



ADDRESSING THE CHALLENGES OF FOOD INSECURITY AND ENVIRONMENTAL DEGRADATION IN ZAMBIA



Location: Luangwa Valley, Zambia

Community Markets for Conservation (COMACO) has helped people address the challenges of food insecurity and environmental degradation while conserving wildlife and other natural resources. COMACO is one of the few programs that operate at the scale of an entire ecosystem—contributing to increased wildlife numbers, better protected habitats, improved food security, and better incomes.

CHALLENGE

Situated at the end of Zambia's Great Rift Valley, the Luangwa Valley has ecological riches but pervasive poverty. Poaching and subsistence farming of maize and sorghum are the main livelihoods. Increasingly, families are also relying on cash crops, such as cotton and tobacco, rendering them less able to meet their own food needs.

Poor farming practices, such as slash and burn agriculture, and erratic rainfall have degraded soils, forcing farmers to find new land. This in turn contributed to deforestation of nearby national forests and parks, which are home to diverse wildlife including wildebeest, waterbuck, hartebeest, roan, kudu, eland, and elephants. The poorest families also generate extra income by selling charcoal made by felling trees, which contributes to forest degradation. Finally, to compensate for staple-crops shortages, subsistence farmers have typically relied on poaching. Illegally hunted meat is exchanged for food produced by more successful farmers.

According to Wildlife Conservation Society's (WCS) population surveys conducted in the late 1990s, annual household income in the Luangwa Valley was about \$80.¹ In sharp contrast, a selected sample of 88 individuals involved in illegal hunting had incomes averaging \$320.

Such higher returns combined with the above mentioned factors have resulted in a dramatic decline in Zambia's wildlife population.²

RESPONSE

In 2002, farmers, the WCS and the World Food Programme initiated the COMACO community program in the Luangwa Valley. The goal: to maintain natural resources, facilitate conservation efforts, and address food insecurity in concert with wildlife protection by providing alternative livelihood options to former poachers. The project worked to build strong linkages between agriculture and rural markets and uphold land use practices conducive to improved natural resource management.

Protecting Wildlife and Making Agriculture Profitable

In exchange for traps and snares, COMACO provided farmers with maize seeds and training in conservation farming techniques such as zero-tillage. The training in zero-tillage farming involves applying home-made fertilizer to each plant, to save fertilizer costs and maximize effectiveness, and covering the area between rows with crop residues to suppress weed growth and

increase soil moisture. This helped reducing dependence on chemical fertilizers and herbicides, and led to major household savings (10-20% of total annual income) by avoiding to buy these expensive inputs.³ The project has promoted crops that meet the area's sustainability and sustenance needs, including paddy rice, which produces food without large labor or pesticide inputs; and groundnuts, which provide good food, an income source, and help fix nitrogen and replenish soils through crop rotation. COMACO also promoted fish farming, poultry, and egg sale as an alternative to wild game meat; and honey produced in bar or log hives—using already dead trees—which gives farmers an economic incentive to manage forests.

The process initially targeted poor, unskilled farmers driven by hunger and poverty to illegally kill wildlife and degrade wildlife habitats. The project changed the microeconomic incentives by improving farmers' incomes and making agriculture more profitable than poaching.⁴ After learning new farming methods, community members were able to diversify their crop production and gain access to new markets, which provided new income sources. Participants were also provided with alternative crop protection and wildlife management strategies, including loading their guns with chili powder instead of bullets to guard agricultural lands from crop-raiding elephants.

Income Generation Activities

Community members were organized into producer groups around a local depot that exports products to a regional community trading center—Conservation Farmer Wildlife Producer Trading Centre or CTC. The CTC and local branches are limited companies that maintain community ownership but benefit from qualified external management. The CTC processes, packages, and markets goods as environmentally friendly products, sold under the COMACO brand name, "IT'S WILD!". Profits are distributed to the producer groups, providing incentives to sustain farmer compliance of conservation targets.

To retain membership within the producer group, farmers must adhere to both community land use plans and production practices that promote wildlife and watershed conservation.⁵ The model's long-term success depends on its capacity to self-finance its interventions and attract an increasing proportion of the community interested in a lucrative trading center and maintaining conservation compliance.

Synergistic Land and Resource Management

COMACO's land management philosophy promotes increased synergies between a diverse group of crops and wildlife. Specific examples include:

"It has been hard work but now hundreds of farmers are realizing the value of keeping trees and protecting them from fire. I have felt such pride in the producers for the way they have changed their practices and it makes me so happy to see them make a better living from conservation."

—Gilbert Botha, Mfuwe CTC
bee-keeping manager



Preparing tree leaves for mulch and nutrient uptake by soil.
© Marcus Bleasdale

Zero tillage is a technique aiming to enhance and sustain farm production by conserving and improving soil, water and biological resources. It maintains a permanent or semi-permanent organic soil cover (e.g. a growing crop or dead mulch) that protects the soil from sun, rain and wind and allows soil micro-organisms and fauna to take on the task of "tilling" and soil nutrient balancing—natural processes disturbed by mechanical tillage.

- Recurrent use of compost in the same planting-holes to improve soil microflora and sustain nutrient regeneration for improved crop yields. This reduces the need to clear new land or invade potential wildlife habitat.
- Inter-row mulching of crop residues to suppress weed growth and reduce soil loss from first rains, thereby increasing incentives not to burn fields.
- Crop rotation with a legume—such as groundnuts or soybeans—to increase soil nitrogen fixation for next-year's crop, thereby contributing to sustained yields. Crop rotation also decreases the need to clear farmland or potential wildlife habitat in order to expand cultivable surfaces and reduces the use or need for pesticides, which were traditionally purchased using funds from poaching or other environmentally destructive activities.
- Use of selected agroforestry species—e.g. *Gliricidia sepium*—to complement compost as a top-dressing. These can be pollarded to hasten tree growth to meet farmer requirements. Maintaining soil fertility by using fertilizer trees reduces the need to clear more land for production and lowers fertilizer costs.

COMACO adopted various practices—either introduced as technological innovations or identified by communities—to lower crop loss from wild animals or birds. These include:

- Solar-powered electric fencing: When wild animals consume or destroy crops, frustrated communities respond with snaring and other mechanisms that threaten wildlife. Though it is expensive (about \$2,500 for a typical area) an electric fence provides an immediate and effective barrier against large crop-raiding mammal species. Electric fencing also defines farming boundaries and reduces the likelihood that farmers will impede on wildlife habitat, rather encouraging intensified crop and soil management practices to sustain agricultural output in the enclosed perimeter.
- Bending sorghum plant stalks when seeds are maturing significantly lowers the incidence of bird and wildlife crop damage.
- Planting locally adapted paddy rice and soybeans instead of cotton: The CTC did not market or promote cotton cultivation because of its adverse effects on soil nutrient depletion and wildlife habitat. COMACO selected a local variety of “wildlife friendly” rice, generally referred to as Chama rice, which has a pleasant taste, produces high yields, and resists breakage during polishing. It matures in about four months, requires relatively low labor inputs, and has minimal impact on wildlife or habitat. The rice has value as food and as a cash crop and does not cut into the time needed to grow primary food crops, such as maize or sorghum. To date, Chama rice has not been affected by pests or disease. In 2003, the CTC introduced soybeans as a second “wildlife-friendly” cash crop; when rotated with maize, soybeans help maintain soil fertility and increase food security.
- Planting cassava: When grown near farmers’ homes so it is easily protected from wildlife, well-tended cassava plots provide a low-cost solution during food shortages, thus reducing the need for wildlife snaring.

RESULTS

- Since 2001, over 61,000 farmers have learned and adopted conservation farming and composting techniques.⁶ In 2006, approximately 25,000 km² had been covered.⁷
- For outcomes assessments, COMACO defines food security as having enough food to reach the end of March when families are once again able to eat from their current year's planting. Records from 17,079 farmers in 2009-2010 show that 74 percent had grain stock sufficient to last through March 2010, and 80 percent had food stocks until February 2010. This represents an increase from only 44 percent in March 2001, when rains were below average and COMACO was not operating. These results suggest that COMACO farmers are less vulnerable to food shortages, as compared to pre-COMACO conditions, when maize was the predominant grain consumed.⁸
- Participating farmers achieved a 19 percent increase in maize yields when using composting and other conservation farming methods. Households were able to add approximately 150 additional kilograms to their family food reserve.⁹
- An estimated 79 percent of households continued practicing conservation farming after maize supplementation (the exchange of maize for traps and snares) ended.¹⁰
- In 2003, the CTC started buying and selling rice, village chickens, honey, and groundnuts, representing commodities produced by the majority of households. By 2004, the price each producer received for these commodities had increased from 37 to 108 percent from the pre-COMACO prices.¹¹
- In 2008, surplus commodities sold under the “IT'S WILD!” brand provided more than \$500,000 in revenues.¹²



Turning crop surplus into value-added products for "IT'S WILD!" brand. © Marcus Bleasdale

- COMACO has recovered, through voluntary surrender, more than 50,000 snares and 1,700 firearms previously used to illegally kill wild animals. To date, over 600 former poachers—many of whom once hunted elephants—adopted alternative livelihoods and surrendered their firearms. About 90 percent of COMACO's participating poachers graduate from the training program and find alternative livelihoods.¹³
- Income diversification beyond on-farm sources includes a variety of activities. Bee-keeping has been actively promoted by the project, with over 4,644 top bar hives in use as of April 2010.¹⁴ COMACO is the primary buyer of honey in the Eastern Province and is a partner with the Zambian Government in building up local capacity to manage forests for honey production. As of April 2010, COMACO had approximately 2,850 registered bee-keeping producers. Honey production is almost doubling per year as producers increase their hive numbers and as more producers join COMACO.¹⁵
- In the 2008-2009 season, 2,526 households were actively involved in poultry production and egg sales using the COMACO vaccination and husbandry program. A total of 200 vials of vaccine were distributed, indicating adherence to COMACO practices.¹⁶
- COMACO fish farming is another popular activity among reformed poachers. Seventy-eight new households joined the project in 2008/2009 season, bringing the total number of COMACO fish-farming households to 972.¹⁷
- WCS estimates that by removing snares and firearms from the area, COMACO helped save more than 6,000 wild animals across the Luangwa Valley, including species such as elephant, giraffe, zebra, wild dogs, lions, impala, and waterbuck. Aerial wildlife censuses from 1999, 2002, and 2004 found that sampling block population increases outnumbered declines by a factor of 1.55. 2006 was a year of record flooding in Luangwa Valley, which killed thousands animals, but since 2007, numbers have been rebounding, with a rapid increase in the populations of different species.¹⁸ COMACO helps reduce the law enforcement and patrol costs for the Zambian Wildlife Authority through addressing the underlying causes of poaching.¹⁹

FOR MORE INFORMATION

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ENDNOTES

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Poacher stalking wildlife. © Marcus Bleasdale