

Community Markets for Conservation (COMACO): Scaling up Conservation Impact through Markets that Change Livelihoods

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Introduction

Within a single generation, Zambia has seen much of its land transform under growing agricultural pressure to feed people and satisfy demanding export markets for such crops as cotton and tobacco. Much of this transformation has contributed to degraded landscapes, and in many cases, reduced land productivity for growing food. No longer can Zambia say its land is boundless and able to sustain food security for all. For the small-scale farmer, the need for soil conservation is greater than ever. In many areas of Zambia, small-scale farmers struggle to meet their food and income needs from farming alone. Lack of understanding about how to enhance soil fertility and how to plant different crop combinations for improved yields contribute to this problem. For many rural farmers, when farming fails and alternative ways to meet family needs are unavailable, cashing in on renewable resources that are locally available is often the only real choice. This is a common phenomenon throughout much of Zambia and the effects are devastating to a rural landscape: deforestation, soil degradation, loss of wildlife and fisheries, surging floods, and diminished water tables.

Across many regions of Zambia, these effects are already pronounced and increasing. When spatially associated with national parks and national forests, they can also critically undermine the conservation and economic value of these protected areas. Few of Zambia's parks and national forests are free from the "spill-over" effects of small-scale farmers who tap into these protected areas' natural assets to compensate farming shortfalls. For a country rushing to grow wealth and prosperity, particularly in urban settings where wealth is mostly concentrated, failure to support the needs of rural farmers and recognize their critical relationship to the land will raise the economic stakes for ignoring the social and environmental consequences.

For over two decades, the Luangwa Valley, which represents a mix of protected areas and settled farm land, has provided an important "laboratory" for conservationists to study these relationships and develop ways to engage farmers and other stakeholders to more effectively embrace conservation as a way of life. The history of these efforts goes beyond the scope of this paper, but in summary, they have generally failed to work at the level of the farmer to influence needed change. Instead, efforts sought change through community institutions, which often lacked the means, the skills, and in many cases the will to address the needs of the poor farmer. Lessons drawn from these experiences have provided the impetus to test a completely new and different approach for engaging farmers to adopt better farming practices and become the foundation for conservation rather than the cause of land and natural resource degradation. The engine for this behavior change is a company called COMACO that builds its business around helping poor farmers and buying the commodities they produce. The company applies a combination of input support, training and trade incentives to influence farming practices as a basis for safeguarding soils, forests and wildlife. The growing success of this approach is giving rise to an important, more holistic model for conservation in Zambia. Taking its name from Community Markets for Conservation, COMACO has demonstrated a relatively unique and cost-effective way of managing land and natural resources at both the

farmer-household and community level over large landscapes. It also serves an additional benefit of reducing the cost-burden of Government to enforce resource use regulations and improve the social needs of rural poor.

Model

The model works through a company that is a limited-by-guaranteed, non-profit company. The company provides six primary services as part of its business plan to produce and sale commercially viable products, all under the brand name, *It's Wild!*, while offering sufficient trade incentives to participating farmers to abandon destructive land use practices while adopting those consistent with sustainable land use:

1. organize low-income, food insecure farmers or individuals with environmentally destructive livelihoods (like poaching or charcoal making) into producer groups
2. train group members in farming practices that increase yields and mitigate against soil and tree loss (or other practices like bee-keeping to replace destructive practices)
3. provide inputs to increase production of food-based commodities, particularly marketable cereal and legume crops
4. buy surplus yields at favorable commodity prices and offer registered group members a higher price
5. monitor compliance of required farming methods (and production practices of non-farm commodities like honey)
6. provide an end-of-season “conservation dividend” to producers who comply with guidelines on conservation-based production practices and who sold commodities to COMACO.

The company builds financial sustainability by offering consumers a high quality, organically-grown, and competitively-priced processed food product. To achieve this sustainability while leveraging sufficient numbers of farmers to adopt improved production practices, the company must buy, process, and sell in sufficient bulk to lower transaction costs and make each step of the value chain as cost-effective as possible. To attain this level of scale and cost-efficiency, the company is organized into regional branches that store and process commodities under the management of skilled staff, who provide daily accountability of production rates, costs, sales and product shipments against agreed targets and budgets. These branches are called Community Trading Centres or CTCs. Associated with each CTC are 10-20 community trading depots where local farmers sell their commodities to COMACO. Trucks are then dispatched from the CTC to collect purchased commodities.

In summary, the company offers participating communities a business proposition: COMACO will run a business to help people out of poverty and the destructive livelihoods they might practice, but in return for company trade benefits and incentives, producers and communities alike must abandon practices harmful to the land and surrounding renewable resources. When local leadership in a community, for example, fails to stop poaching or clear-cutting forests to make charcoal and when such threats are unacceptably high, COMACO will deny conservation dividends to its participating farmers. This action is intended to provoke public debate and peer pressure to resolve the problem. If this fails and more extreme measures are required, the company will withdraw its trade benefits and services altogether until such

practices are reversed. By working together and meeting mutual commitments in an honest and transparent way to support food security, increased rural income, conservation and company sustainability, the company becomes a true partnership with rural producers.

Company structure and policy

COMACO currently has two fully operational branches, covering Lundazi and Mambwe Districts, with two more scheduled to be in full production by May 2010, covering Chama, Nyimba and Luangwa Districts. An additional two on the western side of Luangwa Valley, covering Serenje and Chinsali Districts, will be operational by the end of 2010. Supporting all these branches with professional services in accounting, auditing, sales, marketing, business management, product development and safety, procurement, and human resources is the Lusaka head office. Each branch operates as its own profit/loss centre and the head office assists in raising finance and staff capacity to help develop a viable, self-financing COMACO branch. As a branch moves into a net positive gain, it is then expected to pay a portion of its net gain as a service fee to the head office for the services it provides. Beyond this, branch revenue gains are used to reinvest in its area of operations to support food security, rural income improvement and conservation.

The company is governed by a board of directors that approves annual budgets and audits and assesses performance by its management in achieving company goals, namely rural income, food security, conservation and company sustainability. Each branch through its extension personnel facilitates the formation of farmer producer groups, the training of their members, and the establishment of producer group cooperatives for each participating chief's area once they become and active. Following this step, each COMACO branch then establishes an advisory management committee that consists of cooperative leaders and other relevant community leaders to meet at least once a year to engage branch management on issues of mutual concern. These discussions help resolve problems and misunderstandings, reduce transaction costs for COMACO and increase local compliance to requirements for receiving the conservation dividend.

COMACO purchases commodities from farmers at local community trading depots, where all transactions are recorded and buyers are identified as either COMACO members or non-COMACO members. COMACO members receive a slightly higher price for their commodities. Following this period of commodity purchases, COMACO extension staff and local lead farmers recruit and train new group members in improved production practices. During this same period, extension staff assesses their compliance to accepted production practices for eligibility to receive the end-of-year conservation dividend. Assuming the community as a whole has maintained a commitment to reduce levels of snaring, illegal hunting, charcoal-making and illegal fishing, then registered COMACO farmers who complied with conservation guidelines and who sold commodities to COMACO are eligible to earn a conservation dividend for their compliance. This payment is based on the number of kilograms they sold to COMACO¹.

¹ The dividend payment will begin in November 2010. Previously a conservation premium price was paid at the same time the commodity was purchased, but producers viewed this as part of the commodity price and not as a separate payment for conservation.

Major environmental challenges the COMACO model addresses in the Luangwa Valley

The COMACO model is applicable to a range of environmental challenges on a large spatial scale where human activity threatens natural resources. With its complex of land use conflicts related to poverty and food-insecurity, the Luangwa Valley serves as a valid testing ground for this model's robustness to help resolve environmental challenges. This section summarizes the major ones that COMACO is currently addressing through the combined application of skills, inputs and market-based incentives to change livelihood practices.

- **Illegal wildlife hunting and snaring**

The total number of local hunters living in Luangwa Valley, and who hunt illegally, is an unknown but finite number. Prior to COMACO the total number was probably less than 3000, and may have been nearer to 2000. In most all cases hunters learned their skills from their fathers or close relative. Illegal hunters, or poachers, prefer to hunt large animals to economize on effort and maximize returns on meat. On average local poachers in Luangwa Valley kill 6 animals per year. Hunting is an important source of income for buying farming inputs, and meat is sometimes used to barter for food or even labour to assist with plowing and weeding. If arrested and sentenced to serve in prison, in most cases hunters who return home will continue hunting illegally. A major reason why hunters poach as a livelihood is that they lack skills and access to market to pursue other livelihoods.

Use of wire snares to kill wild animals is most commonly practiced by farmers when family food supplies run low and game meat is used to exchange for carbohydrates (primarily maize, millet, or sorghum). The use of snares has become a common way for families living in Luangwa Valley to mitigate against hunger. In some communities, as many as many 40% of the resident families owned on average 6 snares and used wire snares in this way. Prior to COMACO, owners of snares typically set their snares about 4 times in a year and killed on average 6 animals. Though intended mostly for smaller animals, wires are unselective and are highly destructive to wildlife, including carnivores and large-bodied ungulates that routinely come to drink at waterholes.

- **Soil loss, soil nutrient depletion, crop selection**

The vast majority of small-scale farmers in Luangwa Valley and its surrounding watersheds farm to feed their families and earn income. In the more remote areas, extension services are minimal, and as a result, farmers lack basic understanding on how to maintain soil fertility. Typically soils are plowed and exposed to the sun, and crop residues burned leaving the ground bare for most of the non-farming season. Over time, biological activity in the soil is diminished and top soil is blown or washed away, leaving soils degraded with long fallow periods to recover. Maize yields with such farming practices and poorly managed soils is typically below 800 kg per hectare and far below what is needed to sustain most families.

Exacerbating this problem is the introduction of non-food crops introduced by multinational companies seeking farmers to supply cotton and tobacco for their export market. Because of their efficient payment and input support, many farmers adopt these crops. Over time crop diversity declines and local seed availability for such crops as groundnuts,

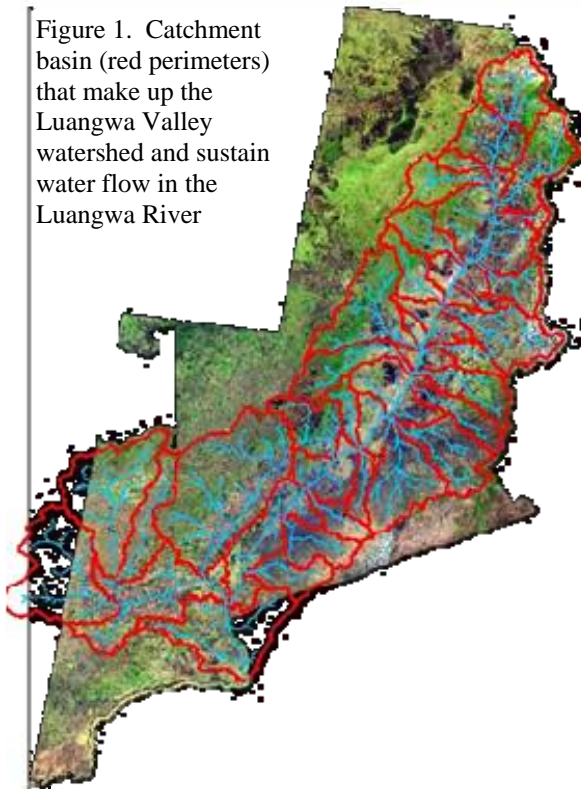
cowpeas and soybeans diminish. In most upland soils, cotton will drain soil nutrients over 3 to 4 years, thus affecting yields without fertilizer. To maintain higher yields and meet household income requirements, farmers typically expand their fields by clearing more land, rather than managing existing farmland for soil improvement.

- Watershed degradation

In growing numbers, pressure to find more fertile soils has pushed farmers away from depleted, exhausted farmland into more sensitive, hilly landscapes where soil and water run-off is contributing to 1000s of tons of soil loss annually. Over a 12 year period from 1989 to 2002, 21% of the forest cover across the upland watershed in Lundazi District was cleared. Correlated with this loss of forest cover was the rise in cotton as a cash crop. Much of the watershed across the eastern catchment area is severely degraded and have affected waterflow in the Luangwa River from its tributaries on the east.

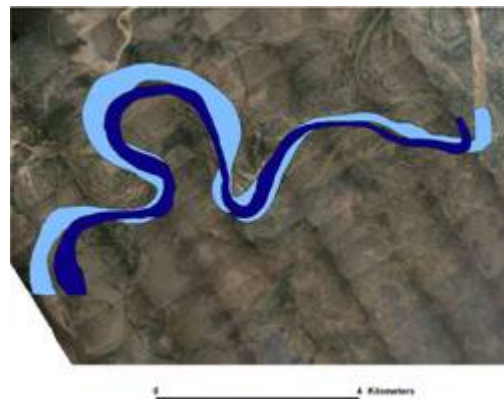
The Luangwa Valley watershed is composed of 45 basins that capture rainwater for sustaining waterflow in its principle river that feeds into Luangwa River. These basins are illustrated in Figure 1. Significantly, tributaries flowing from the east have ceased to flow as year-round flowing rivers. The watershed on the west is more intact and supports the constant flow of the Luangwa River, but it too faces a growing pressure from land clearing caused principally by the increased use of “chitimene” (slash and burn) to grow primarily millet and an escalating demand for charcoal. Increasingly, both are being exported to Tanzania. Chitimene uses only about 20% of the land cleared when converting trees into ash to help neutralize the high acidity in the soil.

Figure 1. Catchment basin (red perimeters) that make up the Luangwa Valley watershed and sustain water flow in the Luangwa River



There is increasing evidence that in recent years the Luangwa River has become wider and shallower (see Figure 2). This change in river morphology is almost certainly caused by the increasing volume of soil and water run-off from the surrounding watershed.

Figure 2. Luangwa river boundary in 1988 (dark blue) and 2007 (light blue), representing, representing a 2-fold increase in river width.



Results

Commercial activity

COMACO provides agricultural marketing and training support for over 40,000 small-scale farming families living across the Luangwa Valley. In 2009 it purchased over 3000 tons of agricultural commodities valued at over K2.2 billion. Sales from *It's Wild!* products during the first half of the 2009-2010 fiscal year totaled K2.6 billion. Total annual sales through March 2010 are expected to exceed K5.8 billion, with approximately 39% returned to COMACO farmers. For the past two years, sales have grown by over 100% annually and though still operating at a financial loss, the trend is toward sustainability and company revenues is expected to break into a net gain by the end of 2011 or early 2012. Projected profit/loss statement for 2009-2010 is as follows:

Sales Income.	K5.8 billion. (\$1.26m)
Cost of sales + Cost of production.	K2.4 billion. (\$521,000)
Gross Profit.	K3.4billion. (\$739,000)
Administration costs (that is all Other costs, including Lusaka)	K3.9 billion. (\$848,000)
Total projected Loss for the year.	K500 million (\$109,000)

Both Mfuwe and Lundazi CTCs will likely operate in net positive, with total profit combined likely to K650 million (\$141,000). This figure does not include the overhead support cost incurred by the Lusaka Head Office.

Farmer members, farming practices and compliance scores

Farmer membership in COMACO is growing and has reached approximately 42,000 with a near equal gender ratio. An effective extension system supported by COMACO works through area managers assigned to each chief's area. Area managers rely on selected lead farmers who have demonstrated competency in COMACO-required farming practices to assist with training and recruiting new farmers. Lead farmers also help maintain demonstration plots to illustrate best practices. Thus far COMACO has over 400 demonstrated sites distributed throughout its operational areas (see Figure 3).

Farming practices that COMACO promote and provide the basis for a conservation dividend payment include the following:

1) for valley areas, primary cereal crop

- Pot-holing with compost and preferably with biochar to add and mobilize soil nutrients
- Intercropping with *Faidherbia albida* and *Gliricidia sepium* (the latter is constrained by seed availability) as agroforestry species to add soil nutrients
- Legume cover crops to reduce weeds, improve soils, supplement food and income security
- Fire break around farm plot to prevent crop residues from burning
- Crop residue left on the ground to retard weeds and add mulch to the soil

- Crop rotation with cereals and legume crops

2) for plateau areas (western and eastern)

- Pot-holing with lime for western area and compost for eastern areas
- Velvet beans as a fallow crop
- Legume cover crops to reduce weeds, improve soils, supplement food and income security
- Fire break around farm plot to prevent crop residues from burning
- Crop residue left on the ground to retard weeds and add mulch to the soil

In all areas, COMACO promotes cassava as a key food reserve crop in the event climatic conditions result in lowered food production of more traditional food crops. In particular, it assists farmers with cassava cuttings of high-yielding varieties to help start local nurseries by lead farmers for distribution of cuttings to neighbors. It also promotes the adoption of bee-keeping and has helped to establish 25,592 hives and 414 apiaries in its areas of operation.

Adoption compliance of the above farming practices vary between areas and factors such as quality of area managers, road access to facilitate markets, relative influence of non-COMACO crops like cotton are some of the factors influencing compliance. Values varied from 26% to 100% for a given chief's area with an average of 64% for the 2008-2009 season. Compliance scores are following a positive trend and the role of lead farmers, demonstration sites and periodic field days to sensitize farmers about COMACO and market incentives to comply is helping to improve compliance. Compliance in growing agroforestry species for improved crop yields is contributing to very high numbers of tree planting: over 1.2 million F. albida and over 4 million G. sepium in 2009.

Farmer income

Annual household income recorded in 2008 for females has increased by a factor of 3.26 (or 4.5 if calculated in US\$) and males by a factor of 2.3 (or 3.3 in US\$) from pre-COMACO levels. A summary of income sources and income earned from farmers who sold crops to COMACO are illustrated below. Total number of farmers who sold commodities to COMACO exceed 8000.

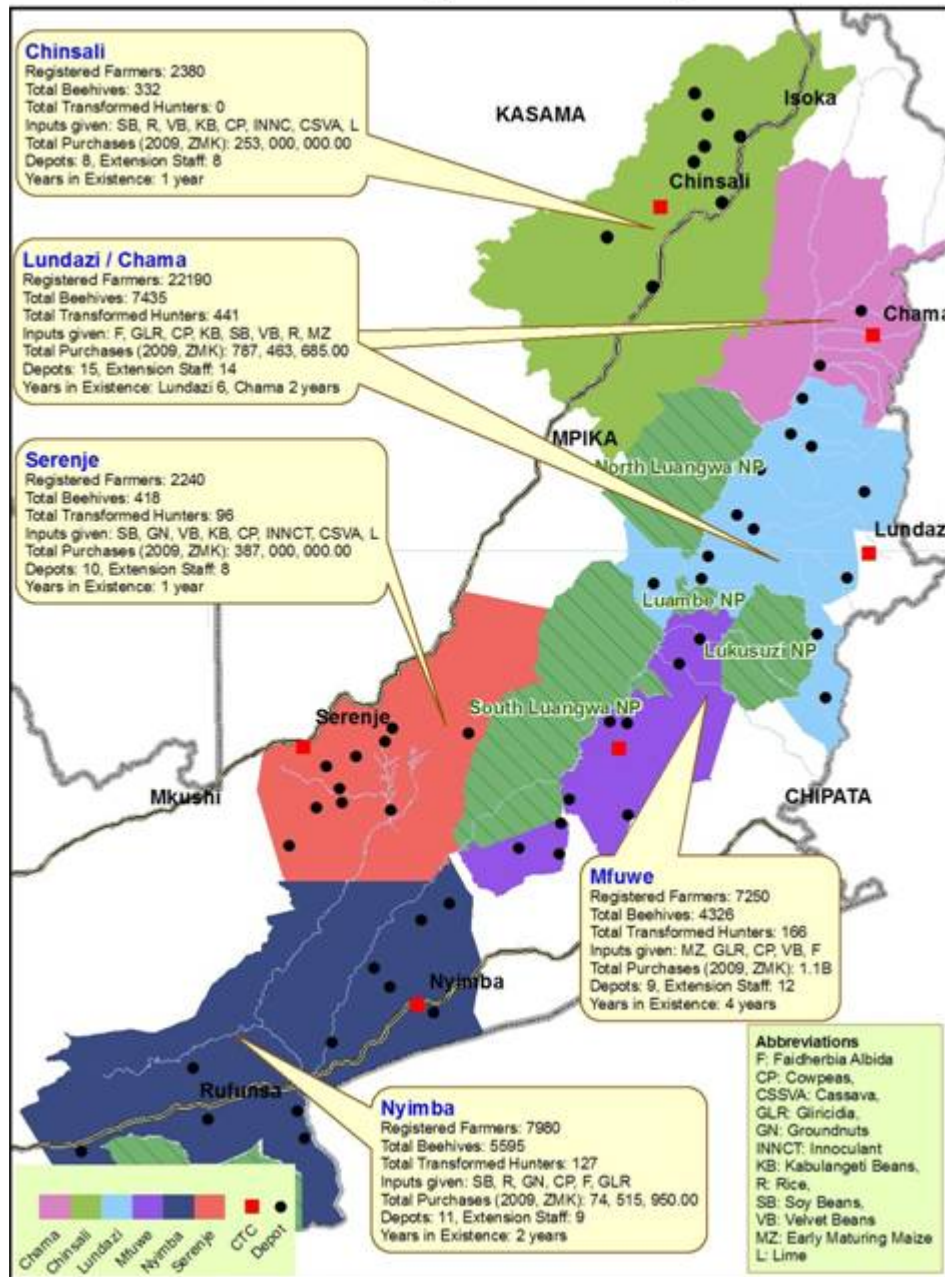
Mfuwe/Mambwe CTC

Crop	Avg yield (kg)	Avg Income
Paddy Rice	140.65	197,841
Honey	21.76	78,902
Gnuts	71.33	162,414
Organic Cotton	132.99	223,861
Soybeans	116.70	280,086
Cowpeas	89.43	98,367
Maize	1,214.12	220,000

Lundazi CTC

Crop	AvgQtySold	AvgIncome
Beans	34.42	103,263
G.Nuts	251.52	522,013
Honey	65.59	253,257
Paddy Rice	312.72	462,853

Figure 3. Areas of COMACO operations and summary statistics



Food security

Farmers complying with COMACO farming guidelines are averaging maize yields above 1200 kg/lima, which is well above yields before COMACO, which averaged 800-900kg. Prior to COMACO, for instance, maize was in a deficit in the Mfuwe area and many farmers were

dependent on WFP relief. COMACO is currently buying maize surplus at its CTC in this same area. Purchases in 2009 totaled over 200 tons. Part of the reason for this increase in production is the availability of a reliable good price COMACO offers to maize farmers. COMACO helps producer group members with seeds on a seed recovery basis to diversify food crops, especially in areas where the emphasis on cotton has reduced crop diversification away from such helpful crops as soybeans, groundnuts, beans, and cowpeas. The company has actively supported the introduction of these legume crops to promote weed control, soil enhancement as well as increased food security. All of these crops are now commodities that COMACO buys and all but cowpeas are now processed and packaged as value-added food products. Cowpeas will be packaged in 2010. By increasing the value of these crops and offering differentially higher prices for COMACO registered farmers, the company will be able to maintain a regular supply of commodities for value-added processing as well as commodity trade markets. More importantly for food security, families will have their own supply for home consumption.

Cassava was another crop that had become scarce in most regions of the valley. Over 4 million cuttings widely distributed throughout much of the valley to producer group members by COMACO have helped reverse this food deficit. In times of floods and localized crop losses, cassava is proving to be a critically important food reserve that farmers can rely on rather than depending on game meat to exchange for food.

In the case of rice, COMACO found this crop grown in only a few locations and relatively low tonnages. In its first year of buying rice, 2002, COMACO only bought 60 tons and prior to that traders bought rice at about K500/kg. Today, COMACO purchases over 1000 tons and pays over K1300/kg and sells a consumer driven product called *It's Wild!* Chama Rice throughout much of Zambia's retail market. With this price incentive, more families are growing rice with improved yields to support both domestic consumption and income. In most areas rice has surprised cotton prices, and this is helping farmers to switch to more food-based crops.

Table 1 illustrates the scale of farmer input support, based on input distribution for the 2009-2010 farming season. Much of the seeds provided to new farmers originate from COMACO farmers. Using its own assets of trucks and storage sheds combined with a seed recovery system to perpetuate seed supplies, the company is able to maintain seed support at relatively low cost to farmers in need.

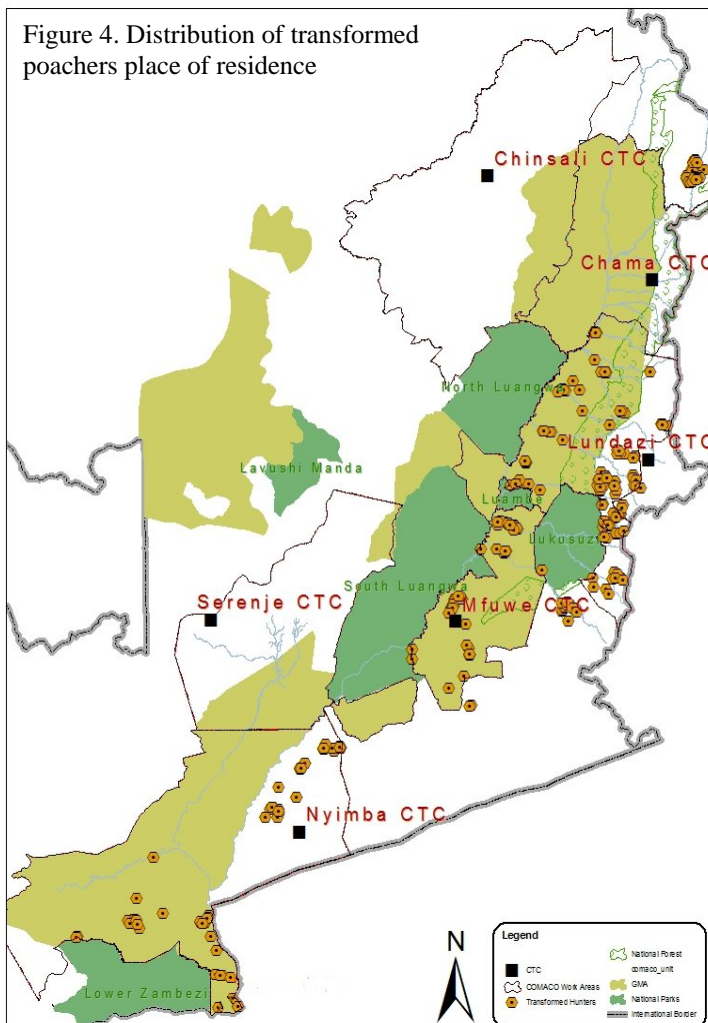
Table 1. Farmer inputs for 2009-2010 season

Item (in kgs)	Lundazi/Chama	Mfuwe	Nyimba	Serenje	Chinsali	Total Amount (ZMK)
Soya beans	4,000	-	7,500	10,000	10,000	31,500,000
Rice	7,660	-	11,650	-	2,000	COMACO sourced
Groundnuts	6,100	-	6,900	10,000	10,000	COMACO sourced
Cowpeas	12,000	2,500	11,350	5,000	5,000	35,850.00 & COMACO sourced
Velvet beans	14,000	500	-	3,750	3,750	22,000,000
Kabulangeti	4,000	-	-	12,500	12,500	COMACO sourced
Cassava	-	-	-	1,000	1,000	2,000
Faidherbia albida	1,770	2,000	760	-	-	COMACO sourced
Lime				125,000	125,000	44,000,000

Wildlife

COMACO started its operations in Lundazi District where incidences of wildlife poaching and snaring were relatively high and capacity by the Zambia Wildlife Authority was understaffed and underfunded. Since then its operations have spread throughout much of the Valley. COMACO used its trade incentives and input and training support to leverage farmers and local hunters to abandon livelihood practices that depended on killing wild animals. Through this effort, farmers and hunters alike have surrendered over 50,000 snares and over 1800 firearms to COMACO extension staff since 2002, when efforts to work with farmers began prior to the formal introduction of CTCs and the production of *It's Wild!* products in 2005.

During this period to present, COMACO has identified (with the help of traditional leaders) and trained at formal 6-week training programs 334 local hunters to qualify for inputs and trade opportunities with COMACO. To fully access these opportunities, these same hunters returned home and formed a group of other hunters and required them to also surrender their firearms. The process has led to a total transformation of 623 hunters with a 4% failure rate where trained hunters returned to hunting. Approximately 12% of these transformed hunters had once hunted elephants. Figure 4 shows the distribution of hunters selected for training across



the Luangwa Valley on the eastern side of Luangwa River, where the program started. In 2009, the first 39 illegal hunters were trained in Serenje.

Wildlife census data provides the best direct measure of impact from the transformation of poachers and the removal of snares. Surveys for 1999, 2002, 2006, 2007, 2008, and 2009 provide a pre-COMACO baseline with changes in numbers as COMACO undertook interventions to reduce the need for local farmers to snare or illegally hunt. The area surveyed overlapped with the area where COMACO originated its work in Lundazi District and part of Chama District.

Results in Table 2 show species population trends from pre-COMACO years (1999 and 2002) to most recent counts in 2009, as well as a comparison of estimated population changes from 2008 to

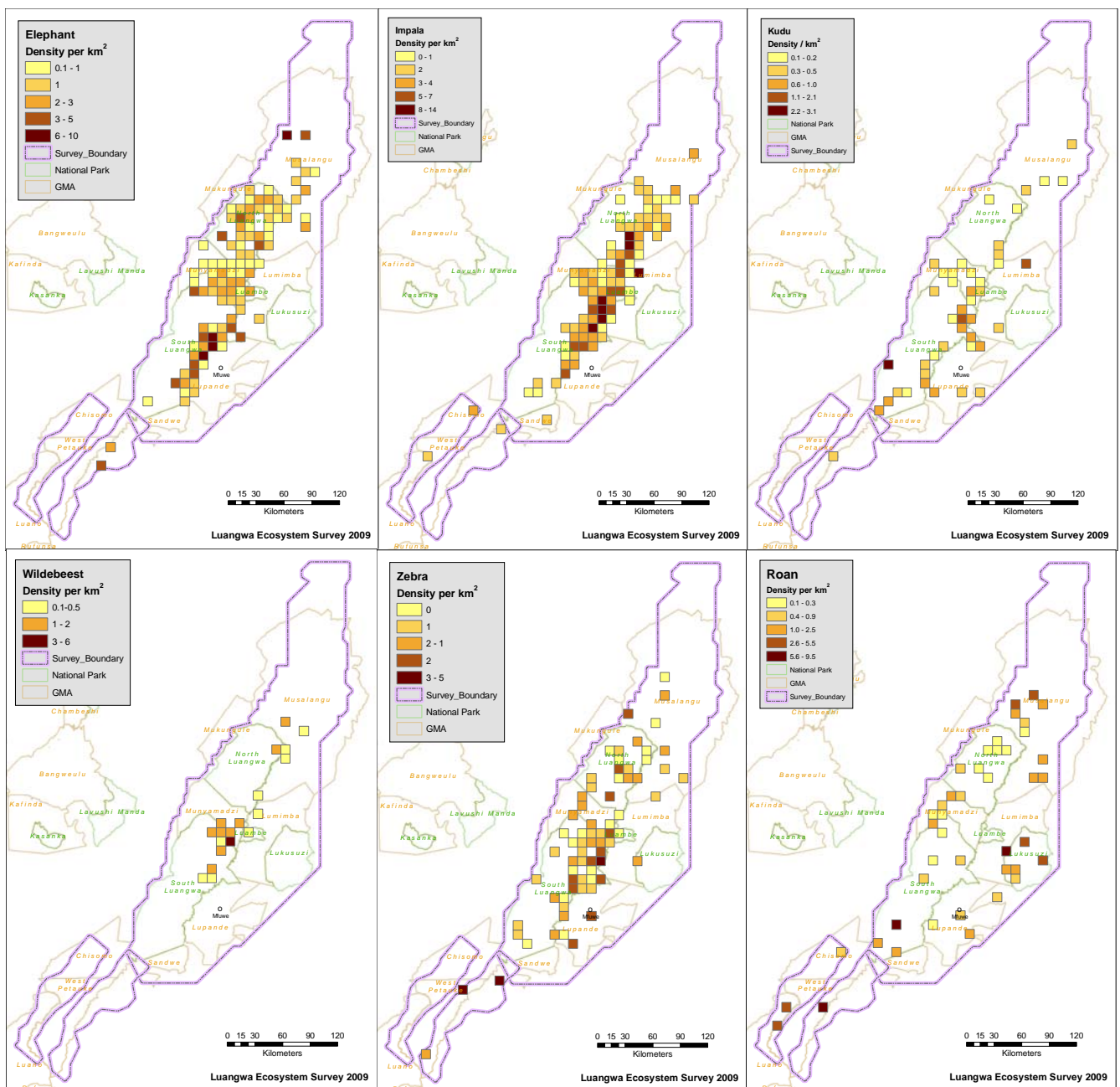
2009. A d-test coefficient of over 1.96 indicates a significant difference at the .05 level. A positive coefficient value suggests a positive trend, and a negative value suggests a decline. Only eland showed a significant decline while about 30% of the other species showed significant increases, including elephant, hartebeest, kudu, impala and warthog. Waterbuck, roan and puku showed a positive increase but not at statistically significant levels, while buffalo showed a decline, though also not significant.

There are other factors that contribute to these trends besides the effects of local hunting and snaring that can confound the interpretation of COMACO's relative impact. A major negative factor is licensed hunting by residents, non-residents and safari clients and actual quotas given to particular species for all these categories of hunters, as well as the control and regulation of these quotas. For instance, licensed hunting typically harvests over 40 buffalo annually from each chief's area that was covered by this survey and serious question arise over the sustainability of such legal hunting pressures. This does not include wounded animals that may go uncounted. Such effects on other species go beyond the scope of this paper, but it is a major concern for wildlife management in Luangwa Valley, particularly low-density species like eland, roan, waterbuck and wildebeest in some areas. A trend analysis was also carried out for a selected group of species, referred to as a vulnerable species guild (waterbuck, eland, roan, hartebeest, kudu), because they are sought by poachers (both hunting and snaring) and licensed hunters and occur at low densities. Only two areas (Chikwa and Munyamadzi) showed a significant increase while Chanjuzi and Mwanya showed a decrease. Combining all areas, trends are positive.

Table 2. Wildlife survey summary statistics for core COMACO areas

TOTAL	1999			2002			2006			2007			2008			2009					
Area of transect	885 km2			1052 km2			544 km2			544 km2			0 km2			805 km2					
Total area sampled	5,307			5,307			5,329 km2			5,336 km2			5,906 km2			6,765 km2					
SI	16.67%			19.82%			10.20%			10.20%			10.20%			11.90%					
Species	Obs	Total	SE	Obs	Total	SE	Obs	Total	SE	Obs	Total	SE	Obs	Total	SE	Obs	Total	SE	d-test	d-test	
Buffalo	1114	5,542	4,245	746	4,833	3,401	156	1,529	1,211	463	4,954	3,055	206	1,695	770	122	1,201	508	-0.54	-1.06	-1.02
Wildebeest	468	2,360	1,476	155	960	583	167	1,651	910	118	1,261	309	253	2,075	613	142	1,398	416	-0.91	0.61	-0.63
Waterbuck	32	161	100	22	147	80	75	735	483	26	278	113	16	133	71	31	304	110	1.31	1.16	0.96
Zebra	114	566	240	93	578	551	116	1,137	788	67	717	202	105	857	373	45	474	142	-0.96	-0.18	-0.33
Elephant	296	1,490	701	137	879	398	207	2,055	816	164	1,753	394	169	1,381	247	279	2,907	517	2.66	3.11	1.63
Eland	29	144	97	10	58	45	7	69	58	5	53	32	36	296	13	0	0	0	-22.44	-1.28	-1.48
Hartebeest	25	125	81	2	11	10	40	421	162	0	0	0	23	188	62	12	129	30	-0.86	3.78	0.04
Roan	3	13	12	6	31	26	14	137	133	0	0	0	25	202	97	12	187	130	-0.09	1.17	1.33
Kudu	22	109	83	14	78	50	13	127	94	22	235	82	18	148	54	34	435	133	1.99	2.51	2.07
Puku	391	1,967	1,248	179	979	477	224	2,212	930	75	802	241	155	1,276	249	200	1,968	408	1.45	1.58	0.00
Impala				678	3,877	1,251	556	5,537	2,296	437	4,671	757	422	3,468	407	658	7,477	869	4.18	2.36	
Warthog				43	223	149	55	540	290	51	545	137	54	444	91	68	924	171	2.47	3.09	
Guild	110	553	182	54	325	108	149	1,490	538	53	567	143	118	967	146	89	1,055	218	0.33	3.00	1.77
Poaching-liable guild																					
Area	1999			2002			2006			2007			2008			2009			09-08	02	99
Chikwa	0	0	0	18	102	46	14	137	95	3	32	31	2	17	11	20	295	141	1.97	1.30	2.09
Chifunda	2	12	7	11	55	20	14	137	83	16	171	92	14	115	62	12	188	134	0.49	0.98	1.30
Chanjuzi	0	0	0	0	0	0	28	303	70	0	0	0	15	125	71	0	0	0	-1.76		
Munyamadzi	45	222	82	17	127	41	42	412	182	16	171	76	20	165	95	44	434	123	1.73	2.37	1.44
Mwanya	44	222	80	0	0	0	13	127	72	11	118	72	15	122	55	4	39	38	-1.24	1.03	-2.07
Total	91	456	115	46	284	64	111	1,117	244	46	492	143	66	544	145	80	956	233	1.50	2.78	1.92

Another interpretation of COMACO's effect on wildlife is an analysis of total Valley wildlife distribution patterns to assess relative numbers where COMACO operates, as well as sightings of fresh elephant carcasses as an indicator of impact from the large number of guns surrendered and illegal hunters who have stopped poaching. Figure 5 shows representative wildlife distributions for 6 of the 12 species counted and the main result is very clear, that in areas where COMACO does not operate: southern and northern end of Luangwa Valley, wildlife numbers are greatly reduced. It also illustrates the critical importance of the Luangwa Rivers in supporting wildlife numbers during the dry season. An extremely important result of this total Valley survey was the complete absence of any fresh elephant carcasses 0-2 years old. Whereas other areas of Zambia and other regions of Africa (Tanzania and Kenya) are seeing increasing levels of elephant poaching, the 2009 results suggest a far less serious problem in Luangwa Valley.



Charcoal and watershed protection

COMACO is at the early stages of applying its market influence on reduction of charcoal-making in principally two key areas of operations: Chinsali and Nyimba/Luangwa Districts regions. The COMACO strategy is to work directly with families making charcoal and to provide inputs and training for other income sources that will reduce the need to make charcoal. These income sources will include honey, soybeans, groundnuts, cowpeas, and millet (in the case of Chinsali). Charcoal-producing areas will be subdivided into blocks with individual producers identified. Residents from each block will agree to reduce charcoal production by selling only on one week per month with an agreed ceiling of number of bags allowed. Moreover, charcoal-making will have to follow guidelines so mature trees are left remaining in areas where charcoal is made. In exchange COMACO will offer above average market prices for their commodities plus an end of year conservation dividend for full compliance. Over 3000 bar hives for honey production have been distributed to date and the 2010 market season will be the first year to market crops and demonstrate the relative benefits of complying with COMACO guidelines and hopeful impact on reduction of charcoal pressure.

The current levels of charcoal extraction is harming watersheds and with extraction rates of about 31,500 tons from Nyimba and Luangwa District alone, the problem is becoming increasingly out-of-control. There is little evidence of counter measures to regulate and control the level of tree destruction. For many people in affected areas charcoal-making is replacing farming as a primary livelihood. Figure 5 shows an example of charcoal management blocks (red section) along the Great East Road in Luangwa District where the proposed interventions are being implemented.

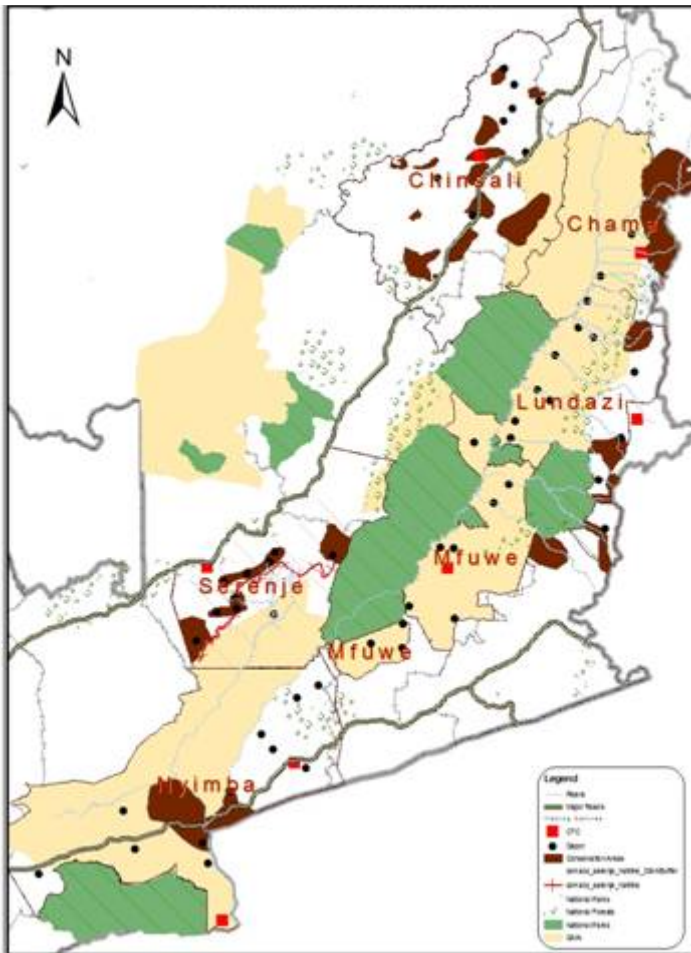
Figure 5. Example of a charcoal-managed area



Communities participating in COMACO through their local leaders have begun to react to these problems and the growing pressure from squatters settling on their land to exploit trees for charcoal. One common approach is community-managed conservation areas that would ban certain land use and in some case would exclude settlement for the long-term protection of natural resources on their customary

lands. Though at a very early stage of planning, COMACO has endorsed this proposal and could reinforce these efforts by offering increased market value for commodities produced outside these conservation areas. Figure 6 shows the extent of community proposals so for these conservation areas.

Figure 10. Proposed Community Conservation Areas



Synergies, cooperation and challenges:
Growing the COMACO model

COMACO is not a cure-all, but is part of a cure to help fix a management approach that has generally failed to keep natural resources and land safe from degradation in Luangwa Valley. It represents a major effort to integrate markets, agriculture and conservation through a business model that shows real promise in achieving sustainability and leveraging increased compliance to conservation among small-scale farmers. Much of this anticipated success and continued impact by COMACO will depend on developing synergies and cooperation with its principal stakeholders to gain additional value from COMACO's strong organizational and market strengths in influencing land use change. Achieving this full value of a COMACO approach will encounter challenges, which may significantly constrain COMACO's success. This

section reviews some of the key opportunities for synergies and cooperation to build on COMACO's success and the potential barriers that may prevent this from happening. Specific recommendations are highlighted in bold.

1) Synergies and cooperation

- Conservation Dividend

The success of widespread adoption of COMACO-recommended farming and land use practices will depend on the above-average commodity prices paid by COMACO and the ability of the company to sustain the payment of its conservation dividends. For this to happen, COMACO will need to build up sufficient cash reserves to make these dividend payments through an already established mechanism for paying small-scale farmers. For the 2010 season, it is estimated an additional \$120,000 will be required to support the dividend requirement for over 10,000 farmers. Major business houses and key lodges in the Luangwa Valley could collectively meet this cost with relative ease and contribute significantly to conservation success in Zambia and in some cases to their own commercial interests. As farmers recognize the additional dividend payment

for compliance is real, compliance will grow at a faster rate for achieving natural resource protection. COMACO has started discussions with the private sector to initiate this potential synergy.

- Zambia Wildlife Authority (ZAWA) interventions to build on COMACO

ZAWA stands to gain significantly from the success of COMACO through its revenue collections of both non-consumptive and consumptive uses of wildlife and from the reduced costs of law enforcement as COMACO removes the threat of poaching through its poacher transformation program and its conservation payment approach. To date, ZAWA's level of synergy with COMACO is relatively low and these potential benefits are constrained by not having a greater level of support from ZAWA. To enhance this level of cooperation, the following recommendations are made:

- a) **Ensure hunting quotas are not undermining the potential gains in wildlife production COMACO is providing. Specifically, reduce buffalo by 50%, remove eland from quota altogether and do not increase quotas for other species until trends are further established.**
 - b) **Just as COMACO withholds trade benefits if poaching levels are unacceptably high in a given community, ZAWA should also withhold revenues to the same communities to press for community action.**
 - c) **Contribute a portion to the conservation dividend fund to help resolve land use conflicts**
 - d) **Second staff to help with the continued expansion of the poacher transformation program**
- Trade in carbon assets in partnership with participating communities and Government

COMACO could be a leader in carbon trading to support poverty reduction and conservation through a workable model that can maintain low transaction costs and enhance incentives for conservation. As Zambia seeks to achieve food and income security around livelihood practices that are not destructive to the land or natural resources, accessing carbon markets to further support conservation payments by COMACO would represent a win-win for all parties concerned. By adding and sustaining income incentives for compliance to good farming practices and other conservation guidelines, small-scale farmers would not only increase their net income and food supplies, but Government would reduce their own costs to enforce natural resource management regulations. Because of COMACO's current work to address avoided deforestation, improve agricultural and land use practices and increase afforestation efforts in selected areas, a recommendation to Government is to **consider COMACO as an effective means to advance carbon markets for enhancing land protection outside protected areas where farming and other land use practices represent potential threats.**

- Forestry Department
COMACO and the Forestry Department could greatly gain from developing improved synergies and cooperation through the value-added processing of forest-products by COMACO to promote tree conservation. Specific recommendations include:
 - a) **Allow COMACO bee-keeping groups to co-manage buffer areas around protected forest areas with the Forestry Department with entitlements to harvest honey from protected areas in exchange for protecting these areas from fire and encroachment.**
 - b) **Assist communities to enforce community by-laws and land use plans to prevent or restrict charcoal-making in selected areas**
 - c) **Recognize community conservation areas and assist with the enforcement of forest protection in these areas**
- Family health and family planning

An important longer-term objective of COMACO, as levels of food and income security improve, is to stimulate discussion and better understanding of a broad range of issues affecting family well-being. One key issue with long-term implications of natural resource sustainability is family planning. The project believes that in a growing number of areas where COMACO has operated the longest, timing for this discussion is favorable and various local and international organizations have been contacted to collaborate with COMACO on these efforts. Farmer day meetings, producer group meetings, and increased reading material added to the COMACO Better Life Book are likely entry points for the introduction of this topic.

- Department of Agriculture and Food Reserve Agency

COMACO has developed a very positive working relationship with District Agricultural and Cooperative Officers and supports efforts to reach into the more remote areas where COMACO operates. This relationship has proven mutually beneficial for cutting Government costs while increasing overall agricultural productivity for a District. A major constraint on COMACO's efforts is manpower and a recommendation for continued collaboration and synergy is to **allocate Dept of Agriculture extension staff to work under the COMACO regional extension coordinators.**

In certain areas, the Food Reserve Agency maintains storage sheds in a COMACO area of operation and buys commodities from local farmers. Because this buying process does not take into account compliance requirements for accessing incentives, there is reduced incentive to adopt better farming practices and follow other conservation guidelines COMACO requires. A possible recommendation is **for FRA to allow COMACO in certain cases to buy commodities on behalf of FRA, using the buying policies of COMACO.**

2. Challenges

One of the key reasons why COMACO has been able to transform such a large number of known illegal hunters is the disincentives of fines and prison terms if they are caught poaching by ZAWA. Unlike ZAWA, the Forestry Department has a relatively weak institution for enforcing their laws and this presents a serious challenge for COMACO in steering people away from making charcoal and clear-cutting forests for the same activity. Zambian national and provincial authorities will need to make enforcement of forestry laws that impose severe penalties a priority if it expects COMACO to reorient rural livelihoods away from destructive forest use practices. As COMACO becomes more widespread and effective in sustaining conservation-based income alternatives, it becomes easier for Government to apply its resource protection laws firmly. The challenge will be to mobilize Government resources to make this happen. What is at stake is the basic need to discourage small-scale farmers from adopting poaching or destructive tree use as an alternative to farming or as a means to support farming with inputs. Improved collaboration and synergy between Government and COMACO can help prevent this from happening.

Another serious challenge to COMACO's success is the weak land tenure system by traditional authorities for controlling settlements. Related to this weakness is the general lack of enforced land use plans by local authorities to restrict settlements and resource use. As a traditional institution governing land use practices and settlement patterns, local chiefs need much more help from Government to oversee the practical work of traditional leaders and improve their competency for managing such vast land areas as customary land owners. Once such local land use plans are defined and enforced by local authorities, it becomes much easier for COMACO to complement these efforts with markets that reward compliance to the plans.

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