

Minji Kim
West Lafayette High School
West Lafayette, IN
Burkina Faso, Factor 1: Plant Science

Burkina Faso: Land of opportunities

“The Man with the Golden Brain”, a short story written by Alphonse Daudet, has implications for current situation of Africa. The main character, a man with a golden brain, scrapped gold from his own brain every time he could not pay the money. Eventually, it drove him to death at the end of the novel. The blessing of gold was a curse to him. In the same way, Africa is blessed with abundant natural resources, making it “a land of opportunities” (Essoungou, 2011). There is no doubt that it is a blessed land: dense jungles, wild animals, diamonds, and gold. As a result, exporting those natural resources constitutes substantial portion of most African countries’ GDP. However, this situation has a potential risk to seriously affect economy of the countries and to severely reduce income of the people when the resources are exhausted. If no action is taken to prepare for the future, soon the countries will head for a downfall as the man with the golden brain did. To break the vicious cycle of poverty, developing countries must invest into sustainable industries to feed their growing population. Especially, improving agricultural productivity can be a way to kill two birds with one stone: by ameliorating quality of life as well as improving the economy.

General information

Burkina Faso is a landlocked nation in West Africa which is often referred to as the Sahel region. It is bordered by six countries: Mali, Niger, Togo, Benin, Ghana, and Cote d'Ivoire (UCLA, 2012). In Global Food Security Index¹ (GFSI), Burkina Faso ranked 92nd out of 109 countries, making it one of the poorest countries while the undernourishment rate is as prevalent as 25.9 % (Global Food Security Index, 2014) Burkina Faso is a multiethnic country made up of 40% Mossi, 60% of other ethnic groups such as Gurunsi and Senufo. (Fearson and Laitin, 2006) The official language is French, but 90% of population uses their own indigenous languages like Mooré (CIA, 2014). Despite its highly diverse population, Burkina Faso has been enjoying a relative political stability for the past 20 years compared to other African countries; sum of the civil war probability in percent was only 0.71 over the entire history since its independence in 1960 (Fearson and Laitin, 2006). Furthermore, the stable political condition promise good economic condition for future growth as well. In the economic sector, the government of Burkina Faso is active in funding programs for agricultural development: it is one of the eight African nations which fulfilled its goal in the Maputo declaration² to spend ten percent of its national budget on agriculture (the Star, 2013). Although GFSI indicated that Burkina Faso is one of the poorest countries in the world, it is currently on track of growing. The Gross Domestic Product (GDP) of Burkina Faso is steadily increasing, and spiked to 8 % in 2012. Stabilizing, it experienced roughly 6% of growth rate in 2013 (African Economic Outlook, 2013). Although the increment in GDP bodes well for the economy, a structural problem must be overcome for further growth; a heavy dependence on mining and cotton industry. Recently, mining industry has contributed to its GDP as overwhelmingly as the cotton industry, which has been the chief export since the colonial period in the 1900s (The World Bank, 2013). However, mining industry poses a growing risk in that natural resources will be exhausted at some point. Therefore, further economic growth should be accompanied by development of sustainable agriculture.

Life of Burkinabe

¹ The first index that examines food security of 109 countries comprehensively across the three internationally established dimensions: affordability, availability, and quality.

² Fifty three African nations pledge commitment to the allocation of national budget on rural development within five years

More than 80% of the population lives in rural area, engaging in subsistence farming³. Domestic life of Burkinabe is centered on extended family which often includes relatives and grandparents other than a married couple and their kids (Population Media Center, n.d.); a typical rural household is composed of more than eight people. (Population Media Center, n.d.) To sustain a large family, the family grows millet or sorghum as staples on small plots of family land; so little of the produced goods go to markets. However, the output is abysmally low; forty percent of crop fails as the country is located in Sahel region where it is affected by climate change and desertification. The continuous crop failure leads to consistently high food prices. One million and seventy thousand people are estimated to be at risk of hunger as a consequence (WFP, n.d.). Despite its hostile economic circumstances, progress has been made in education; the enrollment rate in primary schools has increased over the past ten years. Currently, eight out of ten Burkinabe are reported to enroll in primary school, thanks to government partnership with United Nations International Children's Emergency Fund (UNICEF) and the School of Africa (UNICEF, 2013). On the other hand, not much improvement has been evident in medical care sector; the number of hospitals is very limited especially in the rural areas. Since most people live under poverty line⁴, health care is considered luxury for common Burkinabe, so the demand is low. The government should work to improve the quality of life.

Agriculture in Burkina Faso

Unlike other countries in Africa where the possession of land is limited to a very few number of people, smallholder farmers in Burkina Faso own a large amount of land proportionately. The average possession of land is 5.5 ha (13.75 acre). Yet, a high proportion of the land is not cultivable, due to low levels of soil fertility and low capacity for irrigation; it is known that only 18% of land in Burkina Faso is farmable. The major productions consist of cashew nuts, sorghum, maize, millet and cotton. Furthermore, eighty percent of Burkinabe is involved in animal husbandry. Indigenous chickens (74%), local goats (59%), and local bulls (51%) are the most kept livestock among smallholder farmers. As they do with crops, they sell surplus livestock after consuming domestically. The limited production is also due to the underdeveloped agricultural technology. Predominantly, farmers still harness traditional ways of cultivation; Animal traction (59%) is the most common practice to till land followed by hand hoe (32%). Unfavorable climate of Burkina Faso also contributes to its low production. The climate is largely divided into two seasons: the rainy (May to September) and dry season (October to April). Even though in the rainy season, total rainfall is only 600 and 900 millimeters, which is extremely low when compared with 1,270 millimeters of annual rainfall in Indiana. Farmers grow most of their staple crops in the rainy season. During the dry season, more vegetables such as sesame and onion are grown as well as smaller amounts of staples (World Weather and Climate Information, n.d.).

Economic and agricultural barriers facing the typical family

Smallholder farmers, which make up the most population of Burkina Faso, rely on subsistence farming. Consequently, the output of crop production is a life and death matter of the entire family. The three main causes of crop failure were identified as depletion of soil, scarcity of rainfall, and harmful insects. Depletion of soil in Burkina Faso has been escalating these days; given the situation where the five percent and 69 percent of the land was already classified as arid and semi-arid respectively (IRIN, 2003), desertification is aggravating the situation at an annual rate of 5km in the Sahel zone, which accounts for almost half of the territory (Goze et al. 2003; Vaissayre and Cauquil, 2000). To recover the fertility of soil, Integrated Soil Fertility Management Practices (ISFM) including composting, mulching, inorganic fertilizer, etc., have been recommended to farmers as a

³ self-sufficiency farming in which the farmers focus on growing enough food to feed themselves and their families

⁴ the minimum level of income deemed adequate in a particular country.

remedy. Despite the efforts, the participation rate of farmers is low. Even though farmers are aware of ISFM and its effects (93% awareness for compost and 82% for inorganic fertilizer), farmers lack ability to apply their knowledge on-farm. Irrigation techniques are often mentioned as a way to combat another serious threat, droughts. However, 87% of smallholder farmers do not irrigate their land because of the high costs, hence there is a near total reliance on rain-fed agriculture, with only 1 % of farmland irrigated. To prevent attacks from insects, which cause 30% of crop losses, many farmers turn to insecticide. However, despite high costs of insecticide, the effect is questionable; forty percent of crop losses were reported in spite of full treatment of insecticide. Given the situation when all the measures turned out to be ineffective, it is time to come up with a different policy to deal with the low production of food. Aside from the low production of food caused by the three physical causes above (infertility, droughts, and harmful insects), tendency to depend on cotton production is another limiting factor in improving current food security, making the economy volatile. (AGRA, 2010). Cotton employs 60~70% of export earnings and 5~6% of the GDP; therefore, the country's economy is severely affected by the market price of cotton. For example, economic crisis caused by low cotton price exacerbates a food shortage and thus diversification of crops is necessary (James, 2009).

My Research interest

According to the World Health Organization (WHO), food security can only be achieved by comprehensive improvement of all three parts: food availability, access, and use (WHO, n.d). Among many other ways, like Good governance or international aid, suggested by WFP to enhance food security, the following paragraphs will focus on plant science and genetic modification on the ground of securing food availability.

Present status of plant science in Burkina Faso

i) Advantage of Bt cotton ⁵

Burkina Faso was the first nation which allowed Genetically Modified (GM) crop in Western Africa, while most of African countries remained conservative on adoption of GM crops. Burkina Faso opened the door to GM cotton, and one by one African countries have been joining this trend. Trendsetting began when commercial release of Bt cotton was launched in 2009, after a decade of work to meet legal, technical, and business requirements. According to research of Vitale et al (2010), Bt cotton is resistant to attacks from insects, especially targeting certain caterpillar pests common to cotton and other crops while not affecting non-targeted insects unlike other insecticides. Bt cotton is inserted certain genes extracted from soil bacterium, which develop protein toxic to those harmful insects. When caterpillar consumes cotton, the genes immediately attach to the receptors in its digestive system, and create a hole. The caterpillar was killed through this series of reactions. As a result, the introduction to Bt cotton has been producing positive results. In the survey of Vitale (2009), yield of cotton (with Bt cotton) increased by roughly 30 % compared to conventional ones (James, 2009). Economic impact of Bt cotton was remarkable; it increased cotton income by US \$61.88 per ha (Vitale et al, 2010). Collectively, Bt cotton's economic impact in 2009 was equivalent to the doubled income from the sale of conventional cotton (Vitale et al, 2010). It is estimated that Bt cotton can generate an economic benefit of over US \$106 million per year for Burkina Faso (James, 2009). This growth indicates, in the scale of typical rural household with 3.2 ha of cotton, an extra income of \$124.79 which is a significant enhancement in the quality of their living (Vitale et al, 2010).

Yet, benefits of Bt cotton are not limited on economic sector. According to James (2009), Bt cotton cultivation only requires 2~4 bottles of insecticide; this is a progress considering the fact that 6~8 bottles of insecticide are required for conventional cotton. It not only cuts the production cost, but also

⁵Bollgard®II. A type of GM cotton adopted by Burkina Faso

produce other positive implications. Using fewer insecticides is in line with the country's environmental protection initiatives⁶; such efforts are absolutely important in stopping desertification. Another interesting impact is that reduced exposure to harmful pesticides also facilitated to improve marital relationship of farmers. The less they use insecticides, the less odor they have to endure. Therefore, spouses were happier with reduced odor. Furthermore, spare time created by reduced amount time to be spent on the field enabled people to have time to take care of other duties. These additional benefits of growing Bt cotton will give it superiority over conventional cotton.

ii) Criticism on Bt cotton

a) Social and Economic concern

Despite its positive influence, debate over GMO is still highly contentious. It initially started back in 2003 when civil society of Burkina Faso learned that the government was covertly testing Bt cotton. This elicited strong opposition, and the group called for control on GMO (Scidev.net, 2013). As a result, official regulation was passed in following year, and an agency in charge of handling GMO was established (Birner et al, 2007). Yet, Eveline Compaore, a researcher at the University of Nottingham, said that protests themselves do not mean the opposition to GMO adding "They're [civil society's protests] not against innovation, they're about safe innovations,"(Scidev.net, 2013). Some point out that Bt cotton, due to the high cost of the seeds, is not virtually beneficial to subsistence farmers, and only favorable to large cotton companies like Monsanto, a company which is highly engaged in the Bt cotton project, and taking charge of the supply of the seeds (Woldegebriel, 2014).

b) Health and Medical concern

Some argue that Bt cotton has potential negative effects on environment and human body. According to Ousmane Tiendrébéogo (2011), Secretary of the National Union of Agro pastoral Workers, it is reported that herds of goats, which were raised near Bt cotton, became ill. They were sent to Monsanto lab to identify the link between Bt cotton and disease, but no relations were found. However, Tiendrébéogo added that he doubts the authenticity of the finding, saying that Monsanto, which has a strong interest in genetically modified plant business, is too biased to conduct such research. Besides livestock, children got sick from contact with Bt cotton seeds. In fact, Sofitex, a state-owned cotton company, guides to avoid children and pregnant women's contact with the Bt cotton seeds. It implies Bt cotton itself may have a potential harm to human and nature. (Combat Monsanto, 2011) Concern for the Bt cotton has been stretching to the concern for the GMO in general. He also warned hyperbole of multinational corporations, saying that positive opinions on Bt cotton are excessively pouring out, while opposing opinions are hardly found. The next step would be seeking compromise with opposition to GMO.

Prospect of plant science in Burkina Faso

i) Major issues

Besides the issues above, plant scientists are urged to evolve a new strategy to confront climate change. As more regions of Burkina Faso face consequences of global warming, the study on GMO is considered preparation to cope with climate change. According to analysis of International Food Policy Research Institute, if the projected 1-2 °C increase holds true; it will bring general reduction of crop yield in most regions. Most plants in Burkina Faso can adapt to this change when there is sufficient water. However, lack of irrigation systems in Burkina Faso will pose a threat. For sorghum, which is one of staples for Burkinabe, various prediction models reached consensus that there will be

⁶ Burkina Faso signed and ratified Kyoto-Protocol which is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets (United Nation framework convention on Climate Change, n.d).

20~25% of decline in its production (Somé et al, 2012). In such situation, the next agenda for plant science is to breed drought-resistant plant that can be survived with water scarcity environment.

ii) Local project

Given the situation, one local project is of a great interest of many experts in this field. After Bt cotton increased income of farmers by \$655 (Vitale et al, 2010), another GMO project has been launched on a local scale. In 2013, International Institute of Tropical Agriculture (IITA) with funding from Japanese Ministry of Agriculture, Forestry and Fisheries (MAFF), has released two types of improved cowpea to Central and Northern regions of Burkina Faso. Cowpea, which has already attracted attention for its original drought-resistance quality as temperature rises, is improved for early maturing, high yielding, and Striga⁷ resistibility. As Cowpea is more adaptable to barren environment, this project is expected to avoid some criticisms placed on Bt cotton, which claimed that Bt cotton is only beneficial to when outbreak of pest, not to climate change or drought. Dr. Ishikawa, the IITA Project Coordinator, told that these varieties mature in 60 days, which is 20 days earlier than the conventional option. Overtime, potential yield is projected to increase to 2,170Kg/ha which is three to five-fold of conventional one. This local project is also in line with the agenda of plant science mentioned above (breeding drought-resistant grain). Therefore, it could be successfully scaled up to national level.

iii) Connection between GMO project and Millennium Development Goals (MDG)

Progress of Burkina Faso in biotechnology is important to international society as well as the nation itself in that it advances quality of life in the developing country. Especially, it has a very close connection with MDG set by the United Nation. Positive outcomes of plant science are projected to improve all eight sectors of MDG⁸ (UN, n.d.). Undoubtedly, it will help stabilize food security by making production more predictable through eliminating variables such as insect attack. General increases in income will provide a financial safety net to enhance health. International cooperation has been actively occurring already. Burkina Faso plays both roles of a receiver and a giver; Burkina Faso gained financial and technological help from developed countries, but it currently held a seminar to share its experience of Bt cotton with other African countries (NEPAD Agency, 2013). This is not about success of one country; it is about hope of solidarity. Thus, international support for the success of Bt cotton, which is a key project of biotechnology in Burkina Faso, is more needed than ever.

Role of the Burkina Faso government

i) For customers

Since doubts and questions on GMO exist in the nation, careful and gradual government actions are necessary to allay the concerns. A multidisciplinary journal on policies for food sector, *The food policy* advises countries which are willing to introduce GMO to follow Fiber-Feed-Food (F3) approach to “adopt GM Crops where Bt cotton will be adopted first followed by GM crops for livestock feed while undergoing all the necessary assessments before producing GM foods for human consumption” (Adenle, 2013). Some African countries such as Ghana claimed that they already landed on F3 track. It suggested a smooth transition by giving enough time to customers in order to understand GMO. Because the government lost its trust when the secret field trial of Bt cotton was disclosed in 2003, and Some people still have negative perception on GMO.

The government should rebuild trust in customers and become an impartial institution, which can be turned to authentic data for the people. Opening inspection process to the public would be a way to

⁷ a parasitic weed

⁸ “eradicating extreme poverty, achieving universal primary education, promoting gender equality and empowering women, reducing child mortality rates, improving maternal health, combating HIV/AIDS, malaria, and other diseases, ensuring environmental sustainability, and developing a global partnership for development”

make it transparent. The Tiendrébéogo's, claim that researches on GMO is one-sided is valid; data that deals with advantages of GM crops receives more attention, and thus more of them are conducted. In such situation, the government should take its responsibility for offering various perspectives to help customers have a balanced opinion.

ii) For farmers

The high cost of improved seeds is a major barrier that limits small-scale farmers' access to GM plants. For this reason, GMO is often accused of benefiting large companies only. The government should subsidize the seeds to escape such criticism, and to "take it to the farmers" in the words of Norman Borlaug (Clausi, n.d). As accessibility of technology increases, outperforming yield will offset the costs.

Aside from that, as an agrarian country, Burkina Faso should hold more forums for farmers to share their techniques and to promote advance in agriculture. Sharing ideas can spur the advance in agriculture further. For example, through the forum, Zai⁹ technique was introduced by a smallholder farmer and proved to be effective. (Essama, 2005). Farmers are the people who are most familiar with the climate they are dealing with, thus, they should be more involved in this green revolution.

Role of International Society.

For more transparent government management and smooth adoption, the role of international society is also important. Even though GMO adoption came to reality, and spread to more and more countries, there is an absence of appropriate guideline provided. The Codex Alimentarius Commission, which is a joint agency with Food and Agricultural Organization (FAO) and WHO, only issued an obscure and vague guideline for labeling GMO in recent years (Bereano, 2011). Underneath such circumstance is ongoing debate over validity of GMO. It is true that we have only scratched a surface of plant science. However, hesitancy to take actions will only result in hurting people where there is no policy to regulate GMO. Therefore, UN and the international society should be able to give advice on establishing legal frameworks.

Conclusion

Genetic Engineering is a hot-button issue in the field of science. In developed countries, news about anti-GMO articles make headlines. As a result, some people develop anti-GMO sentiment without accurate knowledge. However, technology is just technology. It is like a knife. If knife is given to a cook, it will be used to make a delicious dish; however, if it is given to a killer, then it will be used to commit crime. In the same way, every technology has benefits and drawbacks., The key is how we use it or who we are going to give a knife to. Therefore, we should not make a mistake of confusing how to use GMO with GMO technology itself, and hastily assume that GMO is invalid. We must remember that our goal is to minimize the drawbacks and to maximize the benefits. In the words of UN Secretary General Ban Ki-Moon, "Now, more than ever, we need to connect the dots between climate, poverty, energy, food and water. These issues cannot be addressed in isolation." (UN, 2010). As the significance of sustainable agriculture is recognized, biotechnology has also been considered a way to bridge the gap between underdeveloped and developed countries by providing underdeveloped countries with better food security and developed countries with opportunity to sell advanced technology. GMO would perform its role to satisfy both kinds of nations so that it would bring global community together to address the increasingly pressing issue of food security. For Burkina Faso, the hope of solidarity has just sprouted in. More global assistance and attention are needed to reap the fruits of the success. This progress is a great start for sustainable development. In the end, Africa is to enjoy a happy ending unlike "The Man with the Golden Brain"

⁹ digging a pit with a diameter of 20-40 cm and a depth of 10-20 cm to capture rain

Works Cited

- Adenle, Ademola A., E. J. Morris, and Govindan Parayil. "Status of Development, Regulation and Adoption of GM Agriculture in Africa: Views and Positions of Stakeholder Groups." *The Food Policy* 43 (2013): 159-66. *ScienceDirect*. Web. 22 Mar. 2013.
- Atser, Godwin. "Farmers in Burkina Faso Get IITA Improved Cowpea Varieties - Press Release - IITA." *International Institute of Tropical Agriculture*. N.p., 25 Jan. 2013. Web. 22 Mar. 2014.
- "Average Weather and Climate in Burkina Faso." World Weather and Climate Information. N.p., n.d. Web. 29 July 2014.
- "Baseline Survey AGRA Interventions in Burkina Faso." *Alliance for Green Revolution in Africa*. AGRA, Aug. 2010. Web. 10 Mar. 2014.
- Bereano, Phil. "A Collaborative Initiative Working to Ensure the Sustained Availability of Non-GMO Options." *The NonGMO Project RSS*. N.p., 18 May 2011. Web. 22 Mar. 2014.
- Birner, R., Abel Kone, S., Linacre, N., & Resnick, D. (2007). Biofortified foods and crops in West Africa: Mali and Burkina Faso. *AgBioForum*, 10(3), 192-200.
- "Burkina Faso." - *African Economic Outlook*. 2014 African Economic Outlook, 6 Mar. 2013. Web. 19 Mar. 2014
- "Burkina Faso." AGRA. Treeline CMS, n.d. Web. 9 Mar. 2014.
- "Burkina Faso." *Central Intelligence Agency*. Central Intelligence Agency, 18 Mar. 2014. Web. 19 Mar. 2014.
- "Burkina Faso." , *Country Profile at UCLA African Studies Center*. The Regents of the University of California, Mar. 2012. Web. 18 Mar. 2014.
- "Burkina Faso: Economy." GlobalEDGE: Your Source for Global Business Knowledge. Michigan State University, n.d. Web. 10 Mar. 2014.
- "Burkina Faso International Health Insurance / Healthcare System." *Burkina Faso International Health Insurance : Globalsurance*. Pacific Prime Insurance Brokers, n.d. Web. 10 Mar. 2014.
- "Burkina Faso." *Global Food Security Index: Country Profile*. An Economist Group Business, Dec. 2013. Web. 23 Mar. 2014.
- "Burkina Faso Overview." *The World Bank*. The World Bank Group, 30 Sept. 2013. Web. 19 Mar. 2014.
- "Burkina Faso." *UNICEF*. UNICEF, 18 Dec. 2013. Web. 10 Mar. 2014
- Clausi, A. "Norman Borlaug – A Perspective." *The World of Food Science*. IFT and IUFoST, n.d. Web. 23 Mar. 2014.
- "Countries and Their Cultures." Culture of Burkina Faso. Advameg.Inc, n.d. Web. 08 Mar. 2014.
UNICEF. "Schools of Burkina Faso: Investing in the Future." www.schoolsforafrica.org. UNICEF, n.d. Web. 8 Mar. 2014.

- Essama, Suzanne. "IK Notes #80 - Burkina Faso: The Zaï Technique and Enhanced Agricultural Productivity." *The World Bank*. Africa Region's Knowledge and Learning Center, May 2005. Web. 23 Mar. 2014.
- Essoungou, André-Michel. "Africa's Least Developed: Lands of Opportunity | Africa Renewal Online." *UN News Center*. UN, Aug. 2011. Web. 23 Mar. 2014.
- "FAO Country Profiles:Burkina Faso." *FAO.org*. N.p., n.d. Web. 23 Mar. 2014.
- "Food Security." *WHO*. N.p., n.d. Web. 26 July 2014.
- Fearson, James D., and David D. Laitin. "Burkina Faso, Random Narrative." *Stanford.edu*. Stanford University, 5 July 2006. Web. 8 Mar. 2013.
- Goze E, S Nibouche and J Deguine. 2003. 'Spatial and probability distribution of *Helicoverpa armigera* (Lepidoptera: Noctuidae) in cotton: systematic sampling, exact confidence intervals and sequential test', *Environmental Entomology*, 32 (5): 203–1210.
- "Interview with Ousmane Tiendrébéogo, Secretary General of the National Union of Agropastoral Workers." Interview by and Combat Monsanto. *Burkina Faso Is a Trojan Horse for GMOs in Africa*. Food Democracy Now, 28 June 2011. Web. 22 Mar. 2014.
<<http://www.gmwatch.org/latest-listing/50-2011/13342-burkina-faso-is-a-trojan-horse-for-gmos-in-africa>>.
- "Is Africa Ready for GM?" *IRINnews*. IRIN 2014, 27 Nov. 2013. Web. 19 Mar. 2014.
- James, Clive. 2009. Global Status of Commercialized Biotech/GM Crops: 2009. ISAAA Brief No. 41. ISAAA: Ithaca, NY.
(<https://www.isaaa.org/resources/publications/briefs/41/download/isaaa-brief-41-2009.pdf>)
- Kagone, Hamadé. "Burkina Faso." *Burkina Faso*. FAO, Oct. 2006. Web. 10 Mar. 2014.
- KOROSS, KIBIWOTT. "Kenya Falls Short of Maputo Declaration on Agriculture." *The Star*. The Radio Africa Group, 3 Sept. 2013. Web. 18 Mar. 2014.
- "Kyoto Protocol." United Nation Framework Convention on Climate Change. United Nation, n.d. Web. 28 July 2014.
- NEPAD Agency. "Study Tour to Bt Cotton Farms in Burkina Faso." *African Biosafety Network of Expertise ABNE*. N.p., 17 Dec. 2013. Web. 22 Mar. 2014.
- "Population Media Center – Burkina Faso." Population Media Center – Burkina Faso. Population Media Center, n.d. Web. 08 Mar. 2014.
- Somé, Léopold, Abdulai Jalloh, Robert Zougmoré, Gerald C. Nelson, and Timothy S. Thomas. "Burkina Faso." *Burkina Faso*. International Food Policy Research Institute, n.d. Web. 17 Mar. 2014.
- Somé, Léopold, Abdulai Jalloh, Robert Zougmoré, Gerald C. Nelson, and Timothy S. Thomas. "West African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — BURKINA FASO." *The African Center for Research on Bananas and Plantains*. International Food Policy Research Institute, Dec. 2012. Web. 22

- Tatalović, Mićo. "SIP13: Burkina Faso's Biotech Regulation Owes Much to Civil Society - SciDev.Net." *SciDevNet*. 2014 Scidev.net, 25 July 2013. Web. 19 Mar. 2014.
- The Editors of Encyclopædia Britannica. "Mossi (people)." Encyclopedia Britannica Online. Encyclopedia Britannica, 29 Apr. 2013. Web. 08 Mar. 2014.
- UNFCC. "Resources for Speakers, Global Issues, Africa, Ageing, Agriculture, Aids, Atomic Energy, Children, Climate Change, Culture, Decolonization, Demining, Development, Disabilities, Disarmament, Environment, Food, Governance, Humanitarian, Refugees, Women." *UN News Center*. UN, 2010. Web. 23 Mar. 2014.
- UN High-Level Task Force, and FAO. "Burkina Faso." *FAO*: FAO, n.d. Web. 10 Mar. 2014.
- "United Nations Millennium Development Goals." *UN News Center*. UN, n.d. Web. 22 Mar. 2014.
- Vitale, Jeffrey D., Gaspard Vognan, Marc Ouattarra, and Ouola Traore. "The Commercial Application of GMO Crops in Africa: Burkina Faso's Decade of Experience with Bt Cotton." *Agbioforum*. Express Academic Services, 2010. Web. 19 Mar. 2014.
- Woldegebriel, E. G. "AllAfrica." *AllAfrica.com: Ethiopia Plans GM Crop Boost for Cotton Industry (Page 2 of 3)*. AllAfrica Global Media, 28 Jan. 2014. Web. 20 Mar. 2014 Mar. 2014.
- "World Food Programme Fighting Hunger Worldwide." *Sahel Crisis: Country By Country*. World Food Programme (WFP), 8 Aug. 2012. Web. 11 Feb. 2014.