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Increasing Agricultural Productivity through Expanding the Use of Conservation Farming Techniques

Poverty. Hunger. Disease. Unemployment. Illiteracy. All of these conditions exist in Zambia, a country in south-central Africa, and all of these issues have intensified as a result of the global economic recession of the past year. This paper will focus on the first two of these issues; poverty and hunger; and specifically on increasing agricultural productivity and improving food security through the reversal of natural resource degradation and the adaptation of agricultural methodologies to water scarcity and climate change.

Recent trends in Zambian population migration indicate an alarming exodus from small rural villages to major urban areas, making Zambia one of the most urbanized countries in Africa. Having one of the lowest population to land ratio's in Africa, this migration has created massive tracts of uninhabited land throughout the country. It is estimated that over 20% of Zambia's 11.1 million inhabitants now live in the capital city of Lusaka, with another 20% concentrated on the Copperbelt to the north of the capital city. History has taught us that the urbanization of any society brings new challenges to both the rural and urban populations, and Zambia is no exception to this lesson. This paper will examine the challenges of the existing rural population as seen through the eyes of a "typical" smallholder farmer in Zambia.

With three distinct agro-ecological regions in Zambia (using rainfall as the dominant factor distinguishing the three), it is beyond the scope of this paper to elaborate on each area. Consequently, our focus will be on the subsistence farmer residing in the central part of the Luangwa valley – the region that receives the lowest, most unpredictable and poorly distributed rainfall, and where a change in farming techniques would have the highest impact on both output and the lives of the inhabitants.

Our "typical" family has been hit hard by the political and economic events of the past few years. The rising cost of farm inputs (such as feed and fertilizer) from 2004-2008 forced the male head-of-household to migrate to the capital city in search of gainful employment, leaving behind his wife and 7 children, who must now depend on the wife's ingenuity to generate cash and support her family. She is one of the 76% of Zambians that live on less than \$1/day – well below the recognized poverty line. Although she desperately would like her children to receive an education to better their economic future, the usury fees for uniforms and books, as well as the various school funds to which parents must contribute, are more than her budget can accommodate. In addition, the labor-intensive demands of farming require the efforts of all family members just to ward off starvation. As a result, each of her seven children will attend school for only an average of about seven years.

With *Nshima* (a food cooked from plain maize – with much the same consistency and taste as rice) being the main staple on our family's diet, it is imperative that they grow maize on their 1.64 hectares (a little over four acres) of farmland. Some of their distant neighbors with larger farms also grow tobacco and cotton, which are the main cash crops of the region. However, those neighbors are part of the lucky 10% of Zambian farms that also own cattle which are using in farming, allowing them to cultivate almost twice as much land as our family. Mechanized farming methods are employed only by commercial farmers, which constitute just 1% of the population. Since our family owns no cattle, they

must either borrow or rent cattle from their distant neighbors or work the farm with hand hoes. Like 60% of other smallholders in Zambia, they really do not have access to the cattle of their distant neighbors, so the only option open to them is to farm with hand hoes.

We have touched on many of the issues facing our “typical” sustenance farming family, but to summarize, they are:

1. Inadequate and/or unpredictable rainfall
2. High cost of farming inputs
3. Labor intensity of farming techniques employed

I now propose that we add another, previously unmentioned, problem facing our family – the decreasing output of their land resulting from soil erosion, the previous overuse of chemical fertilizers (which were government subsidized until the mid 1990’s), and extended planting of just one crop. The balance of this paper will address solutions to the issues listed above.

My research indicates that these issues have all been studied (repeatedly) by various organizations, each arriving at similar conclusions and recommendations. As a result, I cannot claim ownership of these suggestions, but rather will attempt to summarize and update on those that I determined have the highest probability of sustained success.

An excellent discussion paper written for The International Food Policy Research Institute in 2003 by Steven Haggblade and Gelson Tembo entitled Conservation Farming in Zambia examined many of the issues noted above and how farmers were impacted through the implementation of conservation farming techniques in the preceding 10 years. Their (qualified) conclusion was that implementation of these techniques (summarized below) were successful in terms of raising production levels on the land being farmed utilizing conservation farming techniques. The impact was most pronounced for hand-hoe farmers in geographical areas with limited and/or sporadic rainfall. The five principal practices (as stated by aforementioned authors) are:

1. Retention of crop residues in the field, with no burning of residues
2. Restricting land tillage and nutrient application to the 10-15% of surface area where crops are sown
3. Completion of land preparation during the dry season
4. Establishment of a precise and permanent grid of planting stations, furrows or contoured ridges within which successive crops are planted each year and within which purchased organic nutrients can be accurately applied
5. Rotations with nitrogen-fixing legumes

Some impediments to the ongoing success of conservation farming are:

1. Acceptance and management of increased labor-intensive activities (soil preparation and weeding) during the early years of implementation

2. Adoption and disadoption rates of soil conservation techniques among various groups
3. Proper use of tools among those farmers utilizing animal-drawn farming techniques

All of these “problems” could be addressed, and even eliminated, through the effective dissemination of information to farmers throughout the country. This would need to include everything from a discussion of the long-term benefits of implementation to demonstrations of the proper use of tools to an explanation of what to do with surplus goods produced.

In 2008, an extensive study implemented by A.R. Mann Library, Cornell University and funded by the Bill and Melinda Gates Foundation entitled Building Pathways out of Rural Poverty through Investments in Agricultural Information Systems examined this exact issue (the effective dissemination of information to farmers). Their outcome was a set of recommendations for areas of investment that they felt had the potential to improve the lives of smallholders through better access to agricultural education, training and information. My initial reaction after reviewing their recommendations was one of, “Whoa...let’s teach them to walk before they run” as well as “Ugh – just what they need – more highly-paid foreigners creating beaucroatic agencies to tell them what to do.” I say this with the utmost respect for all parties involved in the study, as I’m sure they had the best of intentions and worked endless hours to arrive at their recommendations. Nonetheless, at this time I cannot concur with their recommendations, most of which involved the establishment of new project teams, each needing coordinators, grant administrators, technical advisors, etc, etc.

As I planned my own approach to solving this issue, I kept the following objectives in mind:

1. Local ownership of the problem/solution was mandatory in achieving long-term success
2. The solution had to be transferable to all geographic regions of the country
3. The plan had be economically viable in the long-term to diminish the area’s need for foreign assistance
4. The solution must improve the economic well-being of the Zambian sustinence farmer with the ultimate goal of enticing the urban migrator back to the rural areas; thus increasing land utilization rates to feed the country’s growing population – both urban and rural

Further research revealed that a solution which encompasses all of the objectives outlined above ALREADY EXISTS in Zambia. COMACO (Community Markets for Conservation) operates **through a** community-owned trading center, registered as a non-profit company, called the Conservation Farmer Wildlife Producer Trading Centre. COMACO has evolved from the idea that the aid-dependent rural poor in Zambia could partner with a company to sustain their livelihood. In exchange for agreeing to use conservation farming techniques, farmers receive help in the areas of access to farming inputs, education to improve their farming skills, and a high market value for the goods they produce.

Their first year attempt (2003) to provide local assistance was a financial disaster. They were unable to sell their product to local traders or millers at a price that covered the price paid to farmers plus COMACO’s transaction costs. They realized that they would need to process the commodity into a

value-added product that would cover their costs, or their model would not work. In 2004, with the help of charitable donations, they sold their first packaged rice products. Farmers sold 60 tons of rice in 2004 through COMACO. By 2007 that number had increased to 300 tons, and is forecast to increase to almost 1000 tons of commodities ranging from soybean, groundnuts, rice and honey produced by over 30,000 farmers. COMACO has established three Community Owned Trading Centers with 36 trading depots in rural communities. These depots assist the farmers in dealing with the Community Owned Trading Centers, as well as providing local farmers with the necessary training and education to improve their conservation farming skills.

COMACO, however, is still at risk for failure, as it is not yet financially viable and receives much aid through its various partners. They are, however, working with their partners on a business plan to achieve financial sustainability by 2010 or 2011.

From everything that I have researched, COMACO seems to have an ideal plan in place to begin attacking the poverty problem of the sustenance farmers in Zambia. It has the added benefit of being a “green” company that focuses on techniques that are environmentally-friendly that can be implemented by local people to all geographic areas of the country and beyond, helping to improve the standard of living of all who chose to participate. However, exportation of the organization to other areas will require financial assistance during the first few operations. My final discussion point and conclusion will center on how to obtain this funding.

As previously mentioned, a countless number of organizations have undoubtedly spent hundreds of millions of dollars researching the problems of poverty and food production in Zambia alone, not to mention the millions that have been spent in other countries. It seems that each organization conducts its own research and fact-finding mission, charging its team to come up with an analysis and recommendations for improvement. Although each study has a slightly different twist to accommodate the specific funding organization, the conclusions and recommendations of each group are all very similar. To the cynical outsider it would appear as though the organizations are more interested in providing jobs to its team members than in actually solving the problem(s) being studied. At best, the various international organizations are not working together as a cohesive team to build on each other’s work and findings.

Imagine the progress that could be made if, instead of funding new grants to research the same issues, the money used to fund these grants were spend on expanding the geographic presence of COMACO or a similar non-profit company! The problems and solutions are suffering from analysis paralysis! I say no more studies! It is time for implementation! Organizations such as the Cooperative League of the USA, World Vision, the Land Management and Conservation Farming Project, the Catholic Archdiocese, Development Aid from People to People, Care, Africare, the Bill and Melinda Gates Foundation and countless others have funded, and continue to fund various research projects in this field. We should be assisting COMACO in taking the necessary steps to “sell” their organization and its proven results to these same organizations in an effort to obtain the necessary short-term funding to expand their activities into various other regions in Zambia – and beyond. This is a call to action for everyone involved in world hunger. Only by working together, not just with other members of “our” team, but with ALL teams from ALL organizations can we hope to address the issues of global poverty and hunger – in Zambia and beyond.

Works Cited

- Allen, Dwight W., and Mary A. Ochs. "World Ag Info Project." *WorldAgInfo*. Cornell University, Feb. 2008. Web. 7 Sept. 2009.
<<http://worldaginfo.org/files/WorldAgInfo%20Final%20Report%20Web.pdf>>.
- Haggblade, Steven, and Gelson Tembo. "Conservation farming in Zambia." *Repec.org*. 2003. Web. 20 Sept. 2009. <<http://ideas.repec.org/p/fpr/eptddp/108.html>>.
- Kimbhi, Ayal, and Dennis Chiwele. "Barriers for Development in Zambian Small- Medium- Size Farms." *Harvard.edu*. Web. 12 Aug. 2009.
<<http://www.cid.harvard.edu/archive/events/cidneudc/papers/zambia2.pdf>>.
- "Nshima and Ndiwo are the Most Important Pair of Staple Foods among Zambians in Southern Africa." *Bridgewater.edu*. Web. 15 Aug. 2009.
<<http://www.bridgewater.edu/~mtembo/nshimachapter1.htm>>.
- "Zambia - Agriculture." *Nationsencyclopedia.com*. Encyclopedia Of the Nations. Web. 21 Sept. 2009. <<http://www.nationsencyclopedia.com/Africa/Zambia-AGRICULTURE.html>>.
- "Has Zambia's Farming Systems Research and Extension (FSR/E) approach to agricultural expansion facilitated sustainable development?" *Colby.edu*. Web. 25 Aug. 2009.
<<http://www.colby.edu/personal/t/thtieten/ag-zam.html>>.
- "Region: Sub-Saharan Africa." *Earthtrends.wri.org*. Earth Trends. Web. 1 July 2009.
<<http://earthtrends.wri.org/povlinks/country/zambia.php>>.
- "Zambia - Urban Families." *Family.jrank.org*. LAURE/LAURE COMMUNICATIONS. Web. 11 Aug. 2009. <<http://family.jrank.org/pages/1784/Zambia-Urban-Families.html>>.
- "Zambia." *Zamstats.gov*. Web. 24 Sept. 2009.
<http://www.zamstats.gov.zm/media/chapter_1_background_-_final.pdf>.