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Burundi, Factor 17
**Burundi: Public-Private Partnerships to develop biotechnology that empowers rural farmers.**

In Burundi, the gently rolling hills and lush vegetation are marred by the scars of a country ploughed over by violence, poverty, and starvation. Eighty-nine percent of the population of this mountainous, war-torn country lives in rural areas, and farm for subsistence (CIA). Burundi still ranks as one of the worst countries in Africa for malnutrition. "Only twenty-eight percent of the population is food-secure and as many as 60 percent are chronically malnourished. Food security for the majority of Burundians has not improved in recent years" ("Burundi"). The International Food Research Policy Institute stated in 2010 that food insecurity in Burundi was compounded by the continuing violence that plagues the country (Grebner *et al*). Ever since Burundi was granted independence from UN-Trusteeship and Belgium in 1962, it has been crippled by bouts of ethnic violence that have torn the country into pieces. When Belgium took over the country in 1916, they believed the population would be easier to govern if they were divided into ethnic groups. They separated the Tutsis – a taller people – from the Hutus, and gave them power. The Belgians believed that the Tutsis sometime in the distant past had migrated from Europe and were racially superior.

The Hutus account for around 80% of the population, the Tutsis account for another approximately 19%, and the pygmies or Twa round out Burundi's ethnic cross section (CIA).
In 1993, the traditional ethnic strife between the Hutus and Tutsis erupted in a bloody genocide that has been all but forgotten because of the powder keg it ignited in neighboring Rwanda in 1994. Two hundred thousand people died during the Burundian genocide. Because hunger breeds discontent and Burundi has so many food insecure citizens, its situation is still fragile, causing worries of more violence. Food insecurity drives discontent with the government's inability to provide a stable environment for prosperity. This in turn leads the poor Hutu majority to support the radical Hutu-backed National Liberation Force which in turn destabilizes the government. This then, fuels more violence in an already impoverished and unstable country.

Almost 90% of the 10.2 million (CIA) people scratch a meager living out of the ground around them by growing bananas, plantains, manioc, beans and maize. Sadly, Burundi's agricultural productivity has gone from bad to worse in the face of population growth. Burundi's population has been growing at approximately 3% annually (CIA) while in the past eighteen years; food production per person is down 24% ("Burundi") Burundi has the potential and the natural resources to become a self-sustaining country with a thriving economy. Burundi's chief exports, coffee and tea, are small bright lights on the dark horizon that is Burundi's apparent future. However conflict, poor farming practices, and soil erosion are responsible for a 30% drop in the total amount of food produced in Burundi, leaving many people dependent on international aid ("Bureau of African Affairs – Burundi").

Current aid to Burundi is undermined largely by ethnic and socioeconomic tensions as well as environmental problems like soil erosion and crop diseases such as the banana blight. The Burundian government has shown an inability to combat corruption and promote prosperity– ranking as the third worst country in the world to do business in as well as one of the least competitive countries studied second only to Angola and Chad. ("Burundi: Economy"). If Burundi is to reach a place of peace within its own boarders and maintain economic stability, its people must be fed. That food insecurity is, in part, a result of the international failure to develop comprehensive bio-safety protocols for indigenous crops. In addition, the international community appears disinterested in finding native crops and working to modify them to be more easily grown by poor subsistence farmers. "The anti-genetic modification stance in European Union (EU) nations influences policy among African governments" (Takeshima). In essence,

the EU has exported its bias against genetically modified crops overseas to places like Burundi where they are needed most.

Many of the problems in Burundi caused by food insecurity could be prevented if current technology were made available to them. For instance, a blight is attacking banana farms across the country. IRIN News reports that,

> A disease affecting banana plants has spread to five provinces of Burundi, raising concern among agricultural officials, who fear the disease could hit the country's food security… Banana plants cover the biggest cultivated areas and represent more than 60 percent of the population's income. If the banana is affected [by this disease], it will not only mean great problems for farmers but also a socio-economic problem for Burundi ("BURUNDI: Banana Blight Threatens Food Security").

With hunger already a rising concern in Burundi and a factor driving social instability, it is vital to pursue all available avenues to alleviate the problem. It is shocking to see then, that biotechnology that could stop the banana blight is trapped in laboratories. "For example…[genetically modified] bananas resistant to two devastating diseases in Rwanda and Burundi have been developed in Belgium. Because of the lack of bio-safety protocols, the transformations remain in the laboratory" (Naylor *et al*). In addition to the developments in Belgium, other universities and research institutions have pursued research into Banana plants because they are a primary food source not only to Burundi but to as many as six-hundred-thousand people (Arinaitwe *et al*).

Several factors are preventing companies from divulging patented biotech material to impoverished nations. First, there is a lack of a bio-safety liability scheme that protects the company providing the information from any repercussions that may result from the work of other organizations on their crops. In addition, companies and universities are loath to part with their technology because of a lack of international laws protecting their intellectual property rights.

A study published in the *Journal of Agrobiotechnology Management & Economics* points out that,

> Multinational seed companies, such as Monsanto, Pioneer, Syngenta, or Bayer, may also hesitate to sell their products in countries with no regulatory system simply because they consider it a bad business practice or are afraid of any liability issues that may arise emphasize that similar bottlenecks apply to patents held by universities (Takeshima).

Until there are international laws in place to secure the investments and intellectual property of firms that spend large sums of money to develop advanced biotechnology, this technology will not reach the hands of farmers in marginally developed countries like Burundi.

The majority of research in the current system is focused on industrial row crops like corn, rice, wheat, and soybeans. While advancements in these crops are still important and helpful, genetically modified industrial crops see limited usefulness in areas like Burundi where families still farm for subsistence. A major part of the problem is the lack of research funding. "Neither the nor the private sector has invested significantly in genetic technologies in the more diverse minor or 'orphan' crops that are often critical in the world's most disadvantaged regions. Because orphan crops occupy smaller areas and have more limited markets, they are rarely a target of advanced science" (Naylor *et al*). Public-private partnerships, partnerships where government funds spur private research and development, need to be established to provide funds for genetic research to local, underutilized crops like cassava, bananas, finger millet, yam, and various other roots and tubers. These crops can provide a substantial increase in the living quality of local farmers that depend on them. If the international community decides to back research and

development, many catastrophes like the banana blight could have been averted.

The world's poorest regions are typically those where agricultural investments by the public and private sectors are extremely low. There is an urgent need for mechanisms to enhance agricultural development [for] poor agrarian societies (Naylor *et al*).

Agricultural investments are imperative to countries like Burundi where families are dependent on farming for a livelihood. If a season's crop fails in a region, the inhabitants of that region will be left without any source of income until the next season.

The solution to food insecurity in Burundi must be multi-faceted. New investment into underutilized crops must be made while current genetic research is simultaneously made more available. Attempting to make research on orphan crops more practical will require that public funds be made available for research purposes, and liability laws will need to be reformed so companies are not punished for sharing technology, and finally bio-safety protocol should be adapted to lower transaction costs to adjust for the lower levels of funding for orphan crops.

Biotechnology programs being developed and promoted in Dutch, Swiss, and US aid agencies are contributing to progress in orphan crops. Special programs and new incentives within the scientific and development communities should be further encouraged to achieve widespread spillover benefits for poor farmers (Naylor *et al*).

While current aid organizations in the US and elsewhere are contributing to progress in orphan crops, more funding is desperately needed. This will likely require a change in the type of research and the methods being used. Individual crops have traditionally been targeted by research singularly. However, doing this for orphan crops is not feasible because of their large numbers and lower agricultural potential. Orphan crops encompass a broad range of plants and are more targeted to specific environments and cannot be farmed in the same way as corn, soy, rice and other industrial crops. A pivotal study assessing the feasibility of orphan crops states that "Justifying significant investments in orphan crop improvement requires a shift in investment from individual crops to whole sets of crops with common genetic structures" (Naylor *et al*).

Once these new, sturdier crops are developed, another challenge involves actually getting the seeds into the hands of the farmers in need of them. This leads to additional barriers that must be overcome. First, there is an attitudinal barrier in some African nations that dislike genetically modified (GM) crops because of handed-down regulations from the EU. Secondly, international law will need to be reformed to expedite the path from laboratory and testing facilities to the fields of Burundi and other sub-Saharan African (SSA) countries.

Whether the new GM orphan crops are introduced into SSA countries hinges on how GM crops are perceived by SSA farmers, consumers, and stakeholders, as well as by countries importing agricultural commodities from SSA. According to recent studies, negative perceptions by European countries toward GM crops seem to partially influence perceptions in SSA countries. However, these perceptions may change if African stakeholders see how certain GM varieties can help mitigate problems in their own agricultural sectors (Takeshima).

It is imperative that government officials, African stakeholders as well as farmers are made aware of the potential benefits of GM crops. In 1998, a group of African officials from countries including Burundi told a meeting of the Food and Agricultural Organization of the United Nations, "We strongly object that the image of the poor and hungry from our countries is being used by giant multinational corporations to push a technology that is neither safe, environmentally friendly, nor economically beneficial to us"

("Africa Rejects Monsanto"). This stance in Burundi and other countries must change if rural farmers are to benefit from advances in modern biotech in orphan crops.

One avenue for change was identified by researcher, Hiroyuki Takeshima. He notes that the viability of biotechnology increases as efforts are taken to educate governments and people about the benefits that biotech advances in orphan crops can have. Recently in Kenya, the government changed its longstanding objection to importing genetically modified food and is encouraging research into orphan crops. Hopeful signs, however, are scarce. People in countries like Burundi continue to be denied access to technology that could help save their crops from diseases and drought. However, Burundi is an ideal candidate for greater investment in technology because it has comparatively good infrastructure and excellent conditions for agriculture.

The second and final challenge that must be solved is that of international patent law and intellectual property rights.

> "Issues of intellectual property rights and bio safety are not confined to the transfer of science to orphan crops; major crop improvement programs face similar problems in developing countries. From a policy perspective, new programs will need to be developed in the legal and safety areas—in many cases with the help of external aid and consultation—to facilitate the adoption of technology and its use in farmers' fields (Naylor *et al*).

The international community must reform patent and intellectual property rights laws to allow genetic biotechnology to reach its intended audience. Instead of seeds being planted in fields and bearing a yield for farmers in need, they lie on cold, infertile laboratory shelves. Upon overcoming these obstacles through international action, great benefits could be provided as a result of these unused technologies. Countries like Burundi will have access to cutting-edge technology that previously was either nonexistent or locked away in a laboratory. Only when the food supply of the people of Burundi is secure can peace be sought.

For too long, the international community has stood by and watched Burundi tear itself apart. When violence raged through Burundi, no one answered the anguished cries for help. When the violence finally abated, there was no helping hand to bring Burundi out of a political, social, and ethical quagmire. As a result, the country simmered – tension just below the boiling point. Still, even now, it is not safe for some who spoke out against the atrocities they witnessed to return. I have a personal connection to the problems in Burundi. My running coach here, in Austin, is Gilbert Tuhabonye. He is a native of Burundi. Gilbert was at a boarding school in Burundi when the killing started. Because he was a Tutsi, he was targeted by the Hutu mobs. He alone from his school escaped to tell the tale.

The world must stand up and act, rather than sit by passively and watch. If the international community acts to fund public private partnerships and other research into biotechnology for orphan crops as well as streamline the regulatory process for such research to make it into the soil will contribute to the political stability of Burundi. "GM orphan crops are able to benefit their producers and have the potential to support pro-poor growth, which will contribute to poverty reduction" (Takeshima). As hungry stomachs are filled, people will perhaps become more able to set aside their differences and work together towards one end – that of building a stable country. However, until the problem of hunger is addressed, Burundi will likely continue to be crippled by poverty, violence, and ethnic strife.

**Works Cited**


"Africa Rejects Monsanto." *Orpheus Internet*. 1998. Web. 27 July 2011. <http://www.orpheusweb.co.uk/john.rose/africa.html>.

Arinaitwe, G., S. Remy, H. Strosse, R. Swennen, and L. Sági. "Agrobacterium- and Particle Bombardment-mediated Transformation of a Wide Range of Banana Cultivars." *FAO: FAO Home*. Web. 19 Sept. 2011. <http://www.fao.org/docrep/007/ae216e/ae216e0v.htm>.

"Bureau of African Affairs - Burundi." *U.S. Department of State*. 3 June 2011. Web. 31 Aug. 2011. <http://www.state.gov/r/pa/ei/bgn/2821.htm>.

"BURUNDI: Banana Blight Threatens Food Security." *IRIN Humanitarian News*. 22 Apr. 2011. Web. 27 Aug. 2011. <http://www.irinnews.org/report.aspx?reportid=92553>.

"Burundi: Economy." *GlobalEDGE*. Web. 31 Aug. 2011. <http://globaledge.msu.edu/countries/burundi/economy/>.

"Burundi." *Fighting Hunger Worldwide*. United Nations World Food Programme. Web. 9 Aug. 2011. <http://www.wfp.org/countries/burundi>.

Grebner, Klaus Von, Marie T. Ruel, Purnima Menon, Bella Nestorova, Toluope Olofinbiya, Heidi Fritschel, and Yisehac Yohanne. "Global Hunger Index." *International Food Policy Research Institution*. 2010. Web. 19 Aug. 2011. <http://www.ifpri.org/sites/default/files/publications/ghi10.pdf>.

Naylor, Rodamond L., Walter P. Falcon, Robert M. Goodman, Molly M. Jahn, Theresa Sengooba, Hailu Tefera, and Rebecca Nelson. "Biotechnology in the Developing World: a Case for Increased Investments in Orphan Crops." *Food Policy* 44th ser. 29.15 (2004). Web. 1 Aug. 2011. <http://execdeanagriculture.rutgers.edu/pdfs/goodman-091.pdf>.

Takeshima, Hiroyuki. "AgBioForum 13(1): Prospects for Development of Genetically Modified Cassava in Sub-Saharan Africa." *Prospects for Development of Genetically Modified Cassava in Sub-Saharan Africa* 5th ser. 13.1 (2010). *AgBioForum*. Worldpress. Web. 15 Aug. 2011. <http://www.agbioforum.org/v13n1/v13n1a05-takeshima.htm>.

*World Factbook*. CIA, 23 Aug. 2011. Web. 26 Aug. 2011. <https://www.cia.gov/library/publications/the-world-factbook/geos/by.html>.