-Pool Resources." *Journal of Theoretical Politics* 4(3): 325-342.
- Hobley, M. (1996). "Participatory Forestry: The Process of Change in India and Nepal." *Rural Development Forestry Study Guide* 3. London: Overseas Development Institute.
- Jodha, N. S. (1996). "Property Rights and Development". In: Susan S. Hanna, Carl Folke and Karl-Goran Maler (eds.) *Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environment. (Washington, DC: Island Press)*.
- Kahkonen, S. (1999). "Does Social Capital Matter in Water and Sanitation Delivery?: A Review of Literature". *Social Capital Initiative – Working Paper No. 9. (Washington, DC, USA: The World Bank)*.
- Kant, Shashi and Roshan Cooke (1999). "Minimizing conflict in Joint Forest Management, Jabalpur District, Madhya Pradesh, India". In: Daniel Buckles (ed.) *Cultivating Peace: Conflict and Collaboration in Natural Resource Management. (Ottawa, Canada: International Development Research Centre)*. p81-100.
- McKean, M.A. (1986). "Management of Traditional Common Lands (Iriaichi) in Japan. In: *Proceedings of the Conference on "Common Property Resource Management"* held in Washington, DC from April 21-26, 1985. National Academic Press, Washington, DC, 1986. p533-589.
- Oakerson, R.J. (1986). A model for the analysis of common property problems. In: *Proceedings of the Conference on "Common Property Resource Management"* held in Washington, DC from April 21-26, 1985. National Academic Press, Washington, DC, 1986. p13-30.
- Olson, Mancur, (1965) The Logic of Collective Action. Public Goods and the Theory of Groups, Cambridge, Massachusetts 1965, pp. 43-63

- Ostrom, Elinor. (2002). "Policy Analysis in the Future of Good Societies". *The Good Society* 11 (1):42-48.
- Ostrom, Elinor. (2001) "The contested role of heterogeneity in collective action: some evidence from community forestry in Nepal", *World Development* Vol. 29. No.5. pp 747-765
- Ostrom, Elinor (1990). Governing the Commons: the Evolution of Institutions for Collective Action. New York: Cambridge University Press.
- Pandey, D. N. (1996). Beyond vanishing Woods: Participatory Survival Options for Wildlife, Forest and People. (Udaipur-New Delhi: Himansu Publications).
- Poffenberger, M. (1990). *Joint Management of Forest Lands: Experiences from South Asia*. A Ford Foundation Program Statement. (New Delhi: Ford Foundation).
- Poffenberger, M. with Others (1996). "Grassroots Forest Protection: Eastern Indian Experiences". Research Network Report Number 7, March 1996. (Berkeley: Asia Forest Network, Centre for Southeast Asia Studies, University of California).
- Poteete, Amy R. and Elinor Ostrom. (2004). "Heterogeneity, Group Size and Collective Action: The Role of Institutions in Forest Management," *Development and Change* 35, no 3 (June): 437 – 461.
- Putnam, R. (1993). "The Prosperous Community – Social Capital and Public Life". *American Prospect* 13 (1): 65-78.
- Putnam, R. (1995). "Bowling Alone: America's Declining Social Capital". *Journal of Democracy*. 6(1): 65-78.
- Putnam, R., with R. Leonardi, and R. Nanetti (1993). Making Democracy Work: Civic Traditions in Modern Italy. (Princeton: Princeton University Press).
- Putterman, Louis. (1983). "A modified collective agriculture in rural growth-with-equity: Reconsidering the private unimodel solution". *World Development* 11(2): 77-100.
- Quiggin, John (1993). "Common Property, Equality, and Development". *World Development* 21(7): 1123-1138.
- Runge, C.F. (1986). Common Property and Collective Action in Economic Development. In: *Proceedings of the Conference on "Common Property Resource Management"* held in Washington, DC from April 21-26, 1985. National Academic Press, Washington, DC, 1986. p31-60.
- Sarin, M. (1996). From Conflict to Collaboration: Institutional Issues in Community Management. In: Poffenberger, M. McGean, B. (ed.) *Village Voices, Forest Choices*:

Joint Forest Management in India. (New Delhi, India: Oxford University Press). p165-209.

Saxena, N.C. (1995). Forests People and Profit: New Equations for Sustainability. Dehradun: Natraj Publishers.

Saxena, N.C. (2000). "Participatory Issues in Joint Forest Management in India". Loveraj Kumar Memorial Lecture'. *Wastelands News XV*(2): 42-56.

Singleton, Sara and Michael Taylor (1992). "Common Property, Collective Action and Community". *Journal of Theoretical Politics*. 4(3): 309-24.

Varughese, G. and E. Ostrom. (2001). "The contested role of heterogeneity in collective action: Some evidence from community forestry in Nepal". *World Development* 29 (5): 747-765.