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Zimbabwe: Management of Water Scarcity to Improve Productivity of Rural Farmers

Few nations have experienced and survived more disasters than Zimbabwe: it has been marred by years of political instability and upheaval, from its independence to President Mugabe's controversial election. Despite the new coalition government's recovery programs, Zimbabwe still battles high unemployment rates. Zimbabwe's economy is stabilizing after a period of hyper-inflation in the past decade, but staggering numbers of people are still without jobs or means to provide for basic necessities. Although Zimbabwe was once considered the breadbasket of sub-Saharan Africa, economic crises have greatly reduced its commercial production, and agriculture has been on the decline. Only a fraction of the population has access to clean water, and racial tension and a high HIV/AIDS prevalence rate contribute even more to food insecurity. But agriculture-led economic growth is perhaps most complicated by the frequent and devastating droughts that destroy livestock and crops, putting hundreds of thousands under the threat of starvation. With over 70% in poverty in some areas, Zimbabwe is in desperate need of new initiatives to boost agricultural productivity. To alleviate the state of food insecurity and to revive Zimbabwe as the agricultural breadbasket it once was, water scarcity and other barriers such as racial tensions must be addressed. In these aspects, foreign intervention and international research are key to solving the problem in Zimbabwe.

In the late 1900s, Zimbabwe was the paragon of African development, boasting one of Africa's highest literacy rates ("Zimbabwe"). The population had access to free education, health care, and a rich mineral deposit that sustained Zimbabwe's economy throughout the 20th century (Richardson 541). However, in 2000, the government initiated a land reform policy that forced white commercial farmers to give up their land, which was then redistributed to the vastly unskilled black population (541). This sudden displacement of commercial farmers led to a steep decline in agricultural production, and the agricultural sector never fully recovered. Racial tensions rose while the economy fell, and to escape rapidly deteriorating economic conditions, millions emigrated to nearby countries. Drought and shortage of labor have resulted in 50% reduction of yield ("Zimbabwean agriculture"). Today the Zimbabwean economy is slowly picking up: production of commodities such as tobacco and milk is rising, though it is still only a shadow of Zimbabwe's original prosperity ("Can Robert Mugabe").

The majority of the population of Zimbabwe make a living from subsistence farming. The traditional practice of living with the extended family of up to three or four generations persists in rural areas, with an average of about four children per household (Foster 158). A typical subsistence farm produces just enough corn, wheat, or other crops on five acres or less of land to feed a family. Surpluses are rare. Even though nearly three quarters of Zimbabweans are farmers, agriculture disproportionately accounts for only 20% of their GDP (United States); however, these farms are hardly reliable in times of drought. Located in a dry sub-tropical climate, Zimbabwe experiences recurrent droughts while severe storms are rare, and farmers are constantly threatened by water scarcity. With marginal harvests, droughts can easily push a family into facing the danger of starvation.

Since the collapse of the Zimbabwean economy malnutrition has increased. The International Food Policy Research Institute (IFPRI) states that Zimbabwe was one of the few countries that actually experienced an

increase in their Global Hunger Index from 1990 to 2010, indicating that their hunger situation is worsening (“2010 Global Hunger Index”). In addition, production continues to shrink: successive droughts, poor investment in agriculture, and ineffective water management in Zimbabwe greatly threaten productivity. The land relocation and subsequent economic collapse of the past decade have led to rampant unemployment, as hundreds of thousands of jobs were lost as a result of declining agricultural productivity.

Zimbabwe’s staple consumption grain is maize, although sorghum, cotton, and tobacco are also primary commercial crops. The annual yield of these commercial crops is directly related to rainfall conditions during the growing season. Water is the basis of life and the cornerstone of agriculture. Scarcity of water greatly limits agricultural production, which, in turn, has a negative impact on the economy. In 2001, Zimbabwe experienced a period of severe drought during the summer, leading to a 9% decrease in summer yield for subsistence farmers, causing food shortages that affected most the vulnerable small farmers in central and southern areas (“Zimbabwe: Drought”). Smallholder farmers in Zimbabwe farm less than 20% of adequate farming land; instead they are forced to occupy up to 50% of regions that are subject to frequent droughts and lack suitable rainfall for agriculture, even without access to irrigation (FAO). Access to water is fundamental in subsistence farming—without water there would be no crops. Before problems such as market access or food processing can be solved, water scarcity must be addressed.

The lack of water in Zimbabwe is already a severe problem, damaging agricultural yields and hurting small farmers, and scientists speculate that climate change will lead to an increase in the severity and frequency of droughts. A study by the National Center for Atmospheric Research concluded that climate change will result in much drier conditions for most of Africa within the next nineteen years, including reduced rainfall and amount of surface water (Dai). A warmer climate holds dire implications to Zimbabwe’s economy, which is heavily dependent on agriculture. Zimbabwe is not a major contributor to global warming, nor does it have the resources to purchase or develop technologies needed to reduce emissions. Instead, “developing policies and programmes to address to impact of climate change” is more important for developing countries like Zimbabwe (Climate Institute). But for the industrialized world, combating climate change is one of the most effective ways to ensure environmental sustainability in the future, for Zimbabwe and for all agricultural economies. Although many developed nations have already taken steps to reduce emissions, incentives for international organizations to develop and implement clean alternative energy for rising nations are needed in order to establish good ecological practices from the start, rather than spending time and resources in overhauling destructive sources of energy later.

According to the United Nations, less than half the potential access to water is used for irrigation in smallholder farms. Private sector irrigation companies “are limited to major city centres, which are not close enough to communal areas to provide back-up services to smallholders” (FAO). Irrigation of crops is a source of food security for subsistence farmers, but current management of smallholder irrigation schemes is inefficient in finance and maintenance. Especially because the high cost of irrigation technologies makes them inaccessible to many small farmers, poor irrigation schemes are economically damaging to subsistence farmers. These systems generally produce low-quality crops that are not profitable at competitive markets; however, proper and effective irrigation schemes can generate income for individual farmers, thus contributing to the economic development of a nation.

New, more efficient, and cheaper irrigation technologies should be developed for smallholders to be successful in a climate hostile to horticulture. Zimbabwean farmers themselves are incapable of researching new technologies financially, so international corporations and other organizations need to intercede on behalf of smallholders. International research agencies should begin or expand research into cheaper yet efficient irrigation technologies, funded by organizations such as the World Bank. These organizations need to work with subsistence farmers in Zimbabwe in implementing new irrigation practices and educate farmers on the proper operation and maintenance of these items.

Norman Borlaug, father of the Green Revolution, faced conflict and compromise in his mission to bring new, more productive seeds to the Indian poor. Only through collaboration with the Indian government could he successfully bring change to India's agricultural economy (Schaffer). Although many of Zimbabwe's problems can be solved through technology and innovation, scientists cannot stand alone in a social environment, and certain aspects of society must be addressed before agriculture in Zimbabwe can be improved. The relocation of white farmers in 2000 that redistributed commercial land to poor communal black farmers created an agricultural community in Zimbabwe that lacked the proper skills to farm effectively, driving down production and economy. Training and supervision of subsistence farmers are just as vital to success in subsistence farming as research and development.

In rural families, women and children are affected most during drought. Women, in traditional domestic roles, generally stay home and share limited food with children while men may work in nearby towns. Although men are perceived as the farmers of the community, women often put just as much, if not more, labor into subsistence farming, in addition to household activities; however, women—especially mothers—are more vulnerable to malnourishment during drought because they must provide for their children in addition to themselves. In Kenya, women must travel over five kilometers to find water in dry seasons, a trip that frail children are unable to make (“In Drought”). Women and children in Zimbabwe face the same challenge: accessibility to clean water in these areas could mean the difference between harvest or hunger. The non-profit organization Aga Khan Rural Support Programme (AKRSP) in India found that women were more capable of handling conflicts and enforcing rules and “have also been more effective than men in ensuring that water is not wasted and that irrigators do not take water out of turn.” The success of AKRSP in India demonstrates that “involving women is not only a question of empowering them, but also of managing community irrigation more efficiently, effectively and equitably” (“India”). The intervention of non-governmental organizations in developing countries have largely improved irrigation and water management practices, and the integration of women in irrigation and farming can only be beneficial. Organizations like India's AKRSP should be brought to Zimbabwe to teach and train women in farm work. Most existing agricultural programs target men, but to be successful, Zimbabwe must redirect its focus to supervising the roles of women on smallholder farms. Furthermore, the UN's Millennium Development Goals emphasize empowerment of women, making it clear that countries need to recognize the importance of implementing policies and incentives that strengthen women's roles in irrigation, bettering their position in society and future needs as well.

Current irrigation schemes in Zimbabwe draw water from old reservoirs and dams in dire need of repair. Farming communities need to develop plans and work together to repair mechanisms that control their sources of water. An example of the success of such an effort is evident in community of subsistence farmers in Banga, Zimbabwe. They were able to rehabilitate a local dam, assuring families of clean water and forming the basis for further food security through irrigation and water management (von Kotze).

In times of drought small farmers downstream of large commercial companies may face water shortages do to the “priority date” water allocation system that benefits only a few farmers. A study by the Food and Agricultural Organization of the United Nations reported that irrigation schemes managed by the farmers themselves generally experience greater economic and agricultural success than those managed by the government (FAO). Communities within Zimbabwe, as well as international organizations, should put pressure in the Zimbabwean government to allow more autonomy in irrigation management, transferring power to smallholder farmers and increasing agricultural productivity.

New wells and pumps can be built to supplement further water used in irrigation. Groundwater levels are still relatively unknown in Zimbabwe, so there is much potential for new sources of water to be discovered (Climate Institute). With few rivers and no natural lakes, Zimbabwe’s most reliable alternative is in underground reservoirs with potential to provide 2,000 million cubic meters per year (“The National Action Programme”). Water is used in cooking and washing as well, so the addition of new sources of clean potable water also reaps benefits such as improving sanitation in rural areas and, in turn, promoting healthier living.

Collaboration within Zimbabwe alone cannot completely prevent the threat of drought; international players must act to improve agricultural yields as a whole. Governments and international organizations should encourage through funding the research and development of drought-resistant strains of seeds. Large international organizations would benefit in opening new markets in sub-Saharan Africa, where drought is persistent and water scarcity is an always-prevalent problem. New, hardier plant varieties are in high demand considering climate conditions in Zimbabwe. US-based companies such as Monsanto have already imported and tested genetically-modified drought-tolerant maize in South Africa (Monsanto). According to a study by the International Maize and Wheat Improvement Center (CIMMYT) based in Mexico, implementation of drought-tolerant crops boosted yields 25% (Cocks). Crops that more use water efficiently are more viable to farmers in dry areas. In addition to improving productivity, modified plants would take pressure off the farmer to procure enough water for his crops. Genetically-modified crops suited to harsh climate conditions in Africa have great potential to increase yield and stimulate agriculture; more research is needed to investigate consequences of transgenic plants on ecosystems and human health.

The Millennium Development Goals clearly address causes of food insecurity and barriers to agriculture-led economic growth, and they seek to diminish poverty through environmental sustainability, empowerment of women, and enhancements in agriculture. In reducing water scarcity in Zimbabwe through new technologies and water management, the condition of the poor in rural areas can be greatly improved. While Zimbabwe still faces the aftermath of a damaging land redistribution act, targeting women in agriculture can have profound effects on production, including better water management and crop yields. The changes that both communities within Zimbabwe and international organizations should strive for are not difficult nor of great magnitude, yet if successfully implemented, new initiatives can completely turn around a desperate situation for the major contributors to agriculture—the small farmers.

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