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Communal conservancies and household welfare in Namibia

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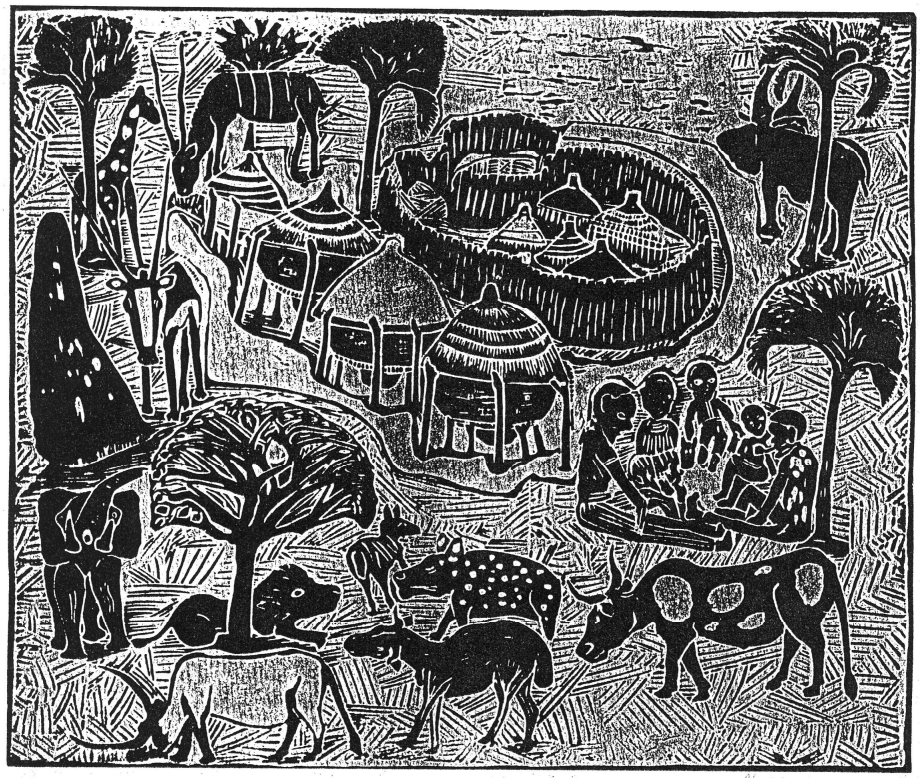

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Abstract

Communal conservancies in Namibia aim to combine nature conservation with economic empowerment of rural households. By looking at households inside and outside conservancies, this study advances the knowledge of the impact of community based natural resource management on household welfare. This study distinguishes between the pure conservancy effect and the effect of other community based organizations. It seeks to answer three questions: (a) Are households living in conservancies better off than those living outside? (b) Who participate in conservancy activities and are the wealthier households more likely to participate? (c) Are the benefits reaching all the community or only those households that participate in the conservancy?

Within conservancies, wealth or assets are not associated with household participation in conservancies in Kunene. In Caprivi, where an average household has relatively less assets, the probability of participation in conservancy is positively associated with assets. The study suggests that, wealth and participation in conservancy activities are related in an inverted U shape. In Kunene, an average household is near the turning point with no association between wealth and participation. In Caprivi, an average household is much below the turning point with positive association between wealth and participation.

On average consumption in a conservancy household is significantly higher when compared with those in the control area in Kunene. In Kunene, household characteristics like education, wealth, and CBO membership explain much of the differences in welfare. The conservancy in itself, without CBO and other factors has no pure effect on households living in conservancies, and the welfare impact of conservancy as an institution on households is not direct and automatic.

The study shows that participation in conservancy activities has large and measurable welfare benefits. Other things being equal, the participating households are associated with more than double consumption per capita as compared with non-participating households in both Kunene and Caprivi.

A household's membership of other CBOs is associated with a direct increase in welfare and a higher likelihood of participation in conservancy activities leading to further welfare gains. In Caprivi, membership of CBOs and conservancies separately do not appear to have significant welfare benefits, but together memberships of both the CBOs and conservancies make a difference in household welfare.

Welfare benefits from participation are widespread in Kunene with two thirds of the households in conservancies reporting to be participants. In contrast, only one in five households living in the conservancies in Caprivi participates in conservancy activities and is associated with the consumption benefits from participation. The challenge in Kunene is to find ways for the remaining one third of the households to get actively involved and benefit from the conservancy and other CBO activities. The challenge in Caprivi is to increase households' membership in other CBO as well as participation in conservancy activities. A higher participation rate would allow a wider set of households to benefit from conservancies in this Region.

This study has two policy implications. First, the synergic relationships between community conservancies and other CBOs are to be supported and strengthened to let households benefit from conservancies. Second, the management policies of conservancies that allow more conservancy residents to actively participate in the conservancy activities are to be encouraged.

1. Introduction

Most community-based wildlife management programs try to meet at least two complex goals: conservation of nature, and economic empowerment of rural households. The key to accomplishing these two objectives is by involving local communities in both the conservation and the economic benefits from wildlife (Hulme and Murphree 2001).

For example, at the beginning of the conservancy project in Namibia, the communities became actively involved in conservation when they noticed alarmingly low levels of wildlife during the 1980s drought. Wildlife recovered from that point on. As a result of the symbiotic relationship between communities through conservancies, national parks, the government, and NGOs, wildlife enjoys a larger area where it is able to survive (NACSO, 2005).

It is not clear that households benefit from community-based natural resource management (CBNRM) programs, despite the fact that these programs have become an important strategy to promote sustainable use and conserve biodiversity in Africa during the past two decades. The fact that local communities have rights to the wildlife and can form joint ventures with tourist enterprises might give the impression that households can command higher income. However, Mulonga and Murphy (2003) show that revenue to conservancies has been distributed in different modalities: village-level payouts; individual cash payouts to registered members; conservancy social funds; and expenditures on social services. The direct financial impact on household livelihoods of the distributed revenue is modest, especially in the context of village-level payouts. The payouts used for developmental purposes can have an indirect positive impact at the household level, but it is the individual cash payouts to registered members that have a greater potential to produce an immediate, direct financial benefit to household livelihoods.

This paper seeks to answer three questions by using consumption expenditure data[1]: (a) Are households living in conservancies better off than those living outside? (b) Among those living in conservancies, who actively participate in conservancy activities? Are the wealthier households more likely to participate? (c) And are benefits reaching the whole community, or only those households that participate in the conservancy?

This study improves upon a previous study by Bandyopadhyay et al (2004) in two major ways. First, Bandyopadhyay et al (2004) only looked at households inside conservancies without considering how other households fared in the region. By looking at households inside and outside communal conservancies, this study advances knowledge of the impact of CBNRM on household welfare. Second, the previous study was unable to identify and isolate the impact of other non government organizations (NGO) which supports community based organizations (CBOs) in conservancies. We looked at a large variety of CBOs such as water-point committees, farmersô groups, womenôs groups, wood carving, beekeeping and basket making groups. This study controls for the effects of such CBOs on households and tries to measure true impact of communal conservancies on household welfare net of the influence of other CBOs.

[1] For the remainder of the paper we will use the term consumption to refer to consumption expenditure. We prefer the word consumption to just expenditure since we include self-consumption of home production in our calculations.

The paper is divided into five sections. In the next section, we provide a background of the community-based wildlife management program in Namibia and in the two specific regions we examined. In the third section, we present the framework and data. In the fourth section we discuss results. Finally, in the last section, we offer some conclusions.

2. General background on community conservancies in Namibia

The origin of community conservancies dates back to 1967 when Namibian colonial authorities granted white commercial farmers conditional rights over certain wildlife species. The Nature Conservation Ordinance of 1967 enabled freehold farmers to hunt, sell, capture and/or relocate wildlife according to their own economic interests. By 1968, freehold farmers had legal rights to utilize certain wildlife on their farms, including consuming them as food. Landowners also pooled their land and financial resources to establish large units on which integrated management could be practiced (Sullivan, 2002; Long, 2004). According to Sullivan (2002), the óconservancyô concept evolved in the 1970s in South Africa as a means of consolidating exclusive rights over animal wildlife by white farmers in commercial areas. This was done largely through the employment of game guards to militate against ópoachingô by black African neighbours (Sullivan, 2002).

In 1995, the post-independence government laid out a set of progressive access rules for communal lands: First, the creation of the Wildlife Management, Utilization and Tourism Policies of 1995; and second, the new Nature Conservation Amendment Act of 1996. The Policy draws from the experience of CAMPFIRE in Zimbabwe and the freehold farms that demonstrated that some rights over wildlife and the opportunity to benefit could promote better management (Long, 2004). Therefore, the main aim of the Policy of 1995 was to give residents of communal areas (living on state land) some rights over wildlife and tourism like those of commercial farmers. The Policy also explored the possibility of rural communities entering into local business arrangements to improve their living conditions. The Act of 1996 sets the formation of communal conservancies as a condition upon which ownership and use rights over game are given to communal area residents; therefore, it puts into effect the Policy of 1995.

Community conservancies complement the ecosystem and biodiversity benefits that are provided by Namibiaôs protected area system. About 36 percent of all communal land in Namibia fell within communal conservancies by the end of 2005. Thirteen percent of that total belongs to conservancies, 6 percent to freehold conservancies and the remaining 17 percent consists of national parks and game reserves. In addition, conservancy boundaries usually abut national parks, thereby extending the area dedicated to protecting biodiversity.

There is some evidence of benefits for wildlife and the communities living in conservancies. On the one hand, communities have some property rights that give them an incentive to protect the wildlife within their area. On the other hand, these communities could economically exploit and gain from wildlife resource management (Jones and Murphree, 2001). NACSO (2005) reports that, total income from CBNRM increased from about N$600,000 in 1998 to over N$19.9 million in 2005.

In addition, communities might expect high returns on conservancy development investment. Barnes et al. (2002) analyzed the financial and economic returns to investments in five conservancies. They found that, at least collectively (at the conservancy level), communities which invest in conservancy development can expect high returns. However, their study did not examine the distributional patterns associated with those returns.

2.1 Kunene and Caprivi conservancies

2.1.1 Kunene

Located in the northwest part of Namibia, Kuneneôs conservancies were born from local communitiesô concern about their wildlife resources. In the mid-1980s, wildlife including elephants and black rhinos were decreasing at an alarming rate in the region because of drought and heavy poaching by local residents, outsiders, and the government. In response, local traditional leaders (with help from the Nature Conservation authority and local NGOs) appointed part-time community game guards to monitor wildlife. The reduction in poaching as a result of their presence, combined with increased conservation efforts by the government and greater rainfall, enabled wildlife numbers to recover. Efforts were then made to show that wildlife-based tourism could generate income for local people, thereby building support for and broader community participation in the system (NACSO, 2005).

There were 16 conservancies in Kunene by the end of 2005, with livestock, hunting, and tourism as the main sources of income (SIAPAC, 2006). Cattle are the most common type of livestock across the conservancies, while pigs are uncommon in all locations. Crop production in the area is very low, except for Epupa area near the Kunene River, which had significant production levels (SIAPAC, 2006). Joint-venture tourism enterprises are the most common type of enterprise established in the conservancies. Their business is limited mostly to trophy hunting, and campsites.

A few conservancies have other sources of income, such as traditional village craft markets (Ehirovipuka, Puros), or resin cultivation and extraction projects (Orupembe, Ozondundu, Sanitatas) (NASCO, 2005).

2.1.2 Caprivi

Located in the panhandle north-eastern region of Namibia, like Kuneneôs conservancies, Capriviôs conservancies were born out of the local residentsô concern about the decreasing stock of wildlife during the 1980s. The regions of Caprivi and Kunene were pioneers in the involvement of local communities in the conservation of wildlife, and serve as models for current community-based wildlife management programs in Namibia.

There are fewer conservancies established in Caprivi: seven in total by the end of 2005. In contrast to Kunene, the environment is appropriate for agriculture. Besides livestock, crop production is a common activity in the area and maize is widely cultivated.

Mahangu (pearl millet), sorghum, and beans are also cultivated, but their extent varies across conservancies (SIAPAC, 2006).

As in Kunene, joint-venture tourism enterprises are the most common businesses in the conservancies. They offer mostly trophy hunting and campsites. Conservancies also benefit from selling thatch-grass (NASCO, 2005).

2.1.3 Control areas

Control areas in this study are areas outside conservancies used as benchmarks. In principle, control areas should have all the characteristics of its neighbouring communal conservancies except for the CBNRM institution. Since natural resource, and economic characteristics of the Kunene and Caprivi regions are very different the analysis of conservancies in these regions require separate control areas in each region.

One area in each region was selected to serve as our control areas. In Kunene, Epupa area was selected. This area is located at the northern part of Kunene region in Kaokoland. The Epupa area shares similar environmental features to those of the conservancies in Kunene. It is close to the national natural reserve and to the Kunene River that crosses the Region.

In Caprivi, the Kabulabula was selected as control area. This area is in the eastern edge of the Caprivi panhandle of Namibia and borders with the Salambala conservancy. Like the conservancies in Caprivi region the Kabulabula control area is characterized by the floodplains of the Chobe and Zambezi Rivers. In both the control areas, Epupa and Kabulabula, tourist enterprises have establishments with similar amenities and entertainment as those found in the conservancies.

3. Data and framework

3.1 Data

We analyze the Socio-Economic Household Survey that was conducted in 2006 for the Integrated Community-Based Eco-System Management (ICEMA) Project. This survey was conducted in the Kunene and Caprivi regions. In Kunene, the conservancies of Purros, Ehirivopuka, #Khoadi/Hôas, and Torra were sampled, along with the control area of Epupa. In Caprivi, the conservancies of Kwandu, Mayuni, Salambala, and Kasika, as well as the control area of Kabulabula were sampled. In total, 965 households were interviewed in 57 communities. The survey had two questionnaires: one for households and another for communities. The household questionnaire collected information on composition, consumption, and experiences with wildlife and conservancies. The community questionnaire collected information about community infrastructure and activities with various NGOs.

Analysis was done separately for Kunene and Caprivi, because there are important economic and geographical differences between the two regions. For example, crop cultivation is practiced in Caprivi thanks to the natural conditions of the region, but Kunene has more livestock. In addition, the conditions in which the survey was

conducted in Caprivi were tougher than in Kunene. During the collection phase, extensive floods prevented the team from reaching some communities in Caprivi (SIAPAC, 2006).

In contrast to Caprivi, the Kunene region has a higher level of overall consumption and asset**s.** The average consumption in Kunene conservancies is about 27 percent higher as compared with the Epupa control area in Kunene (Table 1). On the other hand, the average consumption is 15 percent lower in the conservancies as compared with the Kabulabula control area in Caprivi. It would be erroneous to conclude that conservancies have a positive welfare effect in Kunene and a negative one in Caprivi. The differences in welfare in the conservancies and control areas in the two regions may be due to other factors.

Table 1: Average household characteristics by conservancy status, Kunene and Caprivi: Namibia 2006

Characteristics	Kunene				Caprivi			
	Overall	Epupa	Conser-vancies		Overall	Kabula-bula	Conser-vancies	
Annual per capita consumption N$	7870	6499	8286	*	3273	3705	3142	
Share annual expenditure in education	2.8%	0.7%	3.5%	***	3.5%	3.1%	3.6%	
Share annual expenditure in food	51%	58%	48%	***	51%	53%	50%	
Household assets in Thousand N$	21.1	31.6	17.9		7.1	6.1	7.4	
Distance to health facility (KM)	31.2	13.5	36.6	***	2.8	1.8	3.1	**
Distance to police, Government offices (KM)	42.8	20.7	49.6	***	5.8	8.2	5.3	
Distance to road, or public transport (KM)	7.6	5.6	8.1	*	6.9	19.5	3.8	***
Distance to primary or high school (KM)	18.1	3.4	22.5	***	0.8	0.6	0.9	
Distance to shopping facilities (KM)	24.1	14.4	27.0	***	9.0	13.6	7.7	*
Household head is older than 18 in 1997	91%	87%	92%		91%	89%	92%	
Proportion of households with CBO member	33%	23%	36%	***	13%	9%	15%	*
Household natural resources use except wood	59%	76%	54%	***	77%	83%	75%	*
Wildlife damage to crops, livestock, property	67%	70%	66%		70%	63%	72%	
Years of CBO experience in community	9.5	3.9	11.2	***	5.2	1.7	6.2	***
Female headed household	35%	41%	33%		34%	22%	37%	***
Household size	6.2	7.3	5.9	**	5.9	6.1	5.9	
Highest years of Education in HH	6.9	3.6	7.8	***	9.6	10.2	9.4	***
Age the newest infrastructure	2.7	6.7	1.7	***	6.7	15.3	3.9	***
Age of household head	49.3	46.3	50.2	*	49.4	49.1	49.5	
Number of children <= 14	2.3	2.4	2.3		2.5	2.5	2.5	
Number of female 15-60	1.5	1.2	1.5	*	1.6	1.6	1.6	
Number of male 15-60	1.4	0.9	1.6	***	1.5	1.5	1.4	
Number of members 61+	1.0	2.8	0.5	***	0.4	0.5	0.4	

Difference is significant at the 1%-level ***, at 5% level **, and 10% level *.
Source: Author's calculation using Namibia Socio-economic Household Survey 2006.

The infrastructure is newer in Kunene than in Caprivi, but the distance to shopping canters, schools, and health facilities is shorter for households in Caprivi (Table 1). Likewise, there are differences between the conservancy households and nonconservancy households in both areas, mainly in infrastructure resources, education level, and participation in Community Based Organizations (CBO).

In Kunene, a simple mean comparison reveals that households living in conservancies have a higher consumption per capita, with the education share of expenditures being

higher and the food share lower. This might indicate that they are better off, because it is generally true that, as income rises, other goods become larger parts of the budget while the food share becomes smaller. However, we should take into account the fact that household size is lower in conservancies and they have a higher number of people of working age. Accounting for these variables will be explored in the next section.

Table 2: Average conservancy household characteristics living in conservancy by participation in the conservancy, Kunene and Caprivi: 2006

Characteristics	Kunene Conservancies			Caprivi Conservancies		
	Non-Partici-pating	Partici-pating		Non-Partici-pating	Partici-pating	
Participation: Member/Non-Member Households	**34%**	**66%**		**80%**	**20%**	
Annual per capita consumption	7390	8739		3029	3606	*
Share annual expenditure in education	2.3%	4.1%	***	3.7%	3.0%	
Share annual expenditure in food	49%	48%		50%	48%	
Household assets in Thousand N$	11.6	21.0	**	7.8	5.8	
Distance to health facility (KM)	32.9	38.4		2.9	3.6	
Distance to police, or government offices (KM)	54.6	47.2	*	5.7	3.9	
Distance to road, or public transport (KM)	7.2	8.6		3.6	4.8	
Distance to primary school, or high school (KM)	27.2	20.2	*	0.9	1.1	
Distance to shopping facilities (KM)	26.6	27.3		8.6	3.9	*
Household head is older than 18 in 1997	94%	92%		92%	90%	
Households with a member of a CBO	24%	42%	***	11%	30%	***
Household collected natural resources except wood	52%	55%		73%	84%	**
Knows the year of conservancy registration	5%	18%	***	16%	36%	***
Wildlife damage to crops, livestock, property	56%	72%	***	70%	77%	
Years of CBO experience in community	12.9	10.2	***	6.3	5.9	
Female headed household	27%	36%	*	41%	21%	***
Household size	4.5	6.6	***	5.7	6.6	**
Highest years of education in household	6.4	8.6	***	9.3	10.2	***
Age the newest infrastructure	1.8	1.6		3.9	3.8	
Age of household head	49.5	50.5		49.9	48.0	
Number of children 0-14	1.5	2.7	***	2.4	2.8	*
Number of female 15-60	1.1	1.7	***	1.5	1.7	
Number of male 15-60	1.4	1.7	*	1.4	1.7	**
Number of members 61+	0.4	0.5		0.4	0.4	0.4

Difference is significant at the 1%-level ***, at 5% level **, and 10% level *.
Source: Author's calculation using Namibia Socio-economic Household Survey 2006.

Participation in conservancy activities allows households to play an active role in the natural resource managements and may also allow welfare benefits. In theory, all households living within a conservancy are members of the conservancy. However, different households may participate in conservancy activities at different levels.

The most basic level of participation is to recognize the householdôs membership to the conservancy. We define participating households as those reporting at least one conservancy member. The first row of Table 2 shows the participation rate is 66 percent in Kunene and 20 percent in Caprivi respectively. The rest of Table 2 looks at the

characteristics of participating and nonparticipating households within conservancies in Kunene and Caprivi.

Households with members participating in the conservancies have some characteristics that are different from other conservancy households. In Kunene, the participating households have more assets, closer roads, more natural resources, more female-headed households, more educated people, and a younger population. In Caprivi, they have similar differences as in Kunene, but the proportion of female-headed households and the education level is lower in participating households than other households.

3.2 Framework

This paper relies on consumption as a measure of household welfare. By comparing two households with the same characteristics but different total consumption, we infer that the household with higher consumption enjoys higher welfare. In this context, our main objective is to determine if households inside conservancies, and particularly those that have members registered in the conservancy, enjoy higher welfare than other households in the area. As always when evaluating impact, we face several constraints to achieve this objective. We use several techniques to overcome these constraints and obtain the best estimate of the effect.

3.2.1 Consumption

In principle, a simple comparison of means between households living inside/outside conservancies or participating/not participating might be sufficient to determine the effect of the program. This would be enough if households were assigned to the program randomly, but that is not the case. Communities that decide to participate in the project might have characteristics different from communities that stay outside the project. It is important, then, to account for as many characteristics as may possibly influence participation in the program. We can thereby compare households with similar characteristics and determine the ótrueô effect of the project. Consider the following specification:

$$\ln y_i = \alpha + \beta \ln n_i + \sum \gamma \, n_{ij} / n_i + \delta C + \eta z_{ii} \qquad (1)$$

where y represents household, i is for consumption expenditure per capita, n is the household size, followed by the proportion of different age groups j in the household. C is an indicator for the householdôs participation in conservancies or as member of the conservancy, and the matrix z contains all relevant characteristics that can account for differences between households.

This specification can be estimated by ordinary least squares (OLS) and under strong assumptions, would give the average difference in welfare between households living in conservancies and households outside them.

The coefficient that we want to estimate is ŭ. Using OLS, we are imposing a linear relationship between the participation indicator and the outcome variable. The precision of the estimation of ŭ relies also on the assumption that we control for all variables that affect participation in the project and the outcome variable, so that ŭ is the net effect of the project.

The parametric restriction imposed by Equation **(1)** can be relaxed by using an alternative method such as propensity score matching. The propensity score matching method is regarded as one of the nonparametric alternatives when random experimental design is not possible (Rubin, 1973). It is especially useful when using cross-sectional surveys. A minimum of two steps are needed for this method. First, a score is obtained from the predicted probabilities from a probit model that evaluates the likelihood of being in the treatment group (inside conservancy, or including a registered member). The second step consists of finding for each treatment observation a comparison group that is within a determined range of the observationôs score. There are many techniques for determining such a comparison group; we use a kernel approach that gives decreasing weights to comparison observations according to closeness to the treatment observationôs score. However, the results were not robust and we do not report them.

3.2.2 Working-Leser Engel[2]

As pointed out by Engel, the proportion of total expenditure spent on food is lower in richer households than in poorer households; hence, two households with the same size and structure but different expenditure patterns in foodï ï or other goodsï ï may express differences in welfare. Although Engelôs relationship still is a matter of debate (see Deaton and Paxon, 1998, 2003; Gan and Vernon, 2003), it is a very widely used framework for studying household expenditure patterns (Deaton, 1997; Deaton and Muellbauer, 1980a), and it adapts well to study the patterns of consumption in our study. In practice, the test of Engelôs observations have yielded many specifications (Deaton and Muellbauer, 1980b), and we work with an adaptation of the one use by Leser (1963) based on Working (1943).

The Working-Leser specification is one of the most widely used method for studying relationships between food (or other goods) share and household characteristics (see Deaton and Muellbauer, 1980a). This functional form meets the following criteria: (i) it is suitable for multiple types of goods; (ii) it allows for increasing, decreasing, and constant marginal propensities to spend over a wide range of expenditure levels; and (iii) it satisfies the additivity criterion, namely, the sum of marginal propensities for all goods should equal unity (Adams, 2006). Its estimation can be done using standard regression techniques.

$$w_{ij} = p_j q_{ij} \Big/ y_i = \alpha + \eta \ln\left(\frac{y_i}{n_i}\right) + \beta \ln(n_i) + \sum \gamma \, n_{ij} \Big/ n_i + \delta C + \eta z_{ii} \qquad (2)$$

where w_{ij} is the share of the good j of the total expenditure y_i of household i; in addition, we include the expenditure per capita in the right side to follow the basic Engel curve; the rest remains as in Equation **(2)**.

Because the purpose of this paper is to examine ŭ, we again encounter the problems described previously. A major concern in this case, beyond the parametric form, is that the estimation of ŭ might be biased if there are unobserved characteristics about households that live inside (or participate in) a conservancy which also affect household

[2] The literature surveyed here refers to household expenditure instead of consumption; we decided to use the term expenditure in this section to be consistent with such literature. In the rest of the paper we use consumption to refer to consumption expenditure as explained in footnote 1

expenditure patterns. This also is a concern regarding the previous estimation; however, this possibility is harder to overcome for the current estimation.

To deal with potential bias in ŭ, we use a treatment regression model that allows for the error terms between conservancy participation (selection equation **(3)** below) and the either of the outcome equations **(1)** or **(2)** to be correlated. Ideally, we would have at least one variable included in the selection equation that is not correlated with the outcome variable. In the two cases we analyze in this paper, it was extremely difficult to find such a variable when analyzing the effect of conservancies. The reason for this is two-fold. First, households do not decide individually to participate in a conservancy, rather the community decides as a whole; therefore, the variable that we seek would be at the community level. Second, we have very few communities in the sample compared to the number of households, so any variable identified at the community level does not provide enough variation to be a successful instrument[3]. Thus; we do not use this method for analyzing the effect of conservancy.

For the second selection model, regarding whether a member of the household participates in the conservancy, we use two instruments: whether the household head was older than 18 in 1997 (before any conservancy was established); and whether the person knows when the conservancy was registered. The first variable seeks to measure whether the household could potentially have participated in the communityôs original decision to form a conservancy. If the household head was an adult then, we can assume it was an established household. The second variable comes from the survey; we think that if a person knows the year the conservancy was registered, he or she is more likely to be an active member of the conservancy, but that knowledge would not have any impact on the expenditure pattern of the household.

There are many other measures by which we could have estimated the welfare of households living in conservancies, but they are beyond the scope of this paper. The main concern regarding this methodology is that of unobservable characteristics at the household and community level which correlate with forming a conservancy or being a member of it. However, we feel confident that we have accounted for those possibilities, given the data we have. Superior techniques to evaluate the effect of communities (such as longitudinal surveys or experiments) are not currently available and they might prove potentially unfeasible.

3.2.3 Determinants of participation

A probit model is used to analyze the determination of participation in the conservancy. The model has the following form:

$$\text{Prob}(\text{Participation} = 1) = \varphi(\beta X) \qquad (3)$$

where X contains households characteristics used in equation **(2)** but excludes the proportion of children under 15. We believe the young members of a household may not directly decide on participation in the conservancy membership. X includes the dummy for knowledge of the year the conservancy was registered and also the dummy variable

[3] In fact, we tried different variables but they turned out to be very unsuccessful. They either were not significant, or the treatment regression never converged, producing no standard errors

for whether or not the household head was older than 18 in 1997. The first variable is a proxy for the level of awareness and knowledge about the conservancy in the household. The second age variable indicates that the head of the household was an adult when the conservancies were registered. As an adult member of the community, the head of the household may have participated in the initial decision making at the inception of conservancy in the area and hence is more likely to participate in conservancy activities at the time of the survey. With this equation we might also know if participation is linked to household wealth and education level.

4. Results

In this section, we analyze whether households living in conservancies, or households with members who participate in the conservancies, are better off than their counterparts in the control areas, or in non-participating households, respectively. The second analysis is based exclusively on households within conservancies.

4.1 Are households inside conservancies better off than those outside?

The average per capita consumption is higher in the households in the conservancies in Kunene as compared with those in Epupa control area (Table 1). Other factors such as education, household size, consumer durable assets, wildlife damage to crops, livestock and property, CBO membership, and distances to shops and markets, explain much of the differences between conservancies and control area household welfare. The conservancy as an institution in itself without associated other CBO activities does not appear to have any independent impact on the welfare of households living within conservancies (Table 3).

There are no differences in food share between households living in Kunene conservancies and those in Epupa. However, 2 percent higher share of education expenditure is associated with the households living in conservancies as compared with similar households living in Epupa. Given the small share that education occupies in the household budget (Table 1), this difference might not be important.

There are no significant differences in consumption expenditure per capita or education share in Caprivi. The households in conservancies are associated with a lower food share than similar households in Kabulabula. This means that households with similar characteristics spend about 4 percent less per capita on food in conservancies. In other words, two households with the same number of members and age structure and equivalent socio-economic characteristics, but one living in a conservancy and the other in Kabulabula, the one in the conservancy would be worse off.

A larger proportion of households within conservancies were CBO members as compared with the control areas in Kunene and Caprivi (Table 1). The higher proportion of CBO member households within conservancies implies a closer link between conservancies and CBOs in both Kunene and Caprivi. However, like many other factors, the effect of CBOs in Kunene and Caprivi households were different. In Kunene we found a positive overall CBO membership effect on welfare. CBO member households in Kunene, irrespective of being in conservancies or in the Epupa control

area were associated with a 26 percent higher per capita consumption. In Caprivi, only CBO member households residing in conservancies were associated with 28 percent higher per capita consumption.

Table 3: Results for the effect of conservancy in household welfare in Kunene and Caprivi: 2006

	Kunene			Caprivi		
	Expenditure per capita	Expenditure Share		Expenditure per capita	Expenditure Share	
		Food	Educ.		Food	Educ.
Conservancy Dummy	-0.037	-0.001	0.021***	-0.109	-0.041*	-0.001
	(0.223)	(0.052)	(0.005)	(0.102)	(0.022)	(0.003)
CBO Member	0.257**					
	(0.101)					
CBO X Conservancy				0.280*		
				(0.152)		
Number observations	431	453	453	466	466	466

Note: .01 - ***; .05 - **; .1 - *;
See Table 5Afor full estimation models.
Source: Author's calculation using Namibia Socio-economic Household Survey 2006.

There may be community and wider area based factors that affect household consumption and whether an area is a conservancy or not. With four conservancies and one control area in each region it was not possible to statistically isolate conservancy level variables in the model. The presence of such unobserved variables may make the OLS estimates biased. We tried propensity score-based, kernel-weighted matching of conservancy and control households to identify the average conservancy effect on the households in conservancies. However, the results were not robust and we do not report them.

4.2 What makes a household have a member participating in the conservancy?

In Kunene, households with a member participating in the conservancy are associated with higher education, more participation in other Community Based Organizations (CBO), and are affected more by damage caused by wildlife. These results can be seen in the appendix tables. An additional year of education increases the likelihood of participation by six percent. However, participating in CBO, increases this likelihood by 56 percent. Damage to crops, livestock, and property by wildlife appears to be a major incentive to participate in conservancy. The households that suffer wildlife damages are 79 percent more likely to be conservancy members. On the other hand, new infrastructures in the community are associated with lower participation at the household level, a reduction in the odds by 15 percent.

In Caprivi, household with members participating in the conservancy are associated with more education, CBO membership, farther from health facilities, but household with female heads and asset-rich households are less likely to participate. Thus, the odds to participate in the conservancy increase by 10 percent with each year of education, 109 percent with CBO membership and 5 percent with each kilometer farther from a health facility. The odds that a female-headed household have a member participating are reduced by 82 percent.

Householdôs assets were introduced using a quadratic form, this allows for changes in the likelihood of participation at the ends of the asset distribution. The results show that the likelihood to participate has an inverse-U shape. This means that very asset-poor and asset-rich households have lower odds to have a member in the conservancy. The likelihood of participation rises as the value of consumer durable assets in the household rises to N$22,700 in Caprivi. Beyond this value the likelihood of participation in conservancies declines. Note, the average value of assets in a conservancy participating household in Caprivi has only N$5,800. Thus, as wealth, measured by consumer durables, in the average household in Caprivi increases, the household is more likely to participate in conservancy activities.

In contrast, we find no significant effect of assets on likelihood of participation in Kunene. This may be due to the fact that the average value of assets in a conservancy participating household in Kunene conservancies is N$21,000, and close to the turning point of participation. Thus, in Kunene conservancies, where households are relatively wealthy, participation does not depend on wealth and participation rate is higher than that in Caprivi. In Caprivi, where households are not as wealthy, participation is likely to increase with wealth. At the maximum, a household with N$22,700 of assets in conservancies in Caprivi will have 38 percent higher odds of participating, as compared with a household with the lowest level of assets.

In general, education and membership in CBO are common determinants to participate in the conservancy. This shows that education gives household the edge to understand that by participating in the conservancies and CBO are important for development. This creates an access barrier since it is possible to imagine that the group that participates in a conservancy feels more ñappropriateò to take decisions. Likewise, the membership to CBO might reinforce the need to participate in the conservancy to promote development and monitor the revenue of the conservancy and perhaps obtain a better share of its rents. This last point is explored in the next section.

4.3 Do participants in conservancies extract more benefits than non-participants?

In Kunene, there is no evidence from simple means that households with members who participate in the conservancy have a different level of consumption or food share than other conservancy households. However, simple means reveal that participating households spend more than other households on education as a proportion of total consumption (table 2).

In Caprivi, the consumption per capita is higher in participating households than non-participating households, but the food and education shares are not different. As in Kunene, participating households are more educated and larger than non-participating households. This factor could explain the difference in consumption per capita (table 2).

In Kunene and Caprivi, multivariate analysis reveals that participating households are associated with higher consumption per capita than non-participating households that have similar characteristics. However, this increase is not reflected in the food and education shares (table 4).

Since participation in conservancies and household consumption can both be affected by many unobservable factors, the OLS estimates can be biased. We tested for the selection bias by jointly estimating the outcome and participation equations and tested for the correlation between the two error terms. The results of running a selection bias correction regression are shown in the rightmost three columns in Table 4. In the case of Kunene, the correlation coefficient ɟ is statistically significant in both the consumption expenditure per capita and education share equations. For consumption expenditure per capita, the ɟ is negative. This indicates that the initial coefficient was negatively biased. The opposite is true for the education equation.

Table 4: Results on the effect of having a household member participating in the conservancy, Kunene and Caprivi: 2006

	Kunene					
	OLS			Selection Model[1]		
	Expenditure per capita	Food Share	Education share	Expenditure per capita	Food Share	Education share
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
HH Has Conservancy Member	0.319***	0.025	0.013	1.140***	-0.033	-0.068***
	(0.110)	(0.034)	(0.010)	(0.428)	(0.060)	(0.012)
ρ				-0.645*	0.179	0.823***
$\chi 2$				2.996	1.196	22.847
Number of observations	351	351	351	351	351	351
HH Has Conservancy Member	0.346***	-0.044	-0.016**	1.062***	-0.165	-0.021**
	(0.081)	(0.033)	(0.007)	(0.148)	(0.205)	(0.010)
ρ				-0.537***	0.389	0.062
$\chi 2$				25.184	0.340	0.397
Number of observations	351	351	351	351	351	351

Note: .01 - ***; .05 - **; .1 - *; See Table 6A for the full specification.
Source: Author's calculation using Namibia Socio-economic Household Survey 2006.

Correcting for selection bias, we see that participating households are associated with higher consumption expenditure per capita than non-participating households. According to this specification, households participating in conservancy activities in Kunene are associated with more than double the consumption as compared with nonparticipating households with similar characteristics. Since 66 percent of the conservancy households participate, the majority of households benefit from participation in CBNRM.

The OLS estimate for education share had upward selection bias. The correction for selection bias reveals that participating households in the conservancy are associated with a lower share of their expenditures on education. This makes sense if we consider that participation tends to occur in the more educated households. One possibility is that participants realize that education is not a good investment in conservancies so they stop spending money on it. Although this phenomenon has been seen in other contexts (e.g., education decisions and international migration), it might not explain the positive selection bias we found. Alternatively, participating households may benefit from the training programs in conservancies and spend less on education. In total, these households would spend two percent less on education as compared with households that did not participate in CBNRM activities.

Households participating in conservancy activities are associated with higher consumption as compared with non-participating households in Caprivi. The selection model reveals that the OLS estimation has a downward bias. When we account for the selection bias, and other factors, households participating in conservancy activities in Caprivi are also associated with more than double the consumption as compared with similar non-participating households. However, only 20 percent of households participate in the conservancy in Caprivi. Thus, 80 percent households in Caprivi conservancies are not obtaining the welfare benefits that the participating households receive.

5. Conclusion

There has been almost 20 years since the first conservancy started in 1998 in Namibia. The objectives of protecting biodiversity and wildlife as well as economically empowering rural households gave birth to the conservancies. The assumption was that by giving some wildlife rights to rural households, it would be in their best interest to protect wildlife while increasing their economic potential.

Several accounts from CBNRM and NGOs have shown an increase in biodiversity and restoration of endangered species. In addition, the revenue for some conservancies has increased tremendously since their inception.

Despite this, the evidence that the benefits from the communal conservancy have reached individual households has been limited. This study seeks to improve upon Bandyopadhyay et al (2004). Bandyopadhyay et al (2004) did not find any evidence of elite capture through participation in conservancy activities. The present study supports the previous finding. In the conservancies, an average participating household is less wealthy than an average non-participating household in Kunene and Caprivi. Wealth appears to have no effect on participation in Kunene. In Caprivi, where participation and wealth are low, increase in wealth may increase participation up to a point.

Active participation in conservancy activities is associated with large welfare benefits to the household. Welfare benefits from participation are widespread in Kunene with two thirds of the households in conservancies reporting to be participants. In contrast, only one in five households living in the conservancies in Caprivi participates in conservancy activities and is associated with the consumption benefits from participation.

Unlike the case in previous studies, this study controls for household and community characteristics related to other CBO activities associated with the NGOs operating in rural Namibia. We found a large proportion of households in conservancies were other CBO members. Other CBOs either on their own (in Kunene) or together with conservancies (in Caprivi) were associated with higher household welfare.

The welfare impact of conservancy as an institution on households is not direct and automatic. The benefits are associated with active participation in conservancies and other CBOs. A householdôs membership of other CBOs is associated with a direct increase in welfare and a higher likelihood participation in conservancy activities leading to further welfare gains.

The challenge in Kunene, where already 66 percent of the conservancy households actively participate and derive welfare benefits, is to find ways for the remaining one third of the households to get actively involved and benefit from the conservancy and other CBO activities.

The challenge in Caprivi is to increase householdsô membership in other CBO as well as participation in conservancy activities. A higher participation rate would allow a wider set of households to benefit from conservancies in this Region.

This study has two policy implications. First, the synergic relationships between community conservancies and other CBOs are to be supported and strengthened to let households benefit from conservancies. Second, the management policies of conservancies that allow more conservancy residents to actively participate in the conservancy activities are to be encouraged. Active participation in conservancy membership is associated with higher welfare in both the Regions.

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Appendix Tables

Table 5: Model Results for the effects of conservancies on household welfare in Caprivi and Kunene.: 2006

	Kunene			Caprivi		
	Expenditure per capita	Expenditure Share		Expenditure per capita	Expenditure Share	
	OLS	Food	Educ.	OLS	Food	Educ.
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
Highest Years of Education	0.052***	-0.012***	0.002***	0.079***	-0.014***	0.004**
in Household	(0.018)	(0.003)	(0.000)	(0.019)	(0.004)	(0.001)
Log Household Size	-0.712***	-0.058**	0.009*	-0.624***	-0.046**	0.023***
	(0.084)	(0.024)	(0.004)	(0.090)	(0.016)	(0.005)
Proportion of Female 15-60	0.162	0.024	0.003	0.083	-0.011	0.002
	(0.256)	(0.072)	(0.010)	(0.378)	(0.087)	(0.014)
Proportion of Male 15-60	0.220	0.019	0.001	0.194	-0.001	-0.011
	(0.244)	(0.049)	(0.007)	(0.289)	(0.072)	(0.019)
Household Assets	0.004**			0.011***		
in Thousand N$	(0.002)			(0.002)		
Wildlife Damage to Crops,	0.346***	0.032	0.006	0.162*	0.006	0.003
Livestock, and Property	(0.117)	(0.032)	(0.005)	(0.080)	(0.020)	(0.006)
Distance to Primary School	0.003	-0.000	-0.000*	0.016	0.002	0.000
	(0.002)	(0.001)	(0.000)	(0.014)	(0.003)	(0.001)
Collected Natural Resources	-0.073	0.001	-0.005	-0.139	0.039*	0.000
except Wood	(0.082)	(0.022)	(0.005)	(0.105)	(0.019)	(0.008)
Female Headed Household	-0.132	0.018	0.003	-0.321***	-0.018	0.003
	(0.103)	(0.024)	(0.005)	(0.078)	(0.018)	(0.006)
Proportion of Children 0-14	-0.074	0.002	0.028**	-0.220	0.076	-0.010
	(0.260)	(0.091)	(0.011)	(0.358)	(0.062)	(0.018)
Member of a CBO	0.257**	-0.009	-0.002	-0.073	0.044	-0.017**
	(0.101)	(0.026)	(0.005)	(0.099)	(0.042)	(0.006)
CBO X Conservancy				0.280*	-0.055	0.013
				(0.152)	(0.049)	(0.008)
Years of CBO Experience	0.000	-0.003	0.000		0.001	0.001*
in Community	(0.006)	(0.002)	(0.000)		(0.002)	(0.000)
Household Head age	0.002			0.001		
	(0.004)			(0.004)		
Distance (Km) To Health Facility	0.001	0.000	0.000	-0.002	-0.001	0.001**
	(0.002)	(0.000)	(0.000)	(0.007)	(0.001)	(0.000)
Distance to Police	-0.001	-0.001	0.000			
	(0.001)	(0.000)	(0.000)			
Distance to main Road	0.002	0.001	0.000			
	(0.003)	(0.001)	(0.000)			
Age of Newest Infrastructure	0.002					
	(0.020)					
Distance to Shop	0.002**	-0.000	0.000			
	(0.001)	(0.000)	(0.000)			
Conservancy	-0.037	-0.001	0.021***	-0.109	-0.035	-0.003
	(0.223)	(0.052)	(0.005)	(0.102)	(0.024)	(0.004)
Log Annual Per Capita		-0.062***	-0.013***		0.014	-0.008*
Consumption		(0.015)	(0.004)		(0.015)	(0.004)
Constant	8.565***	1.215***	0.072**	7.920***	0.579***	0.024
	(0.416)	(0.125)	(0.028)	(0.342)	(0.131)	(0.038)
R Squared	0.36	0.18	0.24			
Number of Observations	431	453	453	466	466	466

Table 6: Model results for effect of having a member participating in conservancy, Kunene: 2006

	Kunene								
	OLS			Selection Model[1]					
	Expenditure per capita	Food Share	Education share	Expenditure per capita	Partici-pation	Food Share	Partici-pation	Education share	Partici-pation
	coef/se	coef/se	coef/se	coef/se		coef/se		coef/se	
Conservancy Member Household	0.319**	0.025	0.013	1.140***		-0.033		-0.068***	
	(0.110)	(0.034)	(0.010)	(0.428)		(0.060)		(0.012)	
Female Headed Household	-0.046	0.014	0.005	-0.093	0.146	0.017	0.184	0.010	0.294
	(0.095)	(0.027)	(0.006)	(0.110)	(0.142)	(0.027)	(0.163)	(0.008)	(0.179)
Household Head Age	0.001	0.001	0.000	0.003	-0.006	0.001	-0.003	-0.000	-0.006
	(0.003)	(0.001)	(0.000)	(0.004)	(0.005)	(0.001)	(0.005)	(0.000)	(0.006)
Highest Education in Household	0.056***	-0.012**	0.003***	0.039***	0.064**	-0.011**	0.056*	0.004***	0.058**
	(0.014)	(0.004)	(0.001)	(0.015)	(0.032)	(0.004)	(0.033)	(0.001)	(0.027)
Log Household Size	-0.862***	0.000	0.002	-0.881***	-0.005	0.002	0.063	0.006	0.034
	(0.074)	(0.029)	(0.008)	(0.072)	(0.122)	(0.028)	(0.136)	(0.007)	(0.114)
Proportion of Female Aged 15-60	0.363	-0.070	0.009	0.487*	-0.397	-0.080	-0.335	-0.003	-0.296
	(0.267)	(0.079)	(0.020)	(0.295)	(0.349)	(0.074)	(0.376)	(0.020)	(0.357)
Proportion of Male Aged 15-60	0.270	0.032	0.007	0.429	-0.649*	0.019	-0.563	-0.008	-0.516
	(0.275)	(0.045)	(0.009)	(0.319)	(0.390)	(0.045)	(0.432)	(0.012)	(0.347)
Household Assets In Thousand N$	0.017***	-0.003***	0.000	0.015***	0.005	-0.003***	0.006	0.000	0.005
	(0.003)	(0.001)	(0.000)	(0.002)	(0.006)	(0.001)	(0.006)	(0.000)	(0.004)
Household Assets Squared	-0.000**	0.000**	-0.000**	-0.000**	-0.000	0.000**	-0.000	-0.000**	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Wildlife Damage to Crops Livestock, Property	0.233*	0.036	0.006	0.095	0.537***	0.045	0.543**	0.019**	0.443**
	(0.111)	(0.033)	(0.006)	(0.120)	(0.199)	(0.033)	(0.217)	(0.008)	(0.179)
Distance to Primary School	0.002	0.000	-0.000**	0.001	0.004	0.000	0.003	-0.000	-0.002
	(0.002)	(0.000)	(0.000)	(0.002)	(0.004)	(0.000)	(0.004)	(0.000)	(0.003)
Collected Nat. Resources except Wood	-0.054	-0.020	-0.005	0.019	-0.285*	-0.025	-0.313**	-0.012	-0.285*
	(0.076)	(0.020)	(0.006)	(0.099)	(0.147)	(0.022)	(0.152)	(0.008)	(0.143)
Member of a CBO	0.191***	-0.009	-0.007	0.083	0.440**	-0.001	0.434***	0.003	0.329***
	(0.053)	(0.022)	(0.006)	(0.074)	(0.179)	(0.024)	(0.157)	(0.006)	(0.115)
Years of CBO Experience In Community	0.000	-0.001	0.000	0.002	-0.009	-0.001	-0.007	0.000	-0.002
	(0.005)	(0.002)	(0.001)	(0.005)	(0.006)	(0.002)	(0.005)	(0.000)	(0.007)
Proportion of Children Aged 0-14	0.152	-0.076	0.042*	0.175		-0.080		0.042**	
	(0.269)	(0.081)	(0.021)	(0.254)		(0.077)		(0.019)	
Distance to Shop	0.001	-0.000	0.000	0.000	0.002	-0.000	0.003	0.000	0.003*
	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)
Distance (Km) To Health Facility	0.001	-0.001	0.000*	0.003	-0.009***	-0.001	-0.008***	-0.000	-0.002
	(0.002)	(0.001)	(0.000)	(0.002)	(0.003)	(0.001)	(0.003)	(0.000)	(0.002)
Distance to Police	-0.002	-0.000	0.000	-0.001	-0.000	-0.000	-0.000	0.000	0.001
	(0.001)	(0.000)	(0.000)	(0.001)	(0.004)	(0.000)	(0.004)	(0.000)	(0.003)
Distance to Main Road	0.002	0.001	0.000	0.001	0.009	0.001	0.005	0.000	0.006
	(0.004)	(0.001)	(0.000)	(0.005)	(0.010)	(0.001)	(0.007)	(0.000)	(0.006)
Age of Newest Infrastructure	0.048**	-0.011**	-0.000	0.080**	-0.149**	-0.013***	-0.173***	-0.003*	-0.137**
	(0.020)	(0.005)	(0.001)	(0.037)	(0.059)	(0.004)	(0.060)	(0.002)	(0.064)
Purros / Registered 2000	0.023	0.090	-0.034	-0.476	1.833***	0.125*	2.024***	0.015	1.139**
	(0.335)	(0.061)	(0.020)	(0.420)	(0.521)	(0.066)	(0.452)	(0.028)	(0.472)
Ehirovipuka/ Registered 2001	-0.245**	0.094**	-0.009	-0.493***	1.070***	0.111**	1.146***	0.016*	1.012***
	(0.087)	(0.040)	(0.006)	(0.164)	(0.293)	(0.044)	(0.264)	(0.009)	(0.258)
Log Annual Per Capita Consumption		-0.010	-0.024***			-0.009		-0.021***	
		(0.019)	(0.005)			(0.019)		(0.004)	
Know when Conservancy Established					0.842***		0.574**		0.426**
					(0.303)		(0.247)		(0.201)
Household Head older than 18 in 1997					-0.312		-0.818**		-0.446*
					(0.376)		(0.362)		(0.221)
Constant	8.422***	0.657***	0.166***	7.937***	0.428	0.690***	0.719	0.190***	0.276
	(0.390)	(0.164)	(0.055)	(0.545)	(0.472)	(0.157)	(0.468)	(0.048)	(0.511)
Athrho				-0.767*			0.181		1.165***
				(0.443)			(0.166)		(0.244)
Lnsigma				-0.258**			-1.624***		-2.794***
				(0.121)			(0.033)		(0.117)
Number of Observations	351	351	351	351		351		351	

Table 7: Model results for effect of having a member participating in conservancy, Caprivi: 2006

	Caprivi								
	OLS			Selection Model					
	Expenditure per capita coef/se	Food Share coef/se	Education share coef/se	Expenditure per capita coef/se	Particip-ation	Food Share coef/se	Particip-ation	Education share coef/se	Particip-ation
Conservancy Member Household	0.346*** (0.081)	-0.044 (0.033)	-0.016** (0.007)	1.062*** (0.148)		-0.165 (0.205)		-0.021** (0.010)	
Female Headed Household	-0.269*** (0.098)	-0.024 (0.025)	-0.001 (0.009)	-0.156* (0.094)	-0.603*** (0.196)	-0.043 (0.040)	-0.603*** (0.196)	-0.002 (0.009)	-0.602*** (0.196)
Household Head Age	0.001 (0.004)	-0.001 (0.001)	0.000 (0.000)	0.001 (0.004)	0.001 (0.004)	-0.001 (0.001)	0.002 (0.004)	0.000 (0.000)	0.001 (0.004)
Highest Years Education in Household	0.076*** (0.023)	-0.014*** (0.005)	0.004*** (0.001)	0.062*** (0.021)	0.101*** (0.035)	-0.012* (0.006)	0.111*** (0.032)	0.004*** (0.001)	0.105*** (0.031)
Log Household Size	-0.614*** (0.119)	0.010 (0.026)	0.026*** (0.006)	-0.635*** (0.116)	-0.016 (0.146)	0.013 (0.026)	0.023 (0.161)	0.026*** (0.006)	0.036 (0.151)
Proportion of Female Aged 15-60	-0.139 (0.471)	-0.075 (0.093)	0.018 (0.024)	-0.075 (0.491)	-0.162 (0.617)	-0.082 (0.099)	-0.106 (0.734)	0.018 (0.023)	-0.181 (0.758)
Proportion of Male Aged 15.60	-0.202 (0.437)	-0.075 (0.096)	-0.006 (0.023)	-0.103 (0.461)	-0.179 (0.491)	-0.088 (0.110)	-0.094 (0.547)	-0.006 (0.022)	-0.174 (0.542)
Household Assets In Thousand N$	0.039*** (0.006)	-0.005*** (0.001)	-0.000 (0.000)	0.039*** (0.006)	0.041** (0.018)	-0.005*** (0.001)	0.029 (0.020)	-0.000 (0.000)	0.025 (0.016)
Household Assets Squared	-0.000*** (0.000)	0.000*** (0.000)	0.000 (0.000)	-0.000*** (0.000)	-0.001** (0.000)	0.000*** (0.000)	-0.001* (0.000)	0.000 (0.000)	-0.001 (0.000)
Wildlife Damage Crops, Livestock, and Property	0.211*** (0.079)	0.000 (0.022)	0.009 (0.007)	0.183** (0.082)	0.165 (0.160)	0.005 (0.022)	0.211 (0.172)	0.010 (0.007)	0.207 (0.145)
Distance to Primary School	0.018 (0.017)	-0.003 (0.003)	0.000 (0.001)	0.021 (0.013)	-0.009 (0.024)	-0.003 (0.004)	-0.013 (0.026)	0.000 (0.001)	-0.010 (0.027)
Collected Natural Resources except Wood	-0.255** (0.121)	0.011 (0.025)	-0.000 (0.010)	-0.253** (0.120)	-0.038 (0.170)	0.011 (0.025)	0.030 (0.184)	-0.000 (0.010)	0.038 (0.184)
Member of a CBO	0.159 (0.137)	0.004 (0.029)	-0.001 (0.006)	-0.002 (0.160)	0.656*** (0.239)	0.031 (0.047)	0.689*** (0.234)	0.000 (0.005)	0.683*** (0.239)
Years of CBO Experience	0.005 (0.007)	0.002 (0.002)	0.001*** (0.000)	0.003 (0.008)	0.010 (0.018)	0.003 (0.002)	0.010 (0.018)	0.001*** (0.000)	0.014 (0.019)
Proportion of Children Aged 0-14	-0.468 (0.433)	-0.013 (0.089)	0.012 (0.022)	-0.399 (0.424)		-0.020 (0.096)		0.012 (0.021)	
Distance to Shop,	-0.000 (0.003)	0.001*** (0.000)	-0.000 (0.000)	0.000 (0.003)	-0.004 (0.005)	0.001** (0.000)	-0.005 (0.004)	-0.000 (0.000)	-0.005 (0.005)
Distance (Km) To Health Facility	-0.008 (0.008)	0.003 (0.002)	0.001** (0.001)	-0.016 (0.010)	0.042 (0.027)	0.005 (0.004)	0.045 (0.028)	0.001*** (0.000)	0.046* (0.027)
Log Annual Per Capita Consumption		0.044*** (0.017)	-0.006 (0.006)			0.045*** (0.016)		-0.006 (0.005)	
Mayuni Kwandu / Registered 1999	-0.025 (0.115)	0.030 (0.027)	0.005 (0.005)	-0.160 (0.119)	0.895*** (0.235)	0.053 (0.048)	0.930*** (0.276)	0.006 (0.005)	0.873*** (0.239)
Kasika / Registered 2004	0.271** (0.135)	0.093** (0.047)	0.009* (0.005)	-0.051 (0.136)	1.440*** (0.237)	0.147 (0.111)	1.519*** (0.241)	0.012** (0.005)	1.491*** (0.238)
HH Knows Year Conservancy Established					0.582*** (0.215)		0.409 (0.325)		0.532** (0.209)
Household Head older than 18 in 1997					-0.031 (0.238)		-0.274 (0.306)		-0.182 (0.291)
Constant	7.927*** (0.427)	0.381** (0.176)	-0.032 (0.068)	7.975*** (0.472)	-2.639*** (0.715)	0.357** (0.168)	-2.730*** (0.757)	-0.034 (0.066)	-2.694*** (0.747)
Athrho				-0.600*** (0.120)			0.411 (0.704)		0.062 (0.098)
Lnsigma				-0.211*** (0.053)			-1.682*** (0.103)		-2.938*** (0.124)
Number of Observations	351	351	351	351		351		351	

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