Fighting the Food Crisis:

Feeding Africa One Family at a Time

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INTRODUCTION

> We must address poverty at its core. In Africa, this means enabling small-scale farmers to grow and sell Africa's food. Our goal is to dramatically increase the productivity, food security, incomes and livelihoods of small-scale farmers, many of whom are women. All of us yearn for practical solutions to address the major cause of our continental poverty – an agricultural sector that has languished, but is now poised to be so much more productive and dynamic. We know that the path to prosperity in Africa begins at the fields of African farmers who, unlike farmers almost anywhere else, do not produce enough food to nourish our families, communities, or the populations of our growing African cities.[1]

Today, rising food prices are adding to the serious problem of food insecurity in Africa.[2] The high cost of food is making it difficult for many Africans to buy what they need to feed their families.[3] In the past year and a half, food riots have taken place in seven sub-Saharan Africa ("SSA") countries.[4] The UN's Food and Agriculture Organization ("FAO") estimates that between 214 and 216 million people, or 31 percent of the population of SSA, were undernourished between 2002 and 2004.[5] Most of these hungry people are in rural areas and at least 50 percent are small farmers and their families, who represent the largest group suffering from hunger and malnutrition in the developing world.[6]

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[1] Kofi A. Annan, former Scty. Gen. of the U.N., Address at the Launch of the Alliance for a Green Revolution in Africa at the World Economic Forum session, Investing in Growth: A Green Revolution in Africa (June 14, 2007), http://www.agra-alliance.org/content/news/detail/541/.

[2] Food insecurity is defined as: "the lack of access of all people at all times to sufficient nutritionally adequate, and safe food, without undue risk of losing such access...." U.S. GOVERNMENT ACCOUNTABILITY OFFICE, INTERNATIONAL FOOD SECURITY: INSUFFICIENT EFFORTS BY HOST GOVERNMENTS AND DONORS THREATEN PROGRESS TO HALVE HUNGER IN SUB-SAHARAN AFRICA BY 2015, GAO-08-680 8 (2008) [hereinafter INTERNATIONAL FOOD SECURITY], *available at* www.gao.gov/new.items/d98680.pdf.

[3] *Cereal Prices Hit Poor Countries*, BBC NEWS, Feb. 14, 2008, *available at* http://news.bbc.co.uk/2/hi/business/7244382.stm.

[4] *See* INTERNATIONAL FOOD SECURITY, *supra* note 2, at 2.

[5] FOOD AND AGRICULTURE ORGANIZATION ("FAO"), FOOD SECURITY STATISTICS: NUMBER OF UNDERNOURISHED PERSONS, *available at* http://www.fao.org/es/ess/faostat/foodsecurity/Files/NumberUndernourishment_en.xls; *see* CAROL MARKWEI, LINDELA NDLOVU, ELIZABETH ROBINSON, & WAHIDA SHAH, INTERNATIONAL ASSESSMENT OF AGRICULTURAL KNOWLEDGE, SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (IAASTD): SUB-SAHARAN AFRICA (SSA) SUMMARY FOR DECISION MAKERS 8 (2008), *available at* http://www.agassessment.org/docs/SSA_SDM_220408_Final.pdf; *see also Food Deprivation Trends and Progress: Hunger Reduction Targets in the Developing World* (FAO Statistics Division, Working Paper Series NO: ESS/ESSA/002e, 2006), *available at http://www.fao.org/faostat/foodsecurity/Files/WP002e.pdf* (a recent report from the International Assessment of Agricultural Knowledge, Science and Technology for Development states that the number of poor is rising in sub-Saharan Africa and that 30% of the population lives with "chronic hunger" and that a similar number of children under the age of five are malnourished).

[6] *See* FOOD TRADE AND NUTRITION COALITION, DUMPING FOOD AID: TRADE OR AID? (SUBSIDIZED) FOOD AID IN KIND: WHAT IS IN IT FOR THE WTO 6 (2005) [*hereinafter* DUMPING

Hunger, as Ben Senauer notes, does more than affect nutritional status. For the world's poor it means "their lives are shorter and filled with more suffering," and that millions of their children die from malnutrition-related causes.[7]

What will it take to fight the food crisis in SSA? What strategies, legal and practical, will help improve productivity, raise crop yields, and help create a more vibrant market for farmers on the continent? A contingent of scholars and policy makers, ranging from economist Jeffrey Sachs to former United Nations Secretary General Kofi Annan, agree that part of what Africa needs is a Green Revolution to feed the hungry and overcome the myriad problems of poverty that still plague the continent.[8]

The idea of a Green Revolution for Africa builds on the Green Revolution that took place in Latin America and Asia from the 1950s through the 1990s. During this time, many developing countries in these regions adopted new strategies to fend off a Malthusian crisis of too many people and too little food.[9] Incomes rose, and benefits from rising incomes spread to the non-farm rural sector.[10] Adopting higher yielding seeds (particularly rice and wheat), increasing the use of fertilizers, and improving irrigation led to dramatic results: more food for more people meant less hunger and less malnutrition.[11]

FOOD AID], *available at* http://www.wto.org/english/forums_e/ngo_e/posp47_dumping_food_aid_e.pdf.

[7] Ben Senauer, *A Pro-Poor Growth Strategy to End Hunger*, 84 (3) AM. J. OF AG. ECON. 826 (2002).

[8] *See generally* JEFFREY SACHS, THE END OF POVERTY: ECONOMIC POSSIBILITIES OF OUR TIME (Penguin Books 2006); *see World Warned on Food Price Spiral*, BBC NEWS, Mar. 11, 2008, *available at* http://news.bbc.co.uk/2/hi/in_depth/7288959.stm; *see generally* Alliance for a Green Revolution in Africa, http://www.agra-alliance.org/ (last visited Nov. 20, 2008) (recently, current UN Secretary General Ban Ki -moon said that he was extremely concerned about rising food costs for the poor and suggested that a "Green Revolution" might ease food shortages in Africa).

[9] JARED DIAMOND, COLLAPSE 1-15, 311-28 (Penguin Group USA 2005) (In his 2005 book, *Collapse*, Jared Diamond argues that societies that fail to deal adequately with problems of strong population growth may suffer from a variety of environmental harms that can contribute to society-wide collapse. Examples from the past include Easter Island and the Mayan civilization. He argues that the Rwandan genocide is a recent example of a Malthusian crisis sparking a societal collapse.).

[10] *See* THE WORLD BANK, WORLD DEVELOPMENT REPORT 2008: AGRICULTURE FOR DEVELOPMENT 159–162 (2007) (discussing the history of the genetic improvements in agriculture from the 1950s to the present day); *see* Senauer *supra* note 7, at 829 ("[t]he average real income of small farmers in southern India rose by 90% and that of landless laborers rose by 125% between 1973 and 1994, the period of the 'Green Revolution.' Since agriculture forms the economic base of the rural economy, the increased purchasing power of farmers and agricultural laborers spreads the economic expansion to the rural, non-farm sectors."); *see also* FARM-AFRICA, HARVEST HELP, CENTRE FOR DEVELOPMENT AND POVERTY REDUCTION, REACHING THE POOR: A CALL TO ACTION: INVESTMENT IN SMALLHOLDER AGRICULTURE IN SUB-SAHARAN AFRICA 7 (2004) [*hereinafter* REACHING THE POOR], *available at* http://www.farmafrica.org.uk/documents/20.pdf ("The Asian green revolution made a dramatic contribution to world food supplies, to lower food prices, to economic growth and to poverty reduction." The article goes on to note that, "[the green revolution in Asia] was not without its difficulties and there are real concerns regarding overuse of chemicals, loss of biodiversity, soil degradation, pest problems, and nutritional and risk implications of monoculture systems.").

[11] Robert Evenson & Douglas Gollin, *Assessing the Impact of the Green Revolution, 1960 to*

In Africa, however, a Green Revolution never took hold. Pedro Sanchez and M.S. Swaminathan, co-chairs of the UN's Millennium Project Task Force on Hunger have written:

> The prevalence of hunger in Africa is pervasive and rising .... Africa, unlike Asia, did not benefit from the green revolution, one of the key successes of humankind in the latter third of the 20th century. Food production in developing countries tripled during the past 30 years, the number of rural poor decreased by half, the proportion of malnourished people dropped from 30% to 18%, and the real prices of the main cereal crops fell by 76% .... This success did not extend to Africa .... Overall improvements in food yields in Africa have lagged far behind the rest of the developing world.[12]

To attack this problem, African farmers need to grow more crops. As the Govenrment Accountability Office ("GAO") points out: "[r]aising agricultural productivity is vital to all elements of food security: food availability, food access, and food utilization."[13] Advocates of a Green Revolution for Africa anticipate that farmers who have access to improved seeds, fertilizers, and other needed inputs will grow a surplus of crops for sale in local markets.[14] With such a surplus, farmers will be better able to invest in their families and farms, which will translate into more and better opportunities for poverty alleviation.[15] As Kofi Annan says, the "path to prosperity" begins in farmers' fields.[16]

The call for a Green Revolution in Africa raises at least two questions. First,

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2000, 300 SCIENCE 758, 758-62 (2003).

[12] Pedro A. Sanchez & M.S. Swaminathan, *Hunger in Africa: the link between unhealthy people and unhealthy soils*, 365 THE LANCET 442, 442-43 (2005).

[13] *See* INTERNATIONAL FOOD SECURITY, *supra* note 2, at 19.

[14] *See* Millennium Villages, About the Villages, http://www.millenniumvillages.org/aboutmv/index.htm (last visited Nov. 20, 2008) (The United Nations Development Programme oversees the Millennium Villages Project which ". . . offers a bold, innovative model for helping rural African communities lift themselves out of extreme poverty."); *see* Millennium Villages: A New Approach to Fighting Poverty, http://www.unmillenniumproject.org/mv/mv_cost.htm (last visited Nov. 20, 2008) (One of the goals of the project is to increase agricultural productivity and farmers' income through the use of improved agricultural inputs, such as better seeds and fertilizers. The project website argues: "[o]ver time, household incomes will rise due to increased productivity, diversification into higher value crops and expanded off-farm employment. Higher incomes will raise household savings, accelerating economic diversification and household investments in human capital."); *see* INTERNATIONAL FOOD SECURITY, *supra* note 2, at 4 (In its recent review of food security issues, the GAO notes that "[p]ersistent food insecurity in sub-Saharan Africa is primarily due to several factors, including low agricultural productivity, limited rural development, government policy disincentives, and the impact of poor health on the agricultural workforce . . . . Low agricultural productivity is due, in part, to the limited use of agricultural inputs, such as fertilizer and improved seed varieties, and the lack of modern farming practices.").

[15] *See* SACHS, *supra* note 8, at 254, for a discussion of how capital accumulation, such as generating a profit from the sale of excess crops, can help the poor rise above subsistence living.

[16] Annan, *supra* note 1.

what strategies exist for getting needed agricultural inputs, such as high-yielding seeds, into the hands of African farmers? Recent articles that look at the problem of food insecurity in Africa suggest the use of public channels and/or public-private partnerships to supply farmers with much-needed seeds.[17] The World Bank, for example, writes:

> Agricultural biotechnology has the potential for huge impacts on many facets of agriculture—crop and animal productivity, yield stability, environmental sustainability, and consumer traits important to the poor . . . . Biotechnology thus has great promise, but current investments are concentrated largely in the private sector, driven by commercial interests, and not focused on the needs of the poor.[18]

The idea that the private sector can or will provide a product that meets the needs of subsistence farmers is dismissed as unlikely at best. But is this true?

The idea of an African Green Revolution raises a second question: what kind of legal framework is necessary to support improved agricultural productivity and increased food security? Getting improved seeds and fertilizer into the hands of farmers is vital. But farmers also need reliable access to agricultural technologies, easy access to markets within and outside Africa, and legal security for their property.

In other words, a Green Revolution must be accompanied by a legal revolution in SSA. Most sub-Saharan countries need to increase the tenure security of smallholder farmers by credibly committing to the protection of rights to use and profit from the land farmers have traditionally worked. The legal revolution should also focus on modifying the intellectual property regimes in most SSA countries in order to provide incentives for agricultural innovation and protection of existing intellectual property rights. Improvements in the real and intellectual property environments in SSA are necessary complements of any effort to create a sustainable agricultural sector. Finally, policy changes at the national level inside and outside Africa need to make access to markets easier and less costly for African farmers.[19]

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[17] *See* Frank Tenente, *Feed the world One Seed at a Time: A Practical Alternative for Solving World Hunger*, 5 NW. U. J. INT'L. HUM. RTS. 298 (2007), for a discussion of such policies; *see also* Michael R. Taylor & Jerry Cayford, *American Patent Policy, Biotechnology, and African Agriculture: The Case for Policy Change*, 17 HARV. J. L. & TECH. 321, 323 (2004) ("[m]odern biotechnology can solve some of the basic productivity problems that plague small and subsistence farmers and impede the development of successful agricultural systems in sub-Saharan Africa. However, important components of the biotechnology tool kit – gene traits, plant transformation tools, and genetically improved germplasm – have been patented by companies with little economic incentive to develop and disseminate the technology to meet the needs of small-scale farmers, the backbone of African agriculture."); *see also* WORLD DEVELOPMENT REPORT 2008, *supra* note 10, at 170.

[18] *See* WORLD DEVELOPMENT REPORT 2008, *supra* note 10, at 162-63.

[19] Taylor & Cayford, *supra* note 17, at 329 (note: "[i]n developing countries, the lack of effective and fair markets for surplus food production may be the greatest obstacle to agricultural

This article, based on field work conducted in South Africa, discusses one approach to improving agricultural productivity through a private-sector effort to meet the needs of subsistence farmers. In the late 1990s Monsanto developed a "bottom of the pyramid" [20] product called the Combination, or Combi, Pack for smallholder farmers in South Africa. In addition to supplying needed agricultural inputs at affordable prices, Monsanto also implemented a program of educating farmers about "no-till," "zero," or "conservation" tillage. We trace the development of the Combi-Pack and no-till farming and explore the effect both are having on farmers in two provinces: Mpumalanga and KwaZulu-Natal, both located in eastern South Africa. Some farmers using Combi-Packs and no-till practices in South Africa have seen large surpluses in food crops. This provides them with enough income to expand production and move towards larger-scale planting and ultimately results in increased food security and poverty alleviation.

Next, we focus on some aspects of the legal framework that can help support a Green Revolution in Africa. We suggest changes in three areas of law that can help to create an enabling environment for Africa's farmers. First, these farmers need increased tenure security over the land they work. This is especially important for women, who do most of the agricultural work in Africa,[21] yet often have limited tenure security. Second, farmers need better access to local, regional, and international markets. Improving market access is both a practical matter of improving transportation and a legal matter of reducing barriers to trade between African nations and between African nations and the developed

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development. Access to local, national, and international markets provides farmers with an incentive to risk their labor and capital on expanded production.").

[20] *See generally* C.K. PRAHALAD, THE FORTUNE AT THE BOTTOM OF THE PYRAMID 10, 24 (Wharton School Publishing 2006) which develops the idea of the very poor as prospective consumers and active participants in a market economy. The Combi-Pack is an example of a multinational corporation creating a product for poor consumers, a phenomenon that C.K. Prahalad identifies as marketing to "the bottom of the pyramid" ("BOP"). The idea behind BOP marketing is that the poor represent a huge, if diffuse, market, with aggregate purchasing power in the trillions of dollars. Companies can profit from selling to this market, so long as their products are developed and packaged to meet poor consumers' needs. Characteristics of BOP goods are: "small unit packages, low margin per unit, high volume, and high return on capital employed." Prahalad identifies the key factors involved in serving this market: affordability, accessibility, and availability. Companies that meet these challenges through innovation will find a vast network of consumers who can be active participants in market transactions; *see* WORLD DEVELOPMENT REPORT 2008, *supra* note 10, at 163 (The World Bank writes of no-till, or "zero tillage" that: "[o]ne of the most dramatic technological revolutions in crop management is conservation (or zero) tillage, which minimizes or eliminates tillage and maintains crop residues as ground cover. It has many advantages over conventional tillage: increasing profitability from savings in labor and energy, conserving soil, increasing tolerance to drought, and reducing greenhouse gas emissions.").

[21] *See* Press Release, Consultive Group on International Agriculture Research, Gates Foundation Funds Unprecedented $13 Million Effort to Unleash Expertise of African Women in the Agricultural Sector (Dec. 5, 2007), http://www.genderdiversity.cgiar.org/resource/AWARDPressRelease.doc; *see also* WORLD DEVELOPMENT REPORT 2008, *supra* note 10, at 140.

world. Finally, if the private sector is to play a role supplying Africans with improved seed, it will look to African nations to implement or improve intellectual property laws and regulations.

Policies that provide subsidized seed and fertilizer to farmers, but fail to take a more holistic approach and address much-needed legal reforms, may well solve short-term problems of hunger. They are unlikely, however, to support the development of a sustainable agricultural sector in SSA. We conclude that African countries need to do more to create a legal environment that provides meaningful protection to both real and intellectual property rights and expands trading opportunities for Africa's farmers. A Green Revolution in Africa, in other words, is likely to necessitate a legal revolution as well.

I. THE AGRICULTURAL SECTOR IN SOUTH AFRICA

> The evidence is compelling that sustained income growth for the poorest strata of the rural population will depend on agricultural growth in most countries, even though the poor generally lack the land and other productive resources to respond directly or immediately to policies and investments to stimulate agricultural growth. Agricultural productivity growth, while most easily generating gains for better-off smallholder farmers, is likely to offer the best potential for pulling the poorest and land-constrained households out of poverty.[22]

Nearly 70 percent of the population in SSA lives in rural areas, and 70 to 80 percent of this rural population is dependent on food production, through farming and livestock, for most of their livelihood.[23] Small-scale farming provides most of the food produced in Africa, as well as employment for 60 percent of working people. Agriculture constitutes the backbone of most African economies; it is the largest contributor to the gross national income ("GNI"), the biggest source of foreign exchange, and the main generator of savings and tax revenues. However, agricultural productivity in SSA has remained low, due to a variety of factors, both exogenous and endogenous.[24]

As compared to the rest of SSA, South Africa's agricultural sector is atypical. Unlike in other SSA countries, the number of smallholder farmers in South Africa is fairly low. There are approximately 240,000 black South African

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[22] T.S. Jayne, Takashi Yamano, Michael Weber, David Tschirley, Rui Benfica, David Neven, Anthony Chapoto & Ballad Zulu, *Smallholder Income and Land Distribution in Africa: Implications for Poverty Reduction Strategies* 26 (MSU Int'l Devel. Paper No. 24, 2001), *available at* http://aec.msu.edu/fs2/papers/idp24.pdf.

[23] *See* African Green Revolution Social Impact of African Agriculture (2008), *available at* http://www.africangreenrevolution.com/en/african_agriculture/impact/social_impact/index.html.

[24] *See* FORUM FOR AGRICULTURAL RESEARCH IN AFRICA (FARA), FORMAT FOR AFRICAN AGRICULTURAL PRODUCTIVITY 7-12 (June, 2006), *available at* http://www.fara-africa.org/media/uploads/File/FARA%20Publications/FAAP_English.pdf.

farmers, as compared to 45,000 white South African farmers.[25] White farmers tend to run larger, commercial farms, while black farmers tend to be smallholders. Incomes for informal sector smallholder farmers can be quite low: in 2005 of a total of 925,000 South Africans involved in agriculture, hunting, fishing, or forestry approximately 22 percent had no measurable income.[26] These smallholders represent a large part of South Africa's poor as approximately 75 percent of South Africa's poor live in rural areas and "81% of the ultra-poor are rural inhabitants."[27] Although agricultural production contributes a small percentage to South Africa's gross national product ("GNP") – less than 4 percent – it provides 10 percent of total reported employment.[28]

Similar to the rest of the continent, South African smallholders are among the poorest segment of South African society. They suffer from the problems of poverty rampant throughout Africa: poor access to clean water, electricity, and education, poor nutrition and health care, poor housing, and few comforts. As it would for all smallholders in such difficult circumstances, an increase in crop yields makes a tremendous difference to farmers and their families. But just how would this disadvantaged segment of society get access to the technology and services that make improved crop yields possible?

Traditionally, subsistence farmers could turn to extension agents – government workers who specialized in promoting agricultural improvements. But the agents visited only sporadically. Aside from the deep knowledge held

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[25] *See* ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT ("OECD"), REVIEW OF AGRICULTURAL POLICIES: SOUTH AFRICA 2006 14, 39, 51 (OECD PUBLISHING: PARIS 2006); *see also* Noel Oettle, Saliem Fakir, Wilfred Wentzel, Steven Giddings, & Martin Whiteside, *Encouraging Sustainable Smallholder Agriculture in South Africa* 14-15 (Environment and Development Consultancy, Ltd, 1998), *available at* www.eldis.org/fulltext/rsa.pdf; *see also* STATISTICS SOUTH AFRICA, REPORT ON THE SURVEY OF LARGE AND SMALL SCALE AGRICULTURE, 15 tbl.1.1 (2002), *available at* http://www.statssa.gov.za/publications/LargeSmallScaleAgri/LargeSmallScaleAgri.pdf.

[26] *See* STATISTICS SOUTH AFRICA, LABOUR FORCE SURVEY: SEPT. 2005, STATISTICAL RELEASE P0210 23 ch.3.9 (Sept., 2005), *available at* www.statssa.gov.za/publications/p0210/p0210September2005.pdf.

[27] *See* Oettle et al., *supra* note 25, at 19. Charles Machethe writes: "Poverty is more pervasive in rural areas particularly in the former homelands. The majority (65%) of the poor are found in rural areas and 78 % of those likely to be chronically poor are also in rural areas." CHARLES L. MACHETHE, UNIV. OF PRETORIA DEP'T OF AGRIC. ECON., EXTENSION AND RURAL DEVEL, & POSTGRADUATE SCHOOL OF AGRIC. & RURAL DEVEL., AGRICULTURE AND POVERTY IN SOUTH AFRICA: CAN AGRICULTURE REDUCE POVERTY? (2004), *available at* http://www.sarpn.org.za/documents/d0001005/P1125-Agriculture-Poverty_Machethe_2004.pdf.

[28] *See* OECD *supra* note 25, at 14; *see* NEW PARTNERSHIP FOR AFRICA'S DEVELOPMENT (NEPAD), COMPREHENSIVE AFRICA AGRICULTURE DEVELOPMENT PROGRAMME sec.1.4 (2002), *available at* http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/005/Y6831E/Y6831E00.htm (NEPAD reports: "[a]griculture, providing 60 percent of all employment, constitutes the backbone of most African economies; in most countries, it is still the largest contributor to GDP; the biggest source of foreign exchange, still accounting for about 40 percent of the continent's hard currency earnings; and the main generator of savings and tax revenues.").

by the farmers themselves, few other sources of information existed. Until recently, private companies did relatively little to help smallholder farmers with little to spend on agricultural products or technology. Given the strength of South Africa's commercial agriculture sector, it is not surprising that agricultural-products companies focus on providing goods and services to South Africa's large, well-established farmers.

However, unlike most African smallholders, South African smallholders are not completely ignored. In an attempt to market to these farmers, Monsanto South Africa developed a two-prong strategy to help smallholders improve their maize crops. They provide higher-yielding inputs and teach farmers how to use less labor intensive no-till planting methods. This strategy is an example of marketing to "the bottom of the pyramid ("BOP")." University of Michigan business school professor C.K. Prahalad argues that BOP consumers and the private sector can develop a symbiotic relationship that leads to: "[T]he co-creation of a solution to the problem of poverty. The opportunities at the BOP cannot be unlocked if large and small firms, governments, civil society organizations, development agencies, and the poor themselves do not work together with a shared agenda. Entrepreneurship on a massive scale is the key."[29]

This vision recognizes that the world's poor are both "resilient entrepreneurs and value conscious consumers." When companies market to BOP consumers, the resulting symbiotic relationship will, Prahalad contends, create a more sustainable answer to the problems of poverty that than traditional foreign aid has provided. Monsanto is using this marketing strategy to provide goods to South African smallholders.

Rural poverty is, of course, a complex phenomenon. Combi-Packs are one product that helps address the needs of smallholder farmers, but they are not a panacea. They provide a tool that might support a Green Revolution in Africa, but cannot, by themselves, solve the problems of low agricultural productivity and food insecurity. This requires a layered approach that includes changes in the local and international legal environments. At a more basic level, a sustainable solution will also demand improvements in infrastructure and credit opportunities in Africa (two important issues not addressed in this paper).

A. Monsanto and the South African Smallholder

> Agricultural productivity growth, while most easily generating gains for better-off smallholder farmers, is likely to offer the best potential for sustained income growth among the poorest and land-constrained households as well. The literature on growth linkages indicates that the first-round beneficiaries of agricultural growth generate important

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[29] Prahalad, *supra* note 20, at 2.

> multiplier effects by increasing their expenditures on a range of local off-farm and non-farm activities that create second-round benefits for a wide-range of other households in the rural economy.[30]

In the late 1990s, the South Africa office of Monsanto[31] developed the Combi-Pack, or *Xoshindlala*.[32] The Combi-Pack is a relatively inexpensive box of materials designed specifically for use by smallholder farmers who work anywhere from one-quarter hectare (one-half acre of land) to five hectares of land. It contains a package of hybrid maize seed, herbicide, and a voucher for fertilizer.[33] The outside of the box depicts how to use its contents in illustrated instructions, to accommodate illiterate end-users.

Farmers using the Combi-Pack in conjunction with "no-till" farming methods (discussed below)[34] experience improved soil conditions and larger maize harvests. The results to date, while limited, are positive: farmers grow more maize with less effort and labor, use less pesticide, and preserve their fragile soil.[35] Larger yields make feeding their families easier and produce surplus maize to sell at markets. The positive gains from using the Combi-Pack

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[30] Jayne et al. *supra* note 22, at 30.

[31] *See generally* MONSANTO 2007 ANNUAL REPORT (2007), *available at* http://monsanto.com/pdf/pubs/2007/2007AnnualReport.pdf (The Monsanto Chemical Works started in 1901 in St. Louis, Missouri producing saccharin. Over time, Monsanto produced a wide range of products, including aspirin, sulphuric acid, plastics, and synthetic fibers. In the 1960s, the company created an agriculture division and enjoyed great success with herbicides such as Roundup, now the world's most popular herbicide. Monsanto became involved in biotechnology in the early 1980s when its scientists created the world's first genetically modified plant cell. By the mid-1990s, Monsanto had developed a variety of genetically modified seeds with traits designed to improve crop yields and farmer efficiency. These included Roundup Ready soybeans, YieldGard insect-protected corn, Bollgard insect-protected cotton, and NewLeaf insect-protected potatoes. Today, Monsanto is a multi-national corporation with sales topping $8.5 billion in 2007. The company produces a wide variety of agricultural products: hybrid and biotech seeds and herbicides, as well as animal products. The company has offices on six continents).

[32] *Xoshindlala* is a Zulu word meaning "chase away hunger." The provincial KwaZulu-Natal Ministry of Agriculture and Environmental Affairs ran a program called *Xoshindlala: Chase away hunger* from 1998 to 2000. This project was much broader in scope than providing agricultural inputs to farmers. *See* Xoshindlala Campaign: 1998-2000, http://agriculture.kzntl.gov.za/portal/publications/books/xoshindlala_book/xoshindlala_intro.htm. (The name Xoshindlala was adopted by farmers using Combi-Packs because the packs are seen as a tool that helps fight hunger. The Combi-Pack can help smallholder farmers chase away their hunger by offering them higher crop yields. These higher crop yields translate into increased food security).

[33] Monsanto South Africa, Combi Packs: Overview, http://www.monsanto.co.za/en/layout/products/combi/default.asp (last visited Nov. 20, 2008); *see* WORLD DEVELOPMENT REPORT 2008, *supra* note 10, at 136 tbl.D.1 (the World Bank estimates that Monsanto had $3.1 billion in agrochemical sales in 2004 representing 10% of the agrochemicals market, also $3.1 billion in sales in seeds with 12% market shares, and sales by "Other/Private" providers represented 66% of the seed market).

[34] *See* LEONARD THOMPSON, A HISTORY OF SOUTH AFRICA 191–92 (Yale University Press 2000), for a list of the benefits of no till or zero tillage technology.

[35] *See Reaching the Poor, supra* note 10, at 7 (the benefits of using Combi-Packs along with no-till farming means that some of the concerns associated with the Green Revolution in Asia, such as excessive use of chemicals and soil degradation, are lessened).

encourage smallholder farmers to plant larger plots, allowing them to take the steps necessary to move towards commercial farming.

B. The Importance of "no-till" Farming in a Subsistence Environment

Monsanto has worked in South Africa for decades. The idea for the Combi-Pack came from work done with the national and provincial departments of agriculture, conservation, and environment in KwaZulu-Natal and Mpumalanga and agricultural extension offices as part of the LandCare project.[36] In Mpumalanga, the provincial department of agriculture partnered with the South African Agricultural Research Council and the Australian government to identify ways to improve soil quality.

The LandCare project identified one possible solution to the problem of poor soil quality in the province: no-till farming.[37] No-till farming (also called conservation or minimum tillage) is a sustainable farming practice that reduces required labor input while increasing crop yields. No-till farming also improves the local watershed, reduces soil erosion, and benefits the environment because less fertilizer is used. It is particularly beneficial for the smallholder farmer because it does not require a tractor, a major cost saving for smallholders.[38]

To demonstrate the benefits of no-till technology, Monsanto launched pilot projects in KwaZulu-Natal and Mpumalanga. Local farmers planted one-quarter hectare demonstration plots using no-till, inviting neighboring farmers to watch the fields' progress over time. Interest in no-till grew due to the obvious benefits: by not having to till their fields, farmers had more time for other activities. As noted in the 2008 World Development Report, in general terms,

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[36] *See* LandCare South Africa, *available at* http://www.nda.agric.za/docs/Landcarepage/landcare.htm ("LandCare [South Africa] is a community based and government supported approach to the sustainable management and use of agricultural natural resources[.] The overall goal of LandCare is to optimi[z]e productivity and sustainability of natural resources so as to result in greater productivity, food security, job creation and better quality of life for all."). *See generally* NATIONAL DEPARTMENT OF AGRICULTURE, IMPLEMENTATION FRAMEWORK FOR THE LANDCARE PROGRAMME (1999), *available at* http://www.nda.agric.za/docs/Landcare/landcare.htm, for a more detailed description of the LandCare program.

[37] Christian Pieri, Guy Evers, John Landers, Paul O'Connell, & Eugene Terry, *No-Till Farming for Sustainable Rural Development* 1–2 (The Int'l Bank for Reconstruction and Devel., Agric. & Rural Devel. Working Paper, 2002), *available at* http://info.worldbank.org/etools/docs/voddocs/339/665/NotillFarmingforSustainableDevelopment.pdf

("No-till farming encompasses four broad, intertwined management practices:

- Minimal soil disturbance (no plowing and harrowing),
- Maintenance of a permanent vegetative soil cover,
- Direct sowing, and
- Sound crop rotation.").

[38] NOZIPHO, SHABALALA & BRENDA MOSIMA, STATISTICS SOUTH AFRICA, REPORT ON THE SURVEY OF LARGE AND SMALL SCALE AGRICULTURE 95 tbl.9.3 (2002), *available at* http://www.statssa.gov.za/publications/LargeSmallScaleAgri/LargeSmallScaleAgri.pdf.

farmers who adopt no-till technology lower their costs because they save labor and they save energy.[39]

In addition, no-till farming introduces more organic material into the soil which improves soil conditions over the long-term and reduces soil erosion.[40] Crops planted this way are better able to withstand the dry season because left-over organic matter in the soil lessens evaporation.[41] No-till also puts more potassium and nitrogen in the soil.[42] Overall, no-till farming leads to larger and more stable crop yields.

C. The Benefits of Combi-Packs

In order to generate more benefits and increase crop yields, farmers needed better agricultural inputs. Previously, they only had access to low-yielding open pollinated variety seed or to the seeds, fertilizer, and herbicides designed for big commercial farmers.[43] The higher costs of these larger units meant farmers would need a loan to afford their inputs, or they would go without. Because smallholder farmers often work communal land (rather than individually owned, freehold property, which is easier to collateralize), suffer from illiteracy, or lack a credit history, it is very difficult for them to access credit.[44]

As a result of traveling to rural areas and talking extensively with smallholder farmers, employees at Monsanto South Africa recognized a need, and an opportunity. Smallholders needed access to better, more affordable seed, as well as fertilizers and herbicides. Monsanto's opportunity was creating products for this often-neglected market and their response was the development of the Combi-Pack. Monsanto recognized that servicing smallholders would allow it to explore and learn about a market with a huge potential for growth. Monsanto implemented the Combi-Pack project in part because it could lead to a better understanding of the smallholder market and useful market information.[45] If the

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[39] *See* WORLD DEVELOPMENT REPORT 2008, *supra* note 10, at 163.

[40] *Id.* at 163-64.

[41] David R. Huggins & John P. Reaganold, *No-Till: the Quiet Revolution*, SCI. AM., July 2008, at 7, *available at* http://www.agriculture-de-conservation.com/doc/revolution_semis_direct.pdf.

[42] Interview with Mamati Tembe, in Johannesburg, S. Afr. (Sept. 26, 2005).

[43] Farmers also face crop losses from the African maize stem borer, an insect than can reduce crop yields quite substantially. *See* Marnus Gouse, Carl E. Pray, Johann Kirsten & David Schimmelpfennig, UNIV. OF PRETORIA, A GM SUBSISTENCE CROP IN AFRICA: THE CASE OF BT WHITE MAIZE IN SOUTH AFRICA 1, *available at* http://www.up.ac.za/dspace/bitstream/2263/2854/1/Gouse_GM(2005).pdf.

[44] *See* Karol Boudreaux, *The Effects of Property Titling in Langa Township, South Africa* 24-37 (Pol'y Comment No. 4 Mercatus Policy Series 2006), *available at* http://www.enterprise-africa.org/Publications/pubID.2464/pub_detail.asp, for a discussion of some of the difficulties South Africans face using commercial credit.

[45] *Id.* Monsanto's efforts in this area are notable because they run counter to expectations such as the following: "It is widely accepted that private profit motivated agricultural technology companies are not strongly attracted to the development of technologies appropriate to, or inclusive of, smallholder farmers because they do not represent a major market, especially in non-Green

company developed a profitable product for the South African market, it might be able to capitalize on the much larger smallholder market in other African nations. [46]

Combi-Packs meet smallholders' needs in at least three ways. First, they address the issue of food security. Black smallholder farmers, the initial target market for Combi-Packs, often live on marginal land due to apartheid-era policies.[47] Growing sufficient amounts of maize, a key staple of South African diets, can be difficult due to poor soil conditions in these areas.[48] The inputs contained in Combi-Packs, combined with no-till technology, allow farmers to increase their crop yields which, in turn, improve food security. Second, while the Combi-Pack is more expensive than open-pollinated variety (OPV) seed, it is affordable for at least some farmers.[49] The price for a Combi-Pack with conventional seed is R232 (approximately $35), with Roundup Ready seed R343 (approximately $52), and with Yieldgard Seed, R328 (approximately $50). Finally, the Combi-Pack is a bundled product providing not only seed, but also fertilizers, pesticides, and herbicides. Having these three inputs together in one package is convenient and potentially time saving for farmers who can get what they need in one place and one package.

On its Combi-Pack webpage, Monsanto Area Director for Sub-Saharan Africa, Kobus Lindeque, says: "We have found in the past that many of the smaller farmers only focused on some of the inputs. Either they buy proper hybrid seed and then save on fertilizer and herbicides or the other way round. We believe that this Combi-Pack can keep these farmers on their land in the future."[50]

A former member of the Monsanto smallholder team, Ms. Mamati Tembe,

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Revolution poor countries." Jonathan Kydd, *Agriculture and Rural Livelihoods: Is Globalisation Opening or Blocking Paths Out of Rural Poverty?* 7 (Overseas Dev. Inst., Agric. Res. & Extension Network, Network Paper No. 121 2002), *available at* http://www.sarpn.org.za/wssd/agriculture/kydd/Agric_Livelihoods.pdf.

[46] For example, the company recognized that success selling bio-tech cotton seed in South Africa might lead to sales in other African cotton-growing nations. *See* Marnus Gouse, Carl Pray, & David Schimmelpfennig, *The Distribution of Benefits of Bt Cotton Adoption in South Africa* 4 AGBIOFORUM 7 (2004).

[47] LEONARD THOMPSON, A HISTORY OF SOUTH AFRICA 191-92 (Yale University Press 2000).

[48] Machethe states: "Although the country [South Africa] is self-sufficient in food production, about 14 million people are said to be vulnerable to food insecurity and 43 percent of households suffer from food poverty." Machethe, *supra* note 27.

[49] One study notes that while 10% of smallholder farmers plant with hybrid (resulting from a cross between parent plants that are genetically unlike) seeds, such as those found in the Combi-Pack, 90% still plant with less costly open pollinated varieties or with saved seeds (both OPV and hybrid). Saved hybrid seeds, when planted, revert back to the original parent plants and do not yield as well as the original hybrid seeds. Combi-Packs contain relatively inexpensive packages of hybrid seeds, fertilizer, and herbicide and are made available at local extension offices or at farmers' cooperatives. *See* Gouse *et. al*, *supra* note 43, at 7.

[50] Monsanto South Africa Products & Solutions: Combi Packs, http://www.monsanto.co.za/en/layout/products/combi/default.asp (last visited Nov. 20, 2008).

told us that the Combi-Pack was developed to "empower" communities. She said: "It just had to be done. There was a need. It was difficult, but it had to be done."[51]

II. PERSONAL NARRATIVES: A VARIETY OF EXPERIENCES USING THE COMBI-PACK

"Raising the output of small and marginal farmers is a necessary condition for eradicating rural poverty in Africa. It also has a larger multiplier effect in the rural economy than increasing productivity in commercial farming."[52]

> Agriculture contributes to poverty alleviation at rural, urban and national levels in three ways: (a) reducing food prices; (b) employment creation; (c) increasing real wages; and (d) improving farm income. . . . Agricultural growth has strong and positive impact on poverty often significantly greater than that of other economic sectors.[53]

Maize is South Africa's most important grain crop.[54] Yellow maize provides food for livestock, while white maize is the staple food of most South Africans. Although the total area being planted with maize has dropped over the past several years, approximately one-quarter of the arable land in South Africa is planted with yellow maize.[55]

Despite the declining number of hectares being planted, overall production is rising and maize continues to play an important role for smallholders both in terms of providing subsistence and generating cash income. For South African smallholder farmers, farming income, as opposed to government pensions, wages, or remittances, provides the largest portion of their average monthly income.[56] Farmers in former homelands, who are predominantly smallholders, generate 67.5 percent of their total farming income from the sale of maize for

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[51] Interview with Mamati Tembe, in Johannesburg, S. Afr. (Sept. 26, 2005).

[52] EUROPEAN COMMISSION, PRACTICAL ACTION / PELUM, THE CRISIS IN AFRICAN AGRICULTURE: A MORE EFFECTIVE ROLE FOR EC AID? 27 (2005), *available at* http://www.practicalaction.org/docs/advocacy/the_crisis_in_african_agriculture.pdf [hereinafter PRACTICAL ACTION].

[53] Machethe, *supra* note 27 (citing FOOD AND AGRIC. ORG., SOCIO-ECONOMIC ANALYSIS AND POLICY IMPLICATIONS OF THE ROLES OF AGRICULTURE IN DEVELOPING COUNTRIES, SUMMARY REPORT (Econ. & Soc. Dept., Rome, Italy 2004)).

[54] "Maize is one of the most important staple foods in South Africa." Press Release, CGIAR and CIMMTY, South Africa – CGIAR Partnership Results in New Maize Varieties with 30 to 50 % Higher Yields, (May 21, 2001), *available at* http://www.worldbank.org/html/cgiar/press/news010521.pdf.

[55] *See* NICK VINK, S. AFR. DEPT. AGRIC., SOUTH AFRICAN AGRICULTURE 10 YEARS AFTER DEMOCRACY 17 (2004), *available at* http://www.nda.agric.za/docs/Cropestimates/AFMA%2010%20Years.pdf.

[56] Data from a survey of smallholder farmers in Limpopo Province, South Africa indicates that farming income contributed 27.7% of their monthly income, compared to 23.6% for remittances, 23.1% for wages, and 16.5% for pensions. *See* Machethe *supra* note 27, *at* 4 tbl.2.

grain or consumption.[57] Increasing farming income may, therefore, have important benefits for poverty alleviation. We present personal narratives of farmers who have used the Combi-Pack along with no-till planting. These farmers live in Belgrade in Kwa-Zulu Natal; in Hlabisa, also in Kwa-Zulu Natal; and, in Mlondozi in Mpumaplanga, South Africa.

A. The Mlondozi Farmers Association

Mlondozi is located in a former homeland area. Under apartheid, black South Africans were relocated to homeland areas in order to free up more desirable land for white South Africans.[58] Mlondozi is home to over 5,000 farming families, many of whom were barely producing enough food to support themselves in 1999.[59]

Monsanto has worked in this area for several years, primarily through the Mlondozi LandCare project. The LandCare project, a joint effort between Monsanto and local authorities, teaches farmers how to use no-till conservation farming in combination with Monsanto products to improve soil conditions and increase crop yields.[60] The project began in 1999 with 18 farmers.[61] Previously, these farmers worked with the South African Department of Agriculture and support from the Australian government to conduct small field trials demonstrating no-till planting to the community.[62]

After these initial demonstrations, Monsanto representatives recommended combining no-till with their hybrid seeds. The result was good yields without

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[57] *See* REPORT ON THE SURVEY OF LARGE AND SMALL-SCALE AGRICULTURE, *supra* note 38, at 51 tbl.5.6.

[58] The Homelands were rural areas set aside by the apartheid government for black South Africans to live. *See* THOMPSON *supra* note 47, at 191-92.

[59] *See* Monsanto South African Sharing: Mlondozi LandCare Project, http://www.monsanto.co.za/en/layout/our_pledge/sharing/mlondozi.asp [hereinafter Sharing: Mlondozi].

[60] The Mlondozi LandCare Project "was initiated in 1999 as a partnership between the Mlondozi Farming Community, Mpumalanga Department of Agriculture, Conservation and Environment, the Agricultural Research Council Institute for Soil, Climate and Water and Monsanto. The major funding was from the Australian government in support of the LandCare programme. There are other specialists from the ARC Plant Protection Research Institute and the Grain Crops Institute, who give very valuable professional advice to help ensure success. The concept is to introduce modern conservation agriculture technologies to a rural small-scale farming community to ensure sustainable and profitable crop production." *Id.*

[61] The first demonstrations were conducted on 50 meter x 50 meter plots. There were 17 farmers involved. Quickly, people could see that yields went up on these plots. In the second year 178 people used no-till and in the third year the number of local people adopting no-till was up to 360. *Id.*

[62] Concerning this process, Monsanto literature states: "It is a new learning process and experience, which requires time for confidence to be gained and expertise to be perfected. It is recommended that a group of five to ten farmers, preferably all within walking distance of each other, form a cluster with the extension officer facilitating open discussion, evaluation and farmer visits to each others plots. In the second and third years the group can be expanded as new farmers start to evaluate and adopt the technologies." *See* Sharing: Mlondozi, *supra* note 59.

plowing — meant reduced costs and labor time. Yields in Mlondozi increased from an average of 1.31 tons per hectare in 1999 to six tons per hectare in 2001. Farmers' incomes rose 25 percent between 1999 and 2000 and 71 percent between 1999 and 2001.[63]

One of the Mlondozi farmers who has benefited from using the new techniques is Mrs. Swelekile Nkosi. Mrs. Nkosi is a soft-spoken woman and the mother of ten children. For many years she spent long hours tending the fields that help feed her family. She does this because, like African women across the continent, she is largely responsible for raising the crops her family relies on for their food and animal feed.[64]

Mrs. Nkosi's farm is three hectares (approximately six acres). In the past, she grew her maize as many still do in Mpumalanga: her husband would plough a field, turning the soil to make it ready for planting. Once the field was plowed she would go into the field and plant the maize seed by hand. This was only the beginning of a long season. Each day she would spend many hours weeding the field by hand, looking out for insects called stem borers that destroy maize, and trying to keep the neighbors' cattle or goats out of the field. At season's end in May, she would then harvest, again by hand, the ears of corn not claimed by pests or disease. She would then help store the grain and prepare her family's meals using this maize.

Like all farmers, Mrs. Nkosi has many concerns. In the past, she worried about harvesting enough maize to feed her family. When it rained, Mrs. Nkosi worried about soil erosion and her fields washing away. When it did not rain, she worried about her crops withering. If the rains came, she worried about having extra maize to sell at market so that she could pay for school fees and clothes.

Mrs. Nkosi still has worries. But now that she and her husband have adopted no-till farming and Combi-Packs to grow maize, she does not worry as much about soil erosion. Mr. Nkosi no longer needs to plow the field, thus saving money. Perhaps most importantly, she does not worry as much about feeding their family or paying for school because they have produced a surplus of maize for several years.

The Nkosis now grow a surplus of maize because she and her husband adopted new technologies. In 2005, Mrs. Nkosi planted four Combi boxes on the field, which yielded approximately three tons of maize. This was enough to

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[63] *Id.*

[64] "Rural women in particular are responsible for half of the world's food production and produce between 60 and 80 percent of the food in most developing countries. Yet, despite their contribution to global food security, women farmers are frequently underestimated and overlooked in development strategies. Rural women are the main producers of the world's staple crops – rice, wheat, maize – which provide up to 90 percent of the rural poor's food intake." FAO Gender and Food Security/Agriculture, http://www.fao.org/gender/en/agri-e.htm (last visited July 28, 2008); *see also* Markwei et al., *supra* note 5, at 8.

feed her family and have a surplus. The costs associated with growing and harvesting the maize were lower as well.[65] Before using Combi-Packs and no-till, the Nkosis had low crop yields — around two tons of maize per season — and difficulties feeding their large family. Now, she grows more food using less labor. Her family has greater food security and she spends less time in the field because she does not need to do as much weeding as in the past.

The Combi-Pack was not specifically designed for women but the benefits of this product for women, and older men, are particularly clear when combined with no-till agriculture: more food is grown with less back-breaking work. With more and more families in SSA becoming female-headed (due to conflict and the spread of HIV/AIDS) there is a pressing need to provide women with the tools to take charge of their families. They surely need safe environments where rule of law exists, but they also need to feed their families. Monsanto's Combi-Pack provides one tool to help achieve this goal.

B. Farmers in Belgrade

George and Queen Thango live on the dry, rocky land near the small community of Belgrade in KwaZulu-Natal Province. The Thangos use the no-till method along with Monsanto's Roundup-Ready seed, a biotech product. George's 2005 harvest totaled 60 bags of maize (approximately 4200 Kg or 4.5 tons) from one hectare. The Thango family normally consumes about 12 bags of maize per year, so the 2005 harvest represented a substantial surplus. In the past, this same area would have yielded approximately 25 bags, but now produces nearly three times more. The Thangos sell their surplus crop and can expect an increase in income due to maize prices rising in response to increased global demand.[66]

Queen remembers when she depended on her garden as the family's primary source of food and extra income. After spending a long day in the fields, Queen worked in the evenings at her sewing machine to earn extra money. Since they adopted no-till planting and Monsanto products, Queen has not touched her sewing machine. She now chooses not to sew and instead, has some leisure time. Their perception is that no-till is better than conventional planting because it saves time and money. They now spend less time in the fields and no longer need to hire someone else to plow or weed.

With the extra income the Thangos earn from the sale of surplus maize and lower costs, they are better able to pay for their children's education in addition

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[65] The cost savings associated with no-till can be quite substantial. Monsanto estimates that it can cost on average R2,000 per hectare to plow fields in this area, however, local extension agents cited a R500/hectare figure for plowing costs in Mlondozi. *See* Sharing: Mlondozi, *supra* note 59.

[66] *See generally* DEP'T OF AGRIC. AND LAND REFORM, MAIZE INDUSTRY: SITUATIONAL ANALYSES, MARKET INDICATORS, AND OUTLOOK FOR 2008 SEASON (2007), *available at* http://www.agrinc.gov.za/docs/Maize%20Outlook%202008.pdf.

to purchasing agricultural inputs. All three of the Thangos' sons attend school. Their oldest child, who is 21, attends the University of KwaZulu-Natal at Pietermaritzburg and is studying to be a civil engineer. His studies are financed partly by his parents, with the money generated through farming, and partly by student loans.[67]

While George and Queen originally farmed only a small plot around their home, they have gained valuable experience, confidence, and financial security from their use of the Combi-Pack and no-till farming. This in turn has allowed them to farm a larger parcel.[68] Today, George and Queen are no longer subsistence farmers; they consistently grow a surplus of maize. They reinvest this income into their farm and family, renovating their home, and educating their children. George and Queen also routinely advise neighbors interested in emulating their success. They have started up a ladder towards greater economic empowerment and are helping others do the same.

Mr. Rabie Mntungwa is a tall thin man; father of nine and another of the no-till farmers who has graduated from the Combi-Pack to Roundup Ready maize seed, a stand alone product. He is satisfied with his experiences using Monsanto seeds and minimum till planting. His crop yields have increased and his wife does not work as hard as she previously did. In 2005, he harvested 13 tons of maize from the five hectares he planted and reported making three times more money in 2005 than in 2004.[69]

Rabie is making the transition from smallholder to small-scale commercial farmer. He planted five hectares in 2005, but increased to 13 hectares for the 2006 planting season. He feels comfortable moving to this larger area because he has gained valuable experience and knowledge from his previous success.

With the income he has earned from his surplus, he purchased a second-hand

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[67] Like many students in South Africa, the Thango's son was able to use a loan to supplement the finances available from his family. Student loans are available through the formal banking sector (from South African bank such as ABSA Bank and Standard Bank) or through the National Student Financial Aid Scheme, which is funded by the National Department of Education. Grants can also be obtained through the institution the applicant is attending or, in some cases, through companies that borrowers will work for after graduation. While efforts have been made to grant more loans to need-based applicants, financing is still dependent on factors such as the credit history of applicant or co-signer, academic performance, and the course of study. The money obtained can be used for school fees, books, equipment, and accommodation. Students are only required to pay the interest on student loans while they attend university. Full repayment begins after graduation. *See National Student Financial Aid Scheme*, https://www.nsfas.org.za/web/view/general/general_home/generalhome; ABSA student loan program, http://www.absa.co.za/absacoza/content.jsp?VGN_C_ID=5b73830f83d52010VgnVCM1000003511060aRCRD&VGN_CI_ID=f27b08b0b8262010VgnVCM1000003511060aRCRD (thanks to Johan van der Walt for this insight).

[68] Under a communal land system, the chief or traditional leader allocates land to members of the community. Unused land may be requested by those community members who believe they can make use of it.

[69] Interview with Rabie Mntungwa, in Belgrade, S. Afr. (Sept., 28, 2005).

tractor, which he uses to plant half of the land he farms, planting the other half by hand. In addition, Rabie is not only feeding his family, he is providing employment to others: in 2005 he hired eight people to help bring in the harvest. He imagines he will need to hire ten people for the 2006 season.[70] These jobs are the result of the land's increased productivity as Rabie's higher crop yields require him to hire workers to gather it.

Over the past few seasons the Mntungwa have solved their food security problem. Mrs. Mntungwa said: "they have chased away hunger."[71] The additional income the family earns allows them to do other things. With nine children, eight of whom still live at home, Rabie said he has lots of expenses, especially school fees and clothes, but can better manage these now. His goal for 2006 is to buy a family car and take a holiday.

C. The Hlabisa Farmers Association

Mr. Jeconia Ngema is Chairman of the Hlabisa Farmers' Association. His group first used Combi-Packs in 2002,[72] and began using no-till technology in 2003. Monsanto and the local agricultural extension office jointly organized demonstration plots to introduce Combi-Packs and no-till planting in Hlabisa. The results have been encouraging as yields in the area are reported to be much higher.[73]

Adopting these technologies means that the men are better able to look after cattle because they do not need to spend as much time in the fields. Women also spend less time in the fields hoeing and weeding; allowing more time for domestic work.[74] Mr. Ngema also explained that using the Combi-Pack and no-till has been especially helpful for older farmers, who are less able to manage the physical work involved in plowing and constantly weeding the fields. Furthermore, no-till saves these farmers from the financial costs of plowing.[75]

Monsanto's experience with the Combi-Pack suggests that this product is best viewed as a transition product. Smallholders use Combi-Packs to plant small areas and once they see the results they can generate, they plant larger plots with other seed or larger quantity packages, selling surplus maize to generate income. This shift from subsistence to more extensive farming allows smallholders to climb the ladder of economic empowerment. At the same time, Monsanto develops clients likely to use more seed and other inputs. Thus, Combi-Packs provide an essential step between subsistence farming and sustainable, small-

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[70] *Id.*

[71] Interview with Mrs. Mntungwa, in Belgrade, S. Afr. (Mar. 17, 2006).

[72] Interview with Mr. Jeconia Ngema, Chairman of the Hlabisa Farmers' Ass'n, in Hlabisa, S. Afr. (Mar. 17, 2006).

[73] *Id.*

[74] *Id.*

[75] *Id.*

scale commercial farming. This in turn provides long term benefits to both the farmers and the company.

The future of Combi-Packs may be brightest in other developing nations, where agriculture is a larger share of the economic life than in South Africa.[76] In these countries, subsistence farmers might find a path towards self-sufficiency and empowerment through this product, which allows them to raise enough to feed themselves and their families (assuming sufficient rain and few pests).

The kinds of products offered in the Combi-Pack provide the means to increase crop yields, promote greater food security in Africa, and reverse the tragic trends of the past several decades. To date, Combi-Packs have also been sold in Nigeria and Kenya — just the beginning of what could, given the right institutional environment, be a move towards greater food security and income opportunities across SSA.[77] It also represents a successful entrepreneurial BOP strategy on the part of a major multinational corporation.

III. A DIFFERENT LEGAL FRAMEWORK

Smallholder farmers in South Africa are able to benefit from Combi-Packs, in part, because a particular legal framework exists in the country. Monsanto operates in South Africa because of a lucrative commercial agriculture sector[78] where most of the company's business is focused. But Monsanto also benefits from South Africa's legal environment, favorable business climate, and superior infrastructure (compared to other SSA countries).[79] Although black farmers faced tenure insecurity under the apartheid-era government, today smallholder farmers have reasonable tenure security in the land they work.[80] South African smallholder farmers do face many problems, but they also benefit from the

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[76] *See* PRACTICAL ACTION, *supra* note 52, at 6.

[77] To date, packages similar to Combi-Packs have also been sold in Malawi and Kenya, though with in Malawi the package was oriented toward tobacco. Letter from Paul Chimimba, Monsanto Malawi (Aug. 7, 2008); Letter from Abraham Mbungi, Sales Executive, Monsanto Kenya (Aug. 15, 2008) (on file with K. Boudreaux).

[78] *See* REVIEW OF AGRICULTURAL POLICIES, *supra* note 25, at 43–44 and *Agricultural Policy Reform in South Africa*, ORG. FOR ECON. CO-OPERATION AND DEV. OBSERVER, Apr. 2006, at 3, *available at* http://www.oecd.org/dataoecd/31/45/36581609.pdf, for a description of South Africa's agriculture sector,

[79] Doing Business ranks South Africa as the second easiest place to do business in Sub-Saharan Africa. Despite increasing its overall standing in the 2008 rankings, South Africa moved backward in several categories, including: Registering Property and Paying Taxes. DoingBusiness.org, Economy Rankings – Sub-Saharan Africa, http://www.doingbusiness.org/economyrankings/?regionid=7 (last visited Nov. 20, 2008); DoingBusiness.org, Explore Economies, http://www.doingbusiness.org/ExploreEconomies/?economyid=172 (last visited Nov. 20, 2008).

[80] *See* THOMPSON, *supra* note 47, at 191 (the Homelands were rural areas set aside by the apartheid government for black South Africans to live).

country's relative institutional stability, as does Monsanto.

The experience of smallholders in South Africa suggests that certain legal elements are needed to support a Green Revolution in other parts of Africa. These include land tenure security and legal frameworks that support the commercial use of hybrid or genetically modified ("GM") seeds. Smallholder farmers across SSA would also benefit from changes to both current U.S. food-aid policies and trade regimes among SSA nations. Lowering tariff barriers to regional trade, coupled with "buy local" policies for food-aid, would help to stimulate local agricultural markets and allow products to move more rapidly from areas with a surplus to areas with poor harvests.

A. The Need for Tenure Security

> The issue of security of tenure is . . . fundamental in rural areas. The key to sustainable rural development is for the rural poor and the landless to have legally secure access to assets. Insecure land tenure in rural areas acts as a direct disincentive to investment in sustainable practices of land management. The resulting land degradation and soil loss threaten food security with implications for water resources and the conservation of biodiversity.[81]

Secure tenure in land provides a critical asset for the rural poor.[82] Tim Hanstad, a leading expert on land tenure issues in the developing world, has written: "[i]ndividual and secure land tenure rights are vital components of a productive agricultural sector, which is crucial to poverty alleviation and economic growth."[83] The World Bank, in its most recent World Development Report, argues that people who have insecure tenure rights to land have reduced incentives to use land productively or make "land-related investments."[84] Conversely, when people hold secure property rights they are more likely to

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[81] SEE UNITED NATIONS COMMISSION ON HUMAN SETTLEMENTS, SPECIAL THEMES: SECURITY OF TENURE: REPORT OF THE EXECUTIVE DIRECTOR, DELIVERED TO THE COMMISSION ON HUMAN SETTLEMENTS, U.N. Doc. HS/C/18/6 (Nov. 9, 2000), *available at* http://www.unhabitat.org/downloads/docs/1805_55086_HS_C_18_6.pdf.

[82] *See* KLAUS DEININGER, WORLD BANK, LAND POLICIES FOR GROWTH AND POVERTY ALLEVIATION 43 (2003) (arguing "greater tenure security can enhance access to credit, thereby increasing the value of investment undertaken in situations in which limited credit supply constrains investment"); *see also* Klaus Deininger & S. Jin, *Tenure Security and Land-Related Investment: Evidence from Ethiopia*, 50 EUR. ECON. REV. 5 (2006); Timothy Besley & Robin Burgess, *Halving Global Poverty*, 17 J. OF ECON. PERSP. 3, 16 (2003) (arguing "obtaining property rights over land in urban areas can also help poor households to gain access to credit, increase labor supply and improve productivity").

[83] Tim Hanstad, *Designing Land Registration Systems for Developing Countries*, 13 AM. U. INT'L L. REV. 647, 649 (1998).

[84] WORLD DEVELOPMENT REP. 2008: AGRICULTURE FOR DEVELOPMENT 138 (2008), *available at* http://siteresources.worldbank.org/INTWDR2008/Resources/2795087-1192112387976/WDR08_00_FM.pdf.

invest in both physical and human capital.[85]

The Bathurst Declaration on Land Administration for Sustainable Development defines tenure security as the way in which the rights, responsibilities, and restrictions that people have over land and property are held.[86] Land tenure takes many different forms with government ownership, communal ownership, leasehold, and freehold being common. As noted by UN-HABITAT:

> Security of tenure implies that the right of access to and use of land and property is underwritten by a known set of rules, and that this right is justifiable .... In practice, households having secure tenure rights are protected from involuntary removal from their land or residence.[87]

UN-HABITAT defines tenure security as "the right of all individuals and groups to effective protection by the state against forced evictions."[88] Secure tenure is considered to be one component of the right to adequate housing, which is part of the right to an adequate standard of living under the United Nations Declaration of Human Rights.[89]

Often government actions limit tenure security. A recent, extreme example is

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[85] *See* Joyce Palomar, *Land Tenure Security As a Market Stimulator in China*," 12 DUKE J. COMP. & INT'L L. 8 (2002) ("Land tenure security is essential to stimulate the development of land. If land tenure is not secure, both local and foreign investors will be hesitant to invest in land development."); *see also* DEININGER, *supra* note 82, at 39 ("From an economic point of view, secure tenure is critical to provide incentives for households and entrepreneurs to undertake land-related investments. If their ability to keep the benefits from investment is uncertain, they are unlikely to invest or exert effort. . .").

[86] UN HABITAT Urban Shelter: Security of Tenure, *available at* http://ww2.unhabitat.org/Istanbul+5/32.pdf. Discussing the concept of tenure, J. David Stanfield & Steven E. Hendrix write: "the concept of tenure refers to the rules whereby a society defines the access people have to the land, the uses to which people put the land, and the economic benefits generated from those uses. Tenure includes such familiar concepts as a property title, life estate title, a leasehold title, a usufruct title, etc." J. David Stanfield & Steven Hendrix, *Ownership Insecurity in Nicaragua*, 22 CAP. U. L. REV. 939 (1993).

[87] Stanfield & Hendrix note that tenure insecurity has both objective and subjective elements: "Objectively, insecurity can arise from the absence of a legal document defining a right, or the existence of multiple documents describing the same rights for different people or entities over the same piece of land. Subjectively, insecurity can occur under conditions of a rising probability of losing rights to land; these conditions arise when society's rules of tenure change or when the power of one group to defend its rights wanes and the power of a competing group rises." *See id.* Obviously, insecurity arises for individuals as well as for groups.

[88] *See* UN HABITAT REGIONAL SEMINAR ON SECURE TENURE, NAIROBI, KENYA, SECURITY OF TENURE: BEST PRACTICES 2 (2003), *available at* http://www.unhabitat.org/downloads/docs/1523_32765_security_of_tenure_bp.pdf. This document records the definition of forced eviction under international law as: "the permanent or temporary removal against their will of individuals, families, and/or communities from the homes and/or land which they occupy, without the provision of, and access to, appropriate form of legal or other protections. *Id.*

[89] *Id. See also* UN DECLARATION OF HUMAN RIGHTS, Art.25, Sec.1. "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services...."

Zimbabwe's Operation Murambatsvina in 2005, which led to the forcible eviction of hundreds of thousands of Zimbabweans thought to oppose the current regime of Robert Mugabe.[90] Sub-Saharan African countries in general do a poor job of protecting rights to property. In its 2008 Report, the International Property Rights Alliance ranked 115 countries according to how well or poorly they protect rights to physical property ("PR") and intellectual property ("IPR").[91] They also ranked these countries' "legal and political environments" ("LP"). By region, the report scored African countries the lowest (on a scale of 1 to 10) in their protection of both physical and intellectual property (see Chart I below). While Latin America scored lower in terms of legal and political environment, African countries overall scored lowest in terms of broad protection for property rights at 4.5 (compared to Western Europe at 7.6).

Chart I

REGION	IPRI	LP	PR	IPR
All Countries	5.5	5.3	6.1	5.1
North America	6.7	6.2	7.0	6.9
Latin America	4.6	4.0	5.4	4.4
Africa	4.5	4.3	5.0	4.1
Middle East/North Africa	5.6	5.6	6.2	5.0
Western Europe	7.6	7.7	7.8	7.5
CEE and Russia	4.7	4.6	5.6	3.9
Asia/Oceania	5.9	5.5	6.6	5.5

Source: International Property Rights Index, 2008 Report

In Africa, women face serious problems in terms of tenure insecurity. As a recent report from the Commission on the Legal Empowerment of Poor notes:

> Women own less than 10 percent of the world's property. They constitute half the world's population; they produce between 60 and 80 percent of the food in developing countries, and they are responsible for rural households in increasing numbers. Much of the misery in the developing world is due to statutory and customary property systems which disenfranchise women.[92]

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[90] *See* CENTRE ON HOUSING RIGHTS AND EVICTIONS & ZIMBABWE LAWYERS FOR HUMAN RIGHTS, OPERATION MURAMBATSVINA: A CRIME AGAINST HUMANITY (2007), *available at* http://www.cohre.org/store/attachments/Operation%20Murambatsvina%20CAH%20Report%20-%20Final%20Web.pdf, for a discussion of why Operation Murambatsvina violated international law.

[91] *See* SATYA THALLAM, INTERNATIONAL PROPERTY RIGHTS INDEX, 2008 REPORT 32, *available at* http://www.internationalpropertyrightsindex.org/.

[92] *See* LEGAL EMPOWERMENT OF THE POOR: CHAPTER 2, EMPOWERING THE POOR THROUGH PROP. RIGHTS 78 (Mercatus Center 2008), *available at* http://www.mercatus.org/uploadedFiles/Mercatus/Publications/ch2.pdf.

Among the specific problems women face are land grabbing,[93] disinheritance,[94] difficulties having property jointly titled in non-civil marriages,[95] and difficulties borrowing money without a male co-signatory. If women, who do most of the agricultural work in Africa, are to be empowered to access credit, consolidate land holdings, purchase equipment to raise productivity, and protect and control the crops they raise — they need to have tenure security. Providing more women with tenure security benefits not only them, but their families as well.[96]

Security of land tenure is plays an important role in providing incentives to invest in land-based activities such as farming, terracing, and irrigation.[97] If a Green Revolution is to happen in Africa, it will be important for countries to create conditions that increase farmer's tenure security. Increased tenure security would, in turn, provide farmers with positive incentives to invest in their land and improve their productivity.

A pressing question then becomes, how can government create greater tenure security for their citizens? Efforts to increase tenure security in Africa are not new. Kenya's colonial-era titling program is perhaps the best-known example of a government-driven effort to create more individualized rights to land in Sub-Saharan Africa.[98] However, titling efforts have produced limited benefits in Africa.[99] In some cases, such as Kenya, titling efforts provided local elites with

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[93] *See* HUMAN RIGHTS WATCH, REPORT VOL. 15, NO. 5(A), DOUBLE STANDARDS: WOMEN'S PROPERTY RIGHTS VIOLATIONS IN KENYA 15 (2003), *available at* http://hrw.org/reports/2003/kenya0303/kenya0303.pdf; *see also* Kaori Izumi, *Gender-Based Violence and Property Grabbing in Africa: A Denial of Women's Liberty and Security*, 15 GENDER & DEVELOPMENT 11, 15 (2007).

[94] *See* UN HABITAT LAND, TENURE & PROPERTY ADMINISTRATION, POLICY MAKERS GUIDE TO WOMEN'S LAND, PROPERTY AND HOUSING RIGHTS ACROSS THE WORLD 18 (2007), *available at* http://www.unhabitat.org/pmss/getPage.asp?page=bookView&book=2355 [hereinafter POLICY MAKERS GUIDE TO WOMEN'S LAND]; *see also* Richard S. Strickland, *To Have and To Hold, Women's Property and Inheritance Rights in the Context of HIV/AIDS in Sub-Saharan Africa* 28-31 (Int'l Center for Res. on Women, Working Paper, June 2004), *available at* http://www.icrw.org/docs/2004_paper_haveandhold.pdf.

[95] POLICY MAKERS GUIDE TO WOMEN'S LAND, *supra* note 94, at 22.

[96] *See generally* A. QUISUMBING & JOHN MALUCCIO, INTRAHOUSEHOLD ALLOCATIONS AND GENDER RELATIONS: NEW EMPIRICAL EVIDENCE FROM FOUR DEVELOPING COUNTRIES (INT'L FOOD POLICY RES. INST., Discussion Paper No. 84, 2000).

[97] As Palomar notes: "Secure property rights . . . encourage holders to invest in their property because of the certainty that the property will not be usurped. From a strictly economic standpoint, therefore, the true purpose of property rights is not to benefit the individuals or entities holding those rights, but to give them the incentive to increase the value of their assets by investing, innovating, or combining them advantageously with other resources, something which would have beneficial results for society." *See* Palomar, *supra* note 85, at 13.

[98] Jean Ensminger, *Changing Property Rights: Reconciling Formal and Informal Rights to Land in Africa*, in THE FRONTIERS OF THE NEW INSTIT. ECON. 165, 175–91 (J.N. Drobrak & John V.C. Nye eds., 1997); *see also* S.F.R.Coldham, *Land-Tenure Reform in Kenya: The Limits of Law*, 17 J. OF MOD. AFR. STUD 615 (1979); *see also* Joseph Blocher, *Building on Custom: Land Tenure Policies and Economic Development in Ghana*, 9 YALE HUM. RTS. & DEV. L. J. 167 (2006).

[99] *See* Karol Boudreaux, *The Effects of Property Titling in Langa Township, South Africa*

opportunities to take control of land that had been used by less educated rural peoples. If not carefully managed, titling programs can cause the poor and other marginalized groups to lose what little tenure security titling provides. In other cases, titling provides a legal document to the male head of the household and not to the man's wife.[100] A failure to jointly title land, or refusal to recognize the rights of women married according to customary practices, can result in women losing traditional rights to use or work land.[101] Finally in many countries, government land administration agencies charged with managing titling efforts are "[some] of the most corrupt public services."[102]

Increasingly, scholars look to local customary law as offering hope for strengthening and securing land rights in Africa.[103] Customary law is evolved law, having changed over time to meet specific needs in specific environments.[104] In some cases, African customary law may provide a greater degree of tenure security than formal law, which government officials can modify, repeal, or replace, at times in a non-transparent, arbitrary fashion.

Customary law, however, has its own drawbacks such as when traditional authorities or leaders are in conflict with one another or conflicting allocations of resources are made.[105] Further, customary law typically limits the rights women hold to land, so strategies to increase tenure security relying on customary land law must take this challenge into account.[106] The World Bank notes that: "[o]ver the last decade, a large number of African countries adopted a wave of new land laws to recognize customary tenure, make lesser (oral) forms of evidence on land rights admissible, strengthen women's land rights, and

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(Pol'y Comment No. 4 Mercatus Policy Series, April, 2006); *see generally* T.C. Pinckney & P,K. Kimuyu, *Land Tenure Reform in East Africa: Good, Bad or Unimportant?*.3 J. OF AFR. ECON. 1, 1-28 (1994).

[100] *See* CENTER ON HOUSING RIGHTS AND EVICTIONS, WOMEN AND HOUSING RIGHTS 10 (2000), *available at* http://www.cohre.org/store/attachments/COHRE%20Sources%205.pdf.

[101] WORLD DEVEL. REP., *supra* note 10, at 139.

[102] *Id.* at 41.

[103] Blocher, *supra* note 98, at 167-68 (arguing "[r]econciliation of customary and statutory property law in Africa has never been more important, nor more difficult, than it is now.").

[104] *See* Karol Boudreaux, *The Human Face of Resource Conflict: Property and Power in Nigeria*, 7 SAN DIEGO INT'L L. J. 89, 89-92 (2005), for a discussion of this point, as it applies in Nigeria.

[105] Alain Durand-Lasserve, *Informal Settlements and the Millennium Development Goals: Global Policy Debates on Property Ownership and Security of Tenure*, 2 GLOBAL URB. DEVEL. MAG. 1, 1-15, *available at* http://www.globalurban.org/GUDMag06Vol2Iss1/Durand-Lasserve.htm; *see also* LORENZO COTULA, INT'L INST. FOR ENVIR. AND DEVEL., CAMILLA TOULMIN, & JULIAN QUAN, BETTER LAND ACCESS FOR THE RURAL POOR: LESSON FROM EXPERIENCE AND CHALLENGES AHEAD 22-3 (2006), *available at* http://www.iied.org/pubs/pdfs/12532IIED.pdf.

[106] *See* Aili Mari Tripp, *Women's Movements, Customary Law and Land Rights in Africa: The Case of Uganda*, AFR. STUD. Q. 7, NO.4 (2004), *available at* http://web.africa.ufl.edu/asq/v7/v7i4a1.htm (discussing how this potential conflict has been managed in Uganda).

establish decentralized land institutions."[107] In Uganda, these changes have resulted in increased investments in land and agricultural productivity.[108]

As Geoffrey Payne points out, there are many different ways to provide tenure security.[109] Some of the legal tools that have served as alternatives to titles include certificates of rights and long-term certificates of occupancy.[110] So long as the broader institutional environment is relatively stable, well defined rights can give rural residents increased tenure security.

A first step in the process of creating security, as outlined by Payne, might involve a government official issuing a statement that residents will not be relocated for a set period of time.[111] Steps can then be taken, gradually and based on local demand, to formalize informal properties. Formalization may or may not require titling, but titling should be considered among a number of possible policy tools for securing tenure. Key components of a policy to increase tenure security would include cataloguing existing rights, with input from local residents, and creating accessible dispute resolution mechanisms that draw on local knowledge. It is also important that any property transfers be low-cost and, whenever possible, recorded at local, decentralized government offices. Keeping transaction costs low will help the rural poor.

Empowering the rural poor with increased tenure security and enforceable property rights should reduce land-related conflict,[112] promote investment and entrepreneurship, and help to alleviate poverty. At the same time, it would encourage the development of local governance institutions.[113] All of these outcomes are important to support a Green Revolution in Africa. Reducing land-related conflict will allow farmers to grow crops under more peaceful conditions, thereby reducing losses associated with violent conflict. Because the current levels of productivity in SSA are so low, identifying policies that will help spur local investment are of the utmost importance. International donor

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[107] *See* WORLD DEVEL. REP., *supra* note 10, at 139.

[108] *Id. See also* G. Pascal Zachary, *The Coming Revolution in Africa,* 1 WILSON Q. 32, 50-66 (2008).

[109] GEOFFREY PAYNE, GLOBAL LAND TOOL NETWORK MEETING, STOCKHOLM, SWEDEN, REVIEWING TITLING & OTHER TENURE OPTIONS 2-3 (2005), *available at* http://www.gpa.org.uk/ then go to conferences; *see also* DEININGER, *supra* note 82, at 38.

[110] Payne, *supra* note 109. *See* UN VOLUNTEERS, *Vietnamese Land Use Certificates Must Now Bear Both Husband and Wife Names* (2004), http://dynamic.unv.org/infobase/voices/2004/vietnam.htm (for a discussion of Land Use Right Certificates in Vietnam.)

[111] PAYNE, *supra* note 109, at 2–3.

[112] *See* USAID, LAND AND CONFLICT: A TOOLKIT FOR INTERVENTION 3 (2005) ("[v]iolation of insufficiently protected land tenure rights can lead to conflict and violence. . . . People with insecure tenure rights are often indiscriminately or forcibly removed from their land. In many countries, rural dwellers with weak tenure are pushed off their lands without fair compensation or due process. . . . Tenure insecurity has been party of the dynamic of violence in many places including Uganda, Angola, Rwanda, Burundi, Tajikistan, Krygystan, Papua New Guinea, urban Peru, and Amazon River regions in Brazil and Colombia.").

[113] *See* PAYNE, *supra* note 109, at 1.

money may help ensure that farmers have temporary access to improved inputs. Ultimately, however, farmers need to feel secure in their rights to the land they are using if they are going to invest in costly productivity-enhancing technologies.

B. A Framework that Supports the Use of Biotech Products

Whether farmers acquire improved seed varieties from non-governmental organizations ("NGOs") or for-profit companies such as Monsanto, SSA countries must create an appropriate legal framework to support the sale and distribution of these products. Outside South Africa, few African countries have the legal framework to allow the use of biotech seed. As of 2008, Monsanto sold seeds in only ten of the 53 African countries.[114] Field trials for transgenic crops *are* taking place in a hand-full of African nations, but most lack bio-safety regulations and resources necessary to monitor such trials.

Monsanto is working in partnership with the Sasakawa Africa Association, universities, extension agencies, and other research organizations to improve smallholder farmers' access to seeds, fertilizers and conservation tillage practices. Currently, such programs are in place in the countries of Ghana, Nigeria, Ethiopia, Tanzania and Malawi.[115] This kind of partnership between non-profit and for-profit organizations may help spread the use of improved agricultural technologies. Improving access to other hybrid seeds, including drought-tolerant maize, is an important issue being addressed through public-private partnerships in SSA.[116] However, farmers can also benefit from having access to improved seeds sold by for-profit companies such as Monsanto. As more for-profit companies market seeds to low income farmers, increased competition in the seed market should lower the price of seeds, making it easier for smallholders to purchase this technology. However, in order for farmers to have access to improved seeds and their benefits, more countries will need to create legislative and regulatory frameworks that protect intellectual property rights in proprietary technology. Effective frameworks will also require clear rules regarding bio-safety requirements.

1. The Role of IPRs

Intellectual property plays an important role in encouraging investment in

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[114] Letter from Shadrack Mabuza, Smallholder Team Leader, Monsanto SA (Apr. 15, 2008) (on file with K. Boudreaux, Arlington, VA).

[115] Robert Horsch, Address at Monsanto Co., Agricultural Technologies: locally relevant around the world 23 (Sept. 17, 2004), *available at* http://democracy-africa.org/africando2004/speeches/Horschpresent.pdf.

[116] *See* Henry Neondo, *Body announces plan to develop drought-tolerant maize for Africa*, CHECKBIOTECH, June 1, 2008, http://greenbio.checkbiotech.org/news/2008-04-01/Body_announces_plan_to_develop_ drought -tolerant_maize_for_Africa/.

research and development.[117] Companies have little incentive to develop new products unless they have some assurance that they will maintain a property right in the products they create.[118] This is especially clear in countries without functional IPRs enforcement regimes, where little commercial innovation takes place.[119] However, in countries with more established mechanisms for enforcing IPRs, companies pursue the development of products aimed at satisfying consumer demand.[120]

An IPRs regime creates a private property right in a novel idea.[121] The benefits of the property right created are similar to the rights enjoyed by any other property owner; that is, the rights holder is able to use the property and exclude others from its use.[122] The ability to benefit from the profits that result from the use of the invention or idea is an important part of the owner's rights to that invention or idea.[123] The right to benefit, and profit from the use of intellectual property provides companies with the incentive to innovate.[124]

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[117] *See* R. CARL MOY, 1 MOY'S WALKER ON PATENTS § 1:38 (4th ed. 2007) ("The act of invention very often requires significant expenditures to be made on research and development ... [t]he existence of [patent rights] increases the value that private entities can expect from inventions and, if large enough, will encourage the entities to participate in research and development.").

[118] *See id.* ("The favored explanation for the patent system in the United States, particularly in economic literature, is that it creates an incentive for persons to engage in inventive activity."); *see also* Kenneth L. Port, *Symposium on Intellectual Property Law Theory*, 68 CHI.-KENT L. REV. 585, 591 (1993) ("[T]he generally accepted version [of justification for a patent system] is referred to as the 'incentive theory'." According to the incentive theory, the patent monopoly must be granted to inventors to compensate them for the time, money, and energy they invest in the invention and to assure them any monetary gain resulting from their invention.") (citing Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J. L. & ECON. 265, 266 (1977)).

[119] *See* Keith E. Maskus, *The Role of Intellectual Property Rights in Encouraging Foreign Direct Investment and Technology Transfer*, 9 DUKE J. COMP. & INT'L L. 109, 149-50 (1998) ("[S]tronger IPRs in developing economies promise long-term growth and efficiency benefits as they attract additional FDI and licensing and spur further follow-on innovation and technology spillovers. This outcome is far more likely, however, if the implementation of stronger IPRs is accompanied by complementary policies that promote dynamic competition.).

[120] *Id.* at 109 ("Recently numerous developing countries significantly strengthened their IPR regimes").

[121] *See* R. CARL MOY, 1 MOY'S WALKER ON PATENTS § 1:27 (4th ed. 2007).

[122] *Id.; see* RICHARD R. POWELL, 1-2 POWELL ON REAL PROPERTY § 2.02 (Michael Allan Wolf ed., 2006) (citing A. I. Hallowell, *The Nature and Function of Property as a Social Institution*, 1 J. LEG. & POL. SOC. 115 (1943) (property rights exist to order the "control of valuable objects").

[123] *See* MOY, *supra* note 117 ("By operating a patent system consistently over time, the United States has essentially promised that it will grant patent rights to persons who successfully invent, thus allowing them to expect increased profits. This expectation of increased profits spurs research into invention and increases the chances that inventions will occur.").

[124] *See id.* ("The favored explanation for the patent system in the United States, particularly in economic literature, is that it creates an incentive for persons to engage in inventive activity.") *See also* Port, *supra* note 118, at 591 ("[T]he generally accepted version [of justification for a patent system] is referred to as the 'incentive theory'." According to the incentive theory, the patent monopoly must be granted to inventors to compensate them for the time, money, and energy they invest in the invention and to assure them any monetary gain resulting from their invention.") (citing Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J. L. & ECON. 265, 266 (1977)).

Therefore, IPRs serve an important role in fostering the development of new products and ideas.[125]

IPRs have always existed in the United States,[126] and have been a constitutionally protected property right since the ratification of the Constitution.[127] In the U.S., IPRs have protected processes, machines, manufacturing, and compositions of matter.[128] While the U.S. system has evolved over the years, it has always fostered innovation.[129]

The U.S. patent system is governed mainly by Title 35 of the United States Code[130] and administered primarily through the United States Patent and Trademark Office, under Title 35 of the Code of Federal Regulations.[131] Once a patent is granted, the owner of the patent has a property right which he or she may chose to enforce through either licensing or civil litigation.[132] Under the law, the patent owner keeps his or her right to use or license the property and enforce those rights for a period of twenty years after the patent is filed.[133] After this period expires, the subject matter of the patent is open to the public domain.[134]

The global intellectual property system is a creation of the second half of the twentieth century. The World Intellectual Property Organization ("WIPO") was formed in 1967 and in 1994 the World Trade Organization's ("WTO") TRIPS agreement was signed.[135] WIPO is a specialized agency within the United Nations established "to promote the protection of intellectual property throughout the world through cooperation among States . . . ."[136] Similarly, the TRIPS agreement was created "to reduce distortions and impediments to international trade . . . taking into account the need to promote effective and adequate protection of intellectual property rights . . . ."[137] Both WIPO and TRIPS helped establish a global regime for the enforcement of IPRs, which in turn harmonized IPRs and promoted increased globalization of the world

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[125] 1 – OV CHISUM ON PATENTS § 1 (2008).

[126] Frank D. Prager, *Historic Background and Foundation of American Patent Law*, 5 (4) AM. J. OF LEGAL HIST. 309, 309-25 (1961).

[127] U.S. CONST. art. I, § 8.

[128] 35 U.S.C. § 101 (2006).

[129] *See* CHISUM, *supra* note 125, at § 2-7.

[130] 35 U.S.C. (2006).

[131] 35 C.F.R. (2006).

[132] *See* CHISUM, *supra* note 125, § 1.

[133] 35 U.S.C. § 154(a)(2) (2006).

[134] Evans v. Eaton, 20 U.S. 356, 433-34 (1822).

[135] Convention Establishing the World Intellectual Property Organization, July 14, 1967, 21 U.S.T. 1749 [hereinafter WIPO]. Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, Legal Instruments - Results of the Uruguay Round vol. 1 (1994) 33 I.L.M. 81 *available at* http://www.wto.org/english/docs_e/legal_e/27-trips.pdf [hereinafter TRIPS].

[136] *See* WIPO, *supra* note 135, at art.3.

[137] *See* TRIPS, *supra* note 135, at pmbl.

economy.[138] The TRIPS agreement further responds to a desire for increased local trade, through reductions in impediments to trade.[139] Together, these developments reflect a trend towards global innovation and cooperation in IPRs while at the same time reducing impediments to trade.[140]

Increasingly over the past three decades, patents have been allowed for plant and seed varieties.[141] In the U.S., this development is based both on broad statutory interpretation by the courts[142] and new statutory regimes.[143] Traditionally, the U.S. patent system did not protect plants.[144] However, in 1980 the Supreme Court interpreted 35 U.S.C. § 101 to included living organisms in the category of patentable innovations.[145] This lead to the Board of Patent Appeals' determination in *Ex parte Hibberd* that plant varieties could be patented.[146] In addition to these decisions, there have also been various statutory attempts for some level of plant IPRs protection in the U.S.[147]

The global IPRs infrastructure protects plant varieties mainly through the TRIPS agreement.[148] While countries are given autonomy to make public policy

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[138] *See* Catherine Seville & Joseph McMahon, *Current Developments: European Community Law. Intellectual Property*, 50 INT'L & COMP. L. Q. 714, 714-24 (2001) ("The idea of a unified global system for the protection of intellectual property now seems at least conceivable . . . [i]t is even possible to state that some stages have been achieved on the journey, most notably the TRIPs agreement.").

[139] *See* TRIPS, *supra* note 135, at pmbl. ("Desiring to reduce distortions and impediments to international trade . . .").

[140] Doris Estelle Long, *Democratizing Globalization: Practicing the Policies of Cultural Inclusion*, 10 CARDOZO J. INT'L & COMP. L. 217, 235-36 (2002); *see* Laruinda L. Hicks & James R. Holbein, *Convergence of National Intellectual Property Norms in International Trading Agreements*, 12 AM. U. J. INT'L L. & POL'Y 769 (1997).

[141] *See* TRIPS, *supra* note 135, § 5 art.27 para.3(b) (requiring member nations to provide for the protection of plant varieties).

[142] Diamond v. Chakrabarty, 447 U.S. 303, 318 (1980).

[143] 7 U.S.C. § 2402 (2006).

[144] Monsato Co. v. Byrd, 2000 U.S. Dist LEXIS 22793 at 8 (giving an overview of the law of plant patents in the United States).

[145] *Diamond*, 447 U.S. at 303. *See* Taylor & Cayford, *supra* note 17, for a discussion of US patent protection of plants as it applies to African agriculture.

[146] Ex parte Hibberd, 227 U.S.P.Q. 443 (BNA) (B.P.A.I. 1985); *see also* Pioneer-Hi-Bred Int'l, Inc. v. J.E.M. Ag Supply, Inc., 200 F.3d 1374 (Fed. Cir. 2000) (recognizing that a person who develops a new plant variety may have recourse to patenting under Title 35 or to registration under the Plant Variety Protection Act).

[147] 1970 Plant Variety Protection Act, codified as 7 U.S.C. § 2402 (2006); *see* CHISUM, *supra* note 125, § 24.01; Mark D. Janis & Jay P. Kesan, *The Future of Patent Law: U.S. Plant Variety Protection: Sound and Fury ...?*, 39 HOUS. L. REV. 727 (2002); *see also* William Lesser, *The Impacts of Seed Patents*, 9 (1) N. CENT. J. OF AG. ECON. 37, 37-48 (1987) (comparing the patent act and the PPVA and their relative impacts on the development of Seed Patents in the United States).

[148] *See* David S. Tilford, *Saving the Blueprints: The International Legal Regime for Plant Resources*, 30 CASE W. RES. J. INT'L L. 373, 406-08 (1998) (discussing the International Union for the Protection of New Varieties of Plants); *see also* Debbie Collier, *Access to and Control over Plant Genetic Resources for Food and Agriculture in South and Southern Africa: How Many Wrongs Before a Right?*, 7 MINN J.L. SCI. & TECH. 529 (2006).

decisions regarding IPRs for animal or plant life,[149] signatories to the agreement are required to provide for the protection of plant varieties.[150] TRIPS also requires that each signatory agree to a base level of enforcement such that each signatory "shall ensure that enforcement procedures . . . permit effective action against any act or infringement of intellectual property rights."[151]

The enforcement of IPRs in plant varieties is handled via TRIPS compliant procedures. The International Union for the Protection of New Varieties of Plants ("UPOV") harmonizes "conditions and norms for protecting new varieties while giving farmers the right to save and exchange seed."[152] The UPOV exists "[t]o provide and promote an effective system of plant variety protection, with the aim of encouraging the development of new varieties of plants, for the benefit of society."[153] Some argue that IPRs protecting seed varieties may not be essential to facilitate the development of new varieties of seeds.[154] However, large companies with a choice of where to invest consider IPRs an important determinant of which products and regions to invest in.[155]

Plant patentability has played an essential role in the creation and production of more localized and higher yielding seed varieties.[156] Given the current global concerns about food security and production, especially in SSA, having a legal framework in place that provides farmers with increased access to improved seed varieties is one element of a strategy directed at improving agricultural

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[149] *See* TRIPS, *supra* note 135, at art.27.

[150] 2-1 BAXTER, WORLD PATENT LAW & PRACTICE § 1.08 (2008) (According to the terms of the "Agreement On Trade Related Aspects Of Intellectual Property Rights" which has been adopted among all World Trade Organization members nations, member nations must provide for the protection of plant varieties either by patents or by an effective sui generis system or by any combination thereof).

[151] *See* TRIPS, *supra* note 135, at art.41 sec.1.

[152] WORLD DEVELOPMENT REPORT 2008, *supra* note 10, at 167.

[153] UPOV Mission Statement, http://www.upov.int/en/about/ (last visited Nov. 20, 2008).

[154] *See, e.g.*, WORLD DEVELOPMENT REPORT 2008, *supra* note 10, at 167 ("a recent review of the impacts of stronger IPRs on the seed industries of China, Colombia, India, Kenya and Uganda found relatively little impact to date, mainly because IPRs are still under development in most countries. . . [t]he potential advantages of IPRs should not be overrated in most developing countries. Relative to broader investment climate issues, IPRs do not seem critical in the initial development of a private seed sector, but they could help to support a maturing commercial seed industry.").

[155] *See, e.g.*, Kevin G. Rivette & David Kline, *Discovering New Value in Intellectual Property*, HARV. BUS. REV. (JAN.- FEB. 2000), *available at* http://www.mba.yuntech.edu.tw/ilstudy/doc/file/Rivette_Kline(2000).pdf (discussing generally the benefits a company can obtain through effective leveraging of IPRs when valid enforcement mechanisms are in place).

[156] Sabrina Safrin, *Hyperownership in a time of Biotechnological Promise: The International Conflict to Control the Building Blocks of Life*, 98 AM. J. INT'L. L. 641 (2004); MARGARET LLEWELYN & MIKE ADOCOCK. EUROPEAN PLANT INTELLECTUAL PROPERTY (HART PUBLISHING (2006); Mark D. Janis & Stephen Smith, *The Protection of Rights in Plant Varieties: Technological Change and the Design of Plant Variety Protection Regimes*, 82 CHI.-KENT. L. REV. 1557 (2007).

productivity and crop yields.[157]

However, the developing world requires stronger IPRs protection in order to spur agricultural innovation.[158] Unlike many countries in SSA, South Africa possesses an established system for enforcing IPRs.[159] While South Africa's overall patent system is set up with a stronger focus on patent enforcement than patent prosecution (the process of applying for and obtaining a patent), it has a particularly well-developed structure for the protection of plant varieties.[160]

South Africa adopted its IPRs[161] between 1976-1978 in three separate acts protecting plants,[162] patents,[163] and copyrights.[164] These acts established the infrastructure for IPRs, the process for obtaining IPRs, the enforcement of IPRs, and South Africa's participation in global IPRs treaties.[165] IPRs in South Africa, as in most of Africa, were borne out of their colonial roots.[166] The inspiration for South Africa's IPRs system came from the British system.[167] More recently, however, South Africa has moved closer to the European Union IPRs standards.[168]

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[157] The State of Food Insecurity in the World 2006 report of the World Food Summit under the Food and Agricultural Organization of the United Nations. *See also* INTERNATIONAL FOOD SECURITY, *supra* note 2, at 21 ("The World Bank (in its 2008 World Development Report) reports that while scientific plant breeding has improved agricultural production throughout much of the world, sub-Saharan Africa lags behind in adoption of these new varieties.").

[158] *SCIENCE*, 285 NEW SERIES, 5426.387-389 (1999).

[159] ROSEMARY A. WOLSON, INTELLECTUAL PROPERTY RIGHTS IN AGRICULTURAL BIOTECHNOLOGY 135 (F.H. Erbisch & K.M. Maredia eds., CABI Publishing 2d ed. 2004).

[160] *Id.* at 145.

[161] Trademarks and registered designs were not adopted until the Trade Marks Act No. 194 of 1993 and the Designs Act. No 195 of 1993. While these adoptions were not in the late 1970s IPRs adoption, they are not fully within the scope of this article. Also, more minor IPRs legislation includes: Counterfeit Goods Act No. 37 of 1997, Merchandise Marks Act No. 17 of 1941, Performers' Protection Act No. 11 of 1967 and Registration in Cinematograph Act No. 62 of 1977. Plant Breeders' Rights Act No. 15 of 1976 (Last Amended by the Plant Breeder's Rights Amendment Act No. 15 of 1996); Patents Act No. 57 of 1978 (Last Amended by the Patents Amendment Act No. 58 of 2002); Copyright Act No. 98 of 1978 (Last Amended by the Copyright Amendment Act No.9 of 2002); *see also* WIPO GUIDE TO INTELLECTUAL PROPERTY WORLDWIDE: COUNTRY PROFILES: SOUTH AFRICA 2007, http://www.wipo.int/export/sites/www/about-ip/en/ipworldwide/pdf/za.pdf.

[162] 1976 SA Science 15.

[163] 1978 SA Commercial Law 57; 1978 SA Commercial Law 57, ch.V (Applications for Patents).

[164] 1978 SA Commercial Law 98.

[165] 1976 SA Science 15; 1978 SA Commercial Law 57; 1978 SA Commercial Law 98.

[166] Ruth Gordon, *Sub-Saharan Africa and the Brave New World of the WTO Multilateral Trade Regime*, 8 BERKELEY J. AFR.-AM. L. & POL'Y 79, 86 (2004) (discussing the economic impact of colonialism and the post-colonial attempts to catch-up to the former colonial powers); Adebambo Adewopo, *The Global Intellectual Property System and Sub-Saharan Africa: A Prognostic Reflection*, 33 U. TOL. L. REV. 749, 749 (2002) ("The intellectual property laws in force in most of sub-Saharan Africa today are derived from the colonial laws and legal systems.").

[167] *See* WOLSON, *supra* note 159, at 136.

[168] *Id. See also* 1978 SA Commercial Law 57, ch.V sec.31 (claiming Priority, utilizing the European first to file priority, instead of the United State's first to invent priority for patent

South Africa's Patent Act establishes the patent office and outlines requirements for patent agents.[169] The act puts forth the process for patent application as well as the admission and registration of patents.[170] Further, the act establishes requirements for the enforcement of patent infringement and other violations of IPRs.[171] Finally, the act codifies South Africa's participation in the Patent Cooperation Treaty ("PCT") as administered by the WIPO.[172] Although the patent office and registration methods are established by the act, the relative volume of patents filed in South Africa compared to Europe and the United States is small,[173] making the most beneficial part of the South African IPRs structure its enforcement mechanisms.

The main enforcement mechanism for patent infringement in South Africa is the right owner's ability to bring an infringement suit.[174] If the respondent is found to have infringed on the applicant's patent, the owner may seek either traditional damages or judicially imposed royalties from the defendant.[175] Litigation can also be instigated by a party wishing to challenge the validity of a patent in the Court of the Commissioner of Patents, whose judge is a member of the High Court of South Africa.[176] All litigation takes place at the High Court level of the split South African judicial system.[177] In general, the South African courts have taken a pro-patentee approach, in order to establish a strong stance against infringement.[178] This approach, coupled with the established statutory scheme in South Africa, creates a viable patent enforcement mechanism. It also ensures a positive perception globally about South Africa's protection of

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applications).

[169] 1978 SA Commercial Law 57 at chs. I-IV.

[170] *Id.* at ch.V.

[171] *Id.* at ch. XI; *see also* WOLSON, *supra* note 159, at 142.

[172] 1978 SA Commercial Law 57 at ch.V.

[173] The United States had 425,967 Patent Applications in 2006. U.S. PATENT & TRADEMARK OFFICE, U.S. PATENT STATISTICS REPORT 1963-2007, *available at* http://www.uspto.gov/go/taf/us_stat.pdf (last visited Nov. 20, 2008); The European Patent Office had 61,002 Patent Applications in 2006. EUROPEAN PATENT APPLICATIONS FILED IN 2006, *available at* http://documents.epo.org/projects/babylon/eponet.nsf/0/7AA6C2DE62A4E7CEC12573140049067D/$File/Euro-direct_applications_2006_applicants_residence.pdf (last visited Nov. 20, 2008); South Africa had 10,464 Patent Applications in 2005-2006. COMPANIES AND INTELLECTUAL PROPERTY REGISTRATION OFFICE (CIPRO) ANNUAL REPORT 2005-2006 31, *available at* http://www.cipro.co.za/notices/CIPRO%20Annual% 20Report%202005-2006.pdf, (last visited Nov. 20, 2008).

[174] 1978 SA Commercial Law 57 at ch. XI, sec.65.

[175] 1978 SA Commercial Law 57 at ch. XI, sec.65(3)(c), (6).

[176] 1978 SA Commercial Law 57 at ch. XI sec.69; *see* WOLSON, *supra* note 159, at 142.

[177] *Id.* at 142.

[178] *See* Vari-Deals 101, Ltd. v. Sunsmart Products, Ltd., 2007 (SCA) at 123 (S. Afr.); Sunsmart Prod., Ltd. v. Flag & Flagpole Indus., Ltd., 2007 (SCA) at 50 (S. Afr.); Aktiebolaget Hassle v. Triomed, Ltd., 2002 ZASCA 103 (S. Afr.); Schlumberger Logelco Inc. v. Coflixip SA, 2002 ZASCA 99 (S. Afr.); Monsanto Co. v. MDB Animal Health, Ltd., 2001 ZASCA 4 (S. Afr.); *see also* WOLSON, *supra* note 159, at 142.

IPRs.[179]

South Africa's IPRs structure is the most developed IPRs regime in SSA.[180] This legal framework allows South Africa to be a viable and active participant in both WIPO and TRIPS.[181] In addition to the general IPRs regime, South Africa has historically provided patent protection for plant varieties.[182] This protection is almost completely unique in SSA.[183]

The South African statutory and regulatory framework also supports the commercial use of genetically modified ("GM") materials. In 1997, the South African parliament passed the Genetically Modified Organisms Act,[184] which allows farmers to use GM materials subject to approval by a bio-safety committee and addresses environmental protection concerns. To date, varieties of insect-resistant cotton and maize, and herbicide-tolerant cotton, maize, and soybeans have been approved for use by South Africa's farmers.

In 2001, the country developed a biotechnology strategy that focuses on GM crops as a source for jobs, innovation, food security, and environmental sustainability.[185] Combined with the 1997 legislation, this framework eased the way for South African farmers to use GM maize. For example:

> Planting of genetically modified (GM) maize increased its market share from 14.6 per cent of total South African maize planted in 2005 to 29.4 per cent in 2006 . . . The major unique trait remains insect resistance with 72 per cent of total GM maize, while herbicide tolerant maize now stands at 28 per cent. Actual hectares planted increased by 11 per cent to 455 287 despite total maize area having slumped by 45 per cent. This increase builds upon past trends that amounted to 42 per cent GM maize growth in 2003, 44 per cent in 2004 and 20 per cent in 2005. White GM maize showed the most dramatic increase from 8.6 per cent of total white maize area in 2005 to 28.8 per cent in 2006. Yellow GM area planted grew from 24 per cent to 30.5 per cent of total yellow for the same period.[186]

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[179] INT'T PROP. RIGHTS INDEX (IPRI) REPORT 2008 [hereinafter IPRI REPORT], *available at* http://www.internationalpropertyrightsindex.org/ (Ranking South Africa 24th overall, and significantly higher than the rest of Africa in Intellectual Property Rights specifically looking at protection of intellectual property rights, patent strength, copyright protection, and trademark protection).

[180] WOLSON, *supra* note 159, at 136.

[181] *Id.*

[182] Collier, *supra* note 148, at 554 (discussing The Plant Breeders' Rights Act 15 of 1976).

[183] Norah Olembo, BIOTECHNOLOGY, AGRICULTURE, AND FOOD SECURITY IN SOUTHERN AFRICA 175, tbl. 6.2 (Steven Ware & Klaus von Grebmer eds., Int'l Food Pol'y Research Inst. 2005).

[184] Genetically Modified Organisms Act 15 of 1997; *see* Collier, *supra* note 148, at 555.

[185] *See generally* IQBAL PARKER ET AL., DEPARTMENT OF ARTS, CULTURE, SCIENCE AND TECHNOLOGY OF THE REPUBLIC OF SOUTH AFRICA, A NATIONAL BIOTECHNOLOGY STRATEGY FOR SOUTH AFRICA (2001), http://www.pub.ac.za/resources/docs/biotechstrategy_2002.pdf.

[186] *See* Wynand J. van der Walt, *GM Maize doubles market share in 2006*, AFRICAN CROPS &

Other African countries are working to create the legislative and regulatory environment needed to allow their farmers to access GM seeds to produce higher yields with less pesticide and fertilizers. However, many still need to create clear legal frameworks for such products.[187] Zimbabwe, for example, has a bio-safety act and is conducting field trials with insect-resistant maize.[188] Burkina Faso is conducting field trials with bio-tech cotton. [189] Uganda recently approved field trials for transgenic bananas, and Cameroon, Egypt, and Senegal all have some bio-tech regulations in place.[190] Many African nations, however, have not created bio-tech regulations or bio-safety assessment mechanisms. In order to attract investment from companies like Monsanto, which develop valuable intellectual property such as proprietary seed varieties, these countries need to strengthen IPRs protection.

Generally speaking, plant variety protection is scarce in SSA, even where other IPRs exist or are being developed.[191] In South Africa, plant protection comes in part from the Plant Breeders Rights Act of 1976.[192] This act creates the ability to obtain an IPR to "every variety of any prescribed kind of plant if it is new, distinct, uniform, and stable."[193] The Act provides protection for any clearly distinguishable plant variety.[194] Once a patent is granted in a plant variety, the Act provides all of the traditional patent owner's rights over the plant variety.[195] Enforcement is identical to the enforcement of other IPRs in South Africa.[196]

Plant variety protection ensures that companies are able to secure property rights in any new product they develop based on innovation in biological compounds.[197] The more established the IPRs system in a developing country the more likely it is that a company will research and develop seed varieties tailored to that country's particular climate and soil conditions.

New hybrids are often developed to suit a particular area or climate, in order

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SEED SYSTEMS NEWS SERVICE, May 2006, *available at* http://www.africancrops.net/news/may06/gm-southafrica.

[187] *See* Greg Bodulovic, *Is the European attitude to GM products suffocating African development?* 32 FUNCTIONAL PLANT BIOLOGY 1071 (2005), *available at* http://www.publish.csiro.au/journals/fpd, for a helpful summary of the current state of Africa regulatory regimes and GM crops.

[188] Interview with Mr. Wally Green, Biotech Regulatory Manager at Monsanto, in S. Afr. (Sept. 20, 2005).

[189] See Horsch, *supra* note 115, at slide 11.

[190] *Id.* slide 29.

[191] *See* Olembo, *supra* note 183, at 175 tbl.6.2.

[192] Plant Breeders' Rights Act 15 of 1976 (amended 1996).

[193] *Id.* § 2.

[194] *Id.*

[195] *Id.* §§ 20, 23.

[196] Plant Breeder's Rights Act 15 of 1976 §§ 20, 23A (amended 1996).

[197] *See* TRIPS, *supra* note 135, at art.27.

to increase the plant's yield in that region.[198] Increasing plant yield is essential to the success of poor farmers in developing nations.[199] IPRs foster cost-effective research and development of products designed to help small farmers by ensuring that money spent on research will be recouped through ownership of the rights to the end product.[200] More specifically, the South African IPRs structure, augmented by the Plant Breeders Act, ensures that investments in research are protected, thus fostering private investment in smallholder farmers.[201]

While South African IPRs have been successful in promoting innovation and helping improve food security for the country's poor, other parts of SSA have not been as fortunate.[202] In general, plant variety-IPRs are either non-existent, or not consistently enforced in SSA nations.[203] This is due in part to limited or non-existent IPRs enforcement mechanisms in other parts of SSA.[204] Weak IPRs have stymied the growth of a Green Revolution in much of SSA.

While South African IPRs rank highly in global IPRs analysis, other countries in SSA rank towards the bottom.[205] In some ways, this failure of IPRs keeps SSA reliant on global aid for its food security and production, rather than the benefits of Combi-Packs and similar products smallholder farmers enjoy elsewhere. [206] Inadequate IPRs frameworks limit farmers' access to higher-

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[198] Peter J. Gross, *Guiding the Hand That Feeds: Toward Socially Optimal Appropriability in Agricultural Biotechnology Innovation*, 84 CAL. L. REV. 1395, 1400-03 (1996) (discussing the achievements of agricultural biotechnology); *see generally* Frederick H. Buttel & Jill Belsky, *Biotechnology, Plant Breeding, and Intellectual Property: Social and Ethical Dimensions*, 12 SCIENCE, TECHNOLOGY, & HUMAN VALUES 31, 31-49 (1987); *see generally* Benita Tall, *Seed for Tomorrow*, 75 THE SCIENCE NEWS-LETTER 362, 362-63 (1959).

[199] Charles Mann, *Reseeding the Green Revolution*, 277 SCIENCE 1038, 1038-43 (1997), *available at* http://www.jstor.org/pss/2893152.

[200] *See* FLORENCE WAMBUGU, MODIFYING AFRICA: HOW BIOTECHNOLOGY CAN BENEFIT THE POOR AND HUNGRY, A CASE STUDY FROM KENYA 45-56 (2nd ed. 2001) (showing the benefits of genetic plant modification in a case study performed in Kenya).

[201] ROBERT PAARLBERG, STARVED FOR SCIENCE 79 (Harvard University Press 2008) ("[I]ntellectual property protections [in the United States] for biological innovations provided adequate R&D investment incentives to corporate labs.").

[202] *See* Olembo, *supra* note 183, at ch.6.

[203] Only two Sub-Saharan African countries are members of to the UPOV. *See* Members of the International Union for the Protection of New Varieties of Plants, http://www.upov.int/export/sites/upov/en/about/members/pdf/pub423.pdf (last visited Nov. 20, 2008).

[204] Adebambo Adewopo, *The Global Intellectual Property System and Sub-Saharan Africa: A Prognostic Reflection*, 33 U. TOL. L. REV. 749, 750 (2002) (recognizing that most of sub-Saharan Africa's IPRs are derived from the colonial systems and have not been updated to be effective in modern times).

[205] *See* IPRI Report, *supra* note 179 (showing SSA Nations and their overall rank in the IPRI: Ethiopia (96), Kenya (83), Malawi (73), Nigeria (107), South Africa (23), Tanzania (73)).

[206] *See* FOOD SUPPLY SITUATION AND CROP PROSPECTS IN SUB-SAHARAN AFRICA, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (2005), ftp://ftp.fao.org/docrep/fao/008/J6853e/J6853e00.pdf (summarizing the availability of food in Sub-Saharan Africa and highlighting where aid is needed); *see also* PARIS DECLARATION ON AID

quality agricultural inputs by disincentivizing innovation and investment in these areas.[207] The lack of a meaningful system of IPRs prevents private entities from investing in research-intensive local solutions for the farming conditions of these nations.[208] While the public donation of seeds addresses immediate needs,[209] without private innovation searching for localized solutions, crop yields and food security in these nations will continue to lag.[210] Ultimately, strong IPRs regimes encourage agricultural innovation to potentially improve global food security.[211]

Implementation of stronger IPRs in SSA, along the lines of the South African IPRs system, would provide smallholder farmers greater opportunities to gain access to products that increase crop yields. This in turn would address food security concerns and, in some cases, provide opportunities to sell at local markets.[212] Establishing viable IPRs regimes is a key legal requirement for the creation of a Green Revolution in Africa and ending global hunger. In addition to providing for enhanced food security, the establishment of stronger IPRs will increase the likelihood of the extension of valuable trade benefits from the United States.[213]

2. European Resistance to Importing Biotech Products.

Another possible explanation for the low incidence of IPRs in SSA is pressure from the European Union. Until recently, the E.U. maintained a moratorium on

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EFFECTIVENESS: OWNERSHIP, HARMONISATION, ALIGNMENT, RESULTS, AND ACCOUNTABILITY, HIGH LEVEL FORUM (2005), http://www1.worldbank.org/harmonization/Paris/FINALPARISDECLARATION.pdf (recognizing the need and efforts for increasing aid to the developing world).

[207] *See* Paarlberg, *supra* note 201, at 115. Though Paarlberg argues that increased protection in the United States led to further investment in agriculture he also suggests that biotechnology firms would license their technology "on a royalty-free basis" to the poorest countries.

[208] *See* Olembo, *supra* note 183, at 174 ("In comparison to high-technology countries, southern Africa, like most of Africa, lags behind in the use of gene technology for food production.").

[209] UNITED NATIONS DEVELOPMENT PROGRAMME ANNUAL REPORT (2007), http://www.undp.org/publications/annualreport2007/IAR07-ENG.pdf (discussing the benefit of providing seeds and fertilizer to poor households on improving their livelihood).

[210] *See* Adewopo, *supra* note 204, at 754 ("[I]ntellectual property plays a significant and indispensable role in the search for economic and technological development in developing countries.").

[211] Ismail Serageldin. *Biotechnology and Food Security in the 21st Century*, 285 SCIENCE 387, 387-89 (1999); Charles R. Mcmanis, *The Interface Between International Intellectual Property and Environmental Protection: Biodiversity and Biotechnology*, 76 WASH. U. L. Q. 255, 279 (1998).

[212] *See* WORLD DEVELOPMENT REPORT FOR 2008, *supra* note 10, at 170 ("In industrial countries, where economic incentives (and the expanding use of intellectual property rights) make it more likely that farmers will regularly purchase seed, plant breeding is done mainly by seed companies. But in smallholder agriculture in developing countries, seed companies depend on public research programs to provide varieties. This makes the pipeline for new products uncertain.").

[213] 19 U.S.C. § 3703(a)(1)(C)(ii) (2006).

the import of genetically modified foods.[214] These restrictions were eased somewhat in 2004 when the E.U. authorized some genetically modified products for import so long as they were properly labeled and complied with tracing requirements. The lingering effects of the E.U.'s past policy have had an important negative impact on African nations, which depend heavily on revenues from exported agricultural products. "Exports of agricultural commodities to the European Union account for significant revenue for southern African nations. In many African nations, agriculture is the second most important source of revenue, after mining." Forty-seven percent of South Africa's agricultural exports go to the E.U.[215] Because they would prefer not to lose access to the European export market, African countries have been slow to adopt bio-tech legislation and regulation. This means that improved seed varieties are not available to farmers in many SSA countries. One critic argues that the E.U.'s resistance to importing food from countries that allow genetically modified crops "is another example of the third world needlessly suffering at the expense of the first."[216] Another writes:

> The freedom of choice of farmers in developing countries is being severely challenged by the agricultural policy of the European Union (EU). Developing countries might well be reluctant to approve GM crop varieties because of fears of jeopardizing their current and future export markets. They may also not be able to provide the necessary infrastructure to enable compliance with EU requirements for traceability and labeling.[217]

Recent actions by the E.U. to allow the import of some genetically modified foods might present African nations with the opportunity and incentive to create or strengthen regulatory requirements regarding bio-technology and bio-safety. These actions may, for example, make it easier for companies such as Monsanto to market products like the Combi-Pack to smallholders in other African nations.

C. Barriers to Trade, Limited Market Access

1. Improving Market Access – Regional Trade

Recently, the relationship between farm subsidies in the developed world and resulting harms to farmers in the developing world has received a great deal of

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[214] The WTO recently found this moratorium to be illegal and a violation of WTO rules. *See EU 'Broke Trade Rules' on GM Food*, BBC NEWS, *available at* http://news.bbc.co.uk/2/hi/business/4761121.stm (last visited Nov. 20, 2008).

[215] *See* OECD REVIEW, *supra* note 25, at 16.

[216] *See* Bodulovic, *supra* note 187, at 1072-73.

[217] *The Use of Genetically Modified Crops in Developing Countries, A Follow-up Discussion Paper* 13 (Nuffield Council on Bioethics, 2003), *available at* http://www.nuffieldbioethics.org/fileLibrary/pdf/gm_crops_summary.pdf.

attention.[218] The topic was an important part of the agenda at the flagging Doha Round on Development; the latest attempt by the WTO to lower the costs of trade among nations.[219] While the issue is certainly important, we take a different focus here. Taking as a given the harms these subsidies impose on developing world farmers, we focus instead on two issues that impact the ability of African farmers to access markets and gain from trade: regional barriers to trade and developed world food-aid policies.

2. Regional Difficulties Accessing Markets

A great deal of attention has been focused on the problems associated with providing subsidies to developed world farmers and the subsequent trade distortions the practice creates. However, the important issue of barriers to trade within Africa receives much less attention and needs to be addressed alongside larger global policies. These trade barriers, which include both tariff and non-tariff barriers, raise costs for consumers and farmers in addition to limiting farmers' access to both African and international markets. The World Bank points out that:

> As trade among developing countries is a growing share of their overall trade, improving developing-country access to developing-country markets can have significant effects .... Greater regional integration and opening regional markets can be important in regions with many small countries (Sub-Saharan Africa, for example).[220]

Regional integration in SSA is limited for many reasons. Infrastructure is generally poor, making it difficult and costly to move goods from one area or one country to another.[221] Tariff barriers, while lower today than in recent years, increase the costs associated with selling goods in countries that impose

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[218] *See* WORLD DEVELOPMENT REPORT FOR 2008, *supra* note 10 at 96-98 *and* 110-11. NGOs have been particularly vocal in calls for an end to developed world subsidies; *see generally* Claire Godfrey, OXFAM BRIEFING PAPER, *Stop the Dumping! How EU Agricultural Subsidies Are Damaging Livelihoods in the Developing World* 31 (2002).

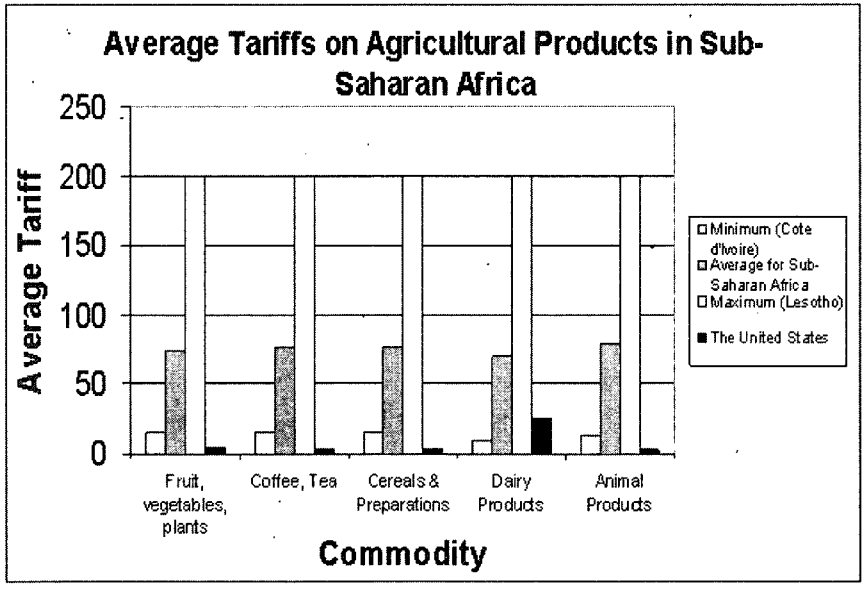
[219] *See* DOING BUSINESS REPORT 2008 44-45, http://www.doingbusiness.org/documents/fullreport/2008/DB08_Trading_Across_Borders.pdf ("Often goods get delayed because of numerous checks on the roads. Traveling from Lagos to Abidjan (992 kilometers, a trucker faces 69 checkpoints. From Abidjan to Ouagadougou (1,122 kilometers) there are "only" 37 . . . Reforms often involve cross-border cooperation – important, because transit regulations often impose restrictions, such as quotas on the number of trucks allowed from neighboring countries. Accords with neighbors can speed the release of transit goods."). WorldDevelopmentReport 2008, supra note 10, at 47.

[220] *See* WORLD DEVELOPMENT REPORT FOR 2008, *supra* note 10, at 111.

[221] *Id.* at 119-20; *see* Ndiame Diop, Paul Brenton, & Yakup Asarkaya, *Trade Costs, Export Development and Poverty in Rwanda*, (World Bank Policy Research, Working Paper No. 3794, 2005), for a discussion of the impact of poor infrastructure on smallholder farmers in one SSA country, Rwanda.

tariffs on imports.[222] In some SSA countries, the government imposes export taxes on goods, making it more costly for exporters to sell their products outside the country.[223] Finally, in many African countries, regulations require importers and exporters to navigate check points, file numerous forms, and pay relatively high fees in order to trade across borders.[224] These requirements translate into lengthy delays to move goods from one country to another, further raising the costs of regional integration and increased market access.

While SSA countries have been reforming their requirements to trade across borders, the region still has comparatively high tariff rates on agricultural products. All SSA countries impose tariffs on a variety of imported agricultural products (see Chart II below). This makes imported agricultural products more expensive for consumers, subsequently shielding local producers from competition.



Source: graph constructed by author from WTO data[225]

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[222] *See* WORLD DEVELOPMENT REPORT 2008, *supra* note 10, at 11, 101.

[223] *Id.* at 100-101.

[224] *See* DOING BUSINESS REPORT, *supra* note 219, at 44-45. "Often goods get delayed because of numerous checks on the roads. Traveling from Lagos to Abidjan (992 kilometers, a trucker faces 69 checkpoints. From Abidjan to Ouagadougou (1,122 kilometers) there are "only" 37 . . . Reforms often involve cross-border cooperation – important, because transit regulations often impose restrictions, such as quotas on the number of trucks allowed from neighboring countries. Accords with neighbors can speed the release of transit goods." WORLD DEVELOPMENT REPORT 2008, *supra* note 10, at 47.

[225] *See generally* WORLD TRADE ORGANIZATION, UNDERSTANDING THE WTO: THE ORGANIZATION, http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm (last visited Nov.

The reduction of agricultural tariff rates is important to long range market stability in SSA. Not only would it help consumers,[226] it would also promote trade and agricultural growth. As the FAO notes in its most recent State of Food and Agriculture report: "agricultural growth contributes directly to food security and acts as an engine of overall economic growth in much of the developing world."[227]

For at least three reasons, reducing trade barriers between African nations could help with problems of food insecurity while also expanding markets for smallholders. First, as noted in *Reaching for the Poor,* reducing trade barriers would allow those farmers better able to grow needed crops to "respond to structural deficits in neighboring countries."[228] Next, in some countries, areas with good agricultural potential are closer to markets in neighboring countries than to large domestic markets, thus making trade across borders a better option (if tariff rates were lower). Finally, if one country experiences a drought or other crisis that limits food supplies, lower tariff barriers would allow producers in other countries to more easily meet the affected country's food needs.[229]
As noted above, many SSA countries tax exports. Much progress has been made in this area, as the taxation of agricultural exports has fallen from an average of 46 percent in the 1980s to 19 percent in the mid-2000s.[230] Nonetheless, continuing policies of taxing agricultural products means farmers face high costs in getting any surplus they grow to foreign markets.[231] While the trend in lowering export taxes is a promising start, lowering these rates further would reduce transaction costs for farmers, making their products more competitive in external markets.

The delay in moving products across borders that inefficient trade procedures create is yet another problem that raises transaction costs for farmers and exporters and limits regional market access. As the World Bank recently noted, the costs associated with exporting products is particularly high in Africa:

20, 2008).

[226] *See* WORLD DEVELOPMENT REPORT 2008, *supra* note 10, at 109 (more Africans are net purchasers of food than net sellers of food); *see also* JOACHIM VON BRAUN, INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE, THE WORLD FOOD SITUATION: NEW DRIVING FORCES AND REQUIRED ACTION (2007), *available at* http://www.ifpri.org/pubs/fpr/pr18.pdf.

[227] *See* FAO, THE STATE OF FOOD AND AGRICULTURE: PAYING FARMERS FOR ENVIRONMENTAL SERVICES at 119 (FAO Agriculture Series No. 38, 2007), *available at* ftp://ftp.fao.org/docrep/fao/010/a1200e/a1200e00.pdf (other observers argue that regional trade has the potential to "act as an engine for growth and serve to attract additional investment in both manufacturing and agriculture."); *see* REACHING THE POOR, *supra* note 10, at 5.

[228] *Id.*

[229] *Id.*

[230] *See* WORLD DEVELOPMENT REPORT 2008, *supra* note 10, at 98-100.

[231] *See* Kimuli Kasara, *Tax Me If You Can: Ethnic Geography, Democracy and the Taxation of Agriculture in Africa*, 101 AMERICAN POLITICAL SCIENCE REVIEW 1 (2007), for an interesting discussion of the role that ethnic identity does, and does not play in the setting of agricultural tax rates in sub-Saharan Africa. *See also* INTERNATIONAL FOOD SECURITY, *supra* note 2, at 23.

> [I]n many countries trading across borders is more difficult than it need be.... Much is lost from delays in trading. The longest are in Africa. Each additional day that an export product is delayed reduces exports by more than 1%. For time-sensitive agricultural products, reducing delays by 10% increased exports by more than 30%. Often, just a few days less in exporting formalities can bring u into the market.[232]

It takes an average of 35 days to export a product in SSA, compared to ten in high-income OECD countries,[233] 22 in Latin America, and 25 in the Middle East and North Africa.[234] The World Bank study notes other benefits of making it easier to trade across borders as 65 percent of large multinational firms surveyed said they would invest more in SSA if it were easier to trade in the region.[235] To help speed the process of moving goods across Africa's borders, especially agricultural goods, the World Bank report suggests that nations conduct tax, security, health and safety, and other inspections at the same time, rather than in piecemeal fashion. The report also recommends that countries create, where possible, electronic systems for processing customs declarations.[236] Such reforms may be difficult, but can pay off by reducing the time needed to move goods from one country to another.[237]

There is room for improvement in reducing agricultural tariff rates and export taxes within Africa. Similarly, much can be done in reducing the time and complexity of exporting and importing within SSA. Lowering the transaction costs associated with trading across African borders would improve farmers' access to markets, thus increasing competition and lowering food costs for African consumers.

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[232] *See* DOING BUSINESS 2008, *supra* note 219, at 44-45.

[233] OECD, ABOUT OECD, http://www.oecd.org/pages/0,3417,en_36734052_36734103_1_1_1_1_1,00.html (last visited Nov. 20, 2008) (the Organisation for Economic Cooperation and Development brings together governments of thirty countries who are "commited to democracy and the market economy." The OECD is commited to increasing economic growth, employment and standards of living. Headquartered in Paris, France, the OECD was established in 1961 and currently has a budget of over 349 million EURO).

[234] *See* DOING BUSINESS 2008, *supra* note 219, at 45.

[235] *Id.*

[236] *Id.* at 46.

[237] *See id.* at 47, noting that "in 2005 Kenya set up an electronic system for processing customs declarations. In 2 years clearance times dropped by half.... The reforms did not start smoothly. Many traders did not have the Internet access needed to use the new system. At first port congestion worsened. The International Freight and Warehousing Association initiated a court action against the Kenyan revenue authority and won. The court ruled the old paper-based system had to be restored. The deadlock was broken when the reformers invited the main freight forwarders for consultation. Discussion led to more operational support to make it easier to use the new system. Now nearly all large cross-border trades are submitted online."

3. Changing the Food-Aid Paradigm

> The United States is the largest provider of food aid in the world, accounting for over half of all global food aid supplies intended to alleviate hunger and support development in low-income countries .... In 2006, the largest U.S. food aid program, Title II of Public Law 480, benefited over 70 million people through emergency and development-focused projects.[238]

The basic premise of food-aid is to transfer commodities (in-kind donation) from countries that grow a surplus to countries that do not. This is intended to meet immediate nutrition needs and allow recipient countries to spend limited resources on other programs.[239] Food-aid takes two basic forms: emergency aid to help in cases of natural disaster, war, or famine, and non-emergency aid. Emergency food-aid is provided free of charge to people in need and is often channeled through the World Food Programme ("WFP") and NGOs.[240]

International agreements, such as the International Covenant on Economic, Social and Cultural Rights, provide for a right to food. Such covenants have in the past helped persuade countries to provide food-aid to countries in need.[241] Currently, the U.S. is the largest provider of food-aid in the world, supplying approximately 43 percent of total aid.[242] Other large donors include the European Commission (9 percent), the United Nations (6 percent), Canada and the United Kingdom (both 5 percent), and Japan and the Netherlands (both 4 percent).[243] Other donors account for 27 percent of total aid.[244] In fiscal year 2006, the U.S. provided food to more than 50 countries, with 80 percent of food-aid funding going to Africa.[245] Much of this was directed to Sudan and the Horn of Africa, areas mired in long-term conflict.[246]

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[238] GOVERNMENT ACCOUNTABILITY OFFICE, FOREIGN ASSISTANCE: VARIOUS CHALLENGES IMPEDE THE EFFICIENCY AND EFFECTIVENESS OF U.S. FOOD AID 1 (Report to the Committee on Agriculture, Nutrition, and Forestry, U.S. Senate, GAO-07-560 Apr., 2007) [hereinafter FOREIGN ASSISTANCE].

[239] *See* Christopher Barrett, *Food Aid: Is it Development Assistance, Trade Promotion, Both, or Neither?* 80 AM. J. OF AG. ECON. 3 566, 566-67 (1998).

[240] *See* FOREIGN ASSISTANCE, *supra* note 238, at 10.

[241] Tenente, *supra* note 17, at 309.

[242] *See* FOREIGN ASSISTANCE, *supra* note 238, at 8 (we note that there appears to be an inconsistency in the GAO's figures in terms of the percentage of food aid supplied by the US).

[243] *Id.*

[244] As the GAO notes, "'other donors' includes approximately 82 countries and 8 other entities, including associations of nations, NGOs, private donors, the Organization of Petroleum Exporting Countries fund, and international finance institutions such as the World Bank and African Development Bank." *See id.*

[245] *See* FOREIGN ASSISTANCE, *supra* note 238, at 8.

[246] *Id.*

Non-emergency aid may be monetized, that is sold on the market in the recipient country.[247] The sale proceeds are then used to support development projects in the recipient country.[248] The OECD reports that the amount of food-aid has declined over the past four decades from representing over 20 percent of total bilateral aid in the 1960's, to less than 5 percent by the mid-1990s.[249] U.S. food-aid has also declined from a peak of over $8.5 billion a year in the 1960s (in constant 2002 dollars) to approximately $2 billion in recent years.[250] Given the current food crisis, U.S. funding for these programs is likely to increase in fiscal year 2009.[251]

The U.S. has a complex process for providing food-aid. Six different programs have food-aid components. The United States Department of Agriculture ("USDA") and the United States Agency for International Development ("USAID") administer Titles I, II, and III of Public Law ("P.L.") 480, also known as the Food for Peace program.[252] The USDA also administers the Food for Progress program;[253] the Section 416(b) surplus commodity program;[254] and the McGovern-Dole Food for Education and Child Nutrition program.[255] Additionally, the U.S. is a signatory to the Food Aid Convention, established in 1967 to improve the predictability of food-aid flows.[256]

Administered by the USDA, Title I of P.L. 480 makes food-aid available in non-emergency situations and provides for the concessional sale of food-aid to governments and private entities. Title I is a much smaller program than Title II and was funded at only $30 million, compared to Title II's $1.7 billion in fiscal year 2006.[257] Title II, administered by USAID, provides donations of

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[247] FAO, THE STATE OF FOOD AND AGRICULTURE 2006 15 (FAO Agriculture Series No. 37, 2006), available at ftp://ftp.fao.org/docrep/fao/009/a0800e/a0800e.pdf.

[248] *Id.*

[249] OECD, THE DEVELOPMENT EFFECTIVENESS OF FOOD AID: DOES TYING MATTER? PRELIMINARY VERSION 11, 22–23 (2005) [*hereinafter* OECD REPORT].

[250] *See id.* at 20; *see also* FOREIGN ASSISTANCE, *supra* note 238, at 1.

[251] H.R. 6124: Food, Conservation, and Energy Act of 2008, Section 30-21 Subsection 1.

[252] P.L. 480 (the Agricultural Trade Development and Assistance Act of 1954, as amended 7 U.S.C. § 1701, *et. seq.*

[253] The Food for Progress Act of 185, as amended, 7 U.S.C. § 1736(o) (2006).

[254] Section 416(b) of the Agricultural Act of 1949, as amended, 7 U.S.C. § 1431 (2006).

[255] P.L. 107-171, the Farm Security and Rural Investment Act of 2002 (other sources of funding for food assistance include the US Department of State's Bureau of Population, Refugees, and Migration which has provides some limited funding in cash to the World Food Programme in order to buy food locally or globally to address food shortages being experienced by refugees and the International Disaster and Famine Assistance Fund, which provides funding to prevent famine, to mitigate the effects of famine by addressing root causes, and to provide relief during a famine); *see* INTERNATIONAL FOOD SECURITY, *supra* note 2, at 47, 59, for more on both programs.

[256] *See generally* United Nations Food Aid Convention, 1999, *available at* http://r0.unctad.org/commodities/agreements/foodaidconvention.pdf; *see also* DUMPING FOOD AID, *supra* note 6, at 6, 12 (the current Food Aid Convention entered into force in 1999. The US remains a signatory).

[257] *See* FOREIGN ASSISTANCE, *supra* note 238, at 68.

commodities to the United Nations World Food Programme ("WFP") and NGOs to meet emergency and non-emergency needs in recipient countries.[258] Under the terms of Title II, commodities are agricultural goods or products produced entirely in the U.S.[259] Title II donations may be monetized in the same manner as non-emergency aid.[260] Title III is currently not funded.[261]

The Food for Progress program was funded at $207.8 million in fiscal year 2006.[262] It provides for donations and credit sales of commodities to a wide variety of NGOs and governments that demonstrate a commitment to introducing and expanding free enterprise in agriculture.[263] The McGovern-Dole program, funded at $97 million, provides donations of commodities as well as financial and technical assistance for school feeding programs and child nutrition in low-income and food-scarce countries that exhibit a commitment to universal education.[264] Section 416(b), funded at $20.8 million in 2006, supplements Titles II and III and the Food for Progress program.[265]

Despite their intentions, inefficiencies plague these programs and create difficulties for both farmers in developing countries and NGOs administering food-aid programs on the ground. For example, congressional mandates to P.L. 480 require that 75 percent of the gross tonnage of all government-generated cargo be transported on U.S. vessels;[266] that up to 25 percent of Title II bagged food be allocated to Great Lakes ports each month; and that at least 50 percent of approved non-emergency whole grain commodities be bagged in the U.S.[267] Congress has also mandated that at least 15 percent of non-emergency Title II food-aid programs be monetized.[268] As of September 2006, 69 percent of these programs were monetized.[269]

These requirements create inefficiencies that make food-aid less effective than it might otherwise be. This in turn creates distortions in recipient markets, creating disincentives for local farmers and hampering the effectiveness of

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258 *Id.*

259 *See* Katherine Theyson, *The Effects of Food Aid on Donor and Recipient Countries* 3 (University of North Carolina at Chapel Hill International Trade and Development Workshop Series 2004), http://www.unc.edu/depts/econ/seminars/theyson.pdf.

260 *Id.*

261 *See* FOREIGN ASSISTANCE, *supra* note 238, at 68.

262 *Id.*

263 *Id. See also* U.S. FOOD & DRUG ADMINISTRATION FOREIGN AGRICULTURE SERVICE, FOOD FOR PROGRESS, *available at* http://www.fas.usda.gov/excredits/FoodAid/FFP/foodforprogress.asp.

264 U.S. Dept. of Ag. Foreign Agricultural Service, Linking US Agriculture to the World, http://www.fas.usda.gov/aboutfas.asp.

265 *See* FOREIGN ASSISTANCE, *supra* note 238, at 68.

266 *See* Christopher B. Barrett & Daniel G. Maxwell, *PL 480 Food Aid: We Can Do Better*, 3 CHOICES (2004), *available at* http://www.choicesmagazine.org/2004-3/2004-3-12.htm (this provision is contained in the Cargo Preference Act (1954) enacted along with P.L. 480).

267 *See* FOREIGN ASSISTANCE, *supra* note 238, at 13, 70.

268 *See* FOREIGN ASSISTANCE, *supra* note 238, at 70.

269 *Id.*

NGOs handling U.S. food-aid. For example, the WTO argues that monetized food-aid has the same effect as selling goods at below-market prices because food-aid necessarily competes with local producers.[270] When food-aid is monetized, local consumers benefit from access to cheap food only at the expense of local farmers, who are often unable to compete with the prices at which food-aid is sold.[271] Farmers thus have disincentives to produce the food that is provided cheaply as a result of food-aid.[272] As Theyson points out, if food-aid is available, recipient governments may pay local farmers less for purchases the public sector needs to make.[273] Additionally, consumers who have access to food-aid do not need to buy locally produced food, further driving down prices on local markets.[274]

CARE, the largest NGO seller of U.S. food-aid in recipient countries, has announced that it will stop selling food-aid in local markets beginning in 2009.[275] CARE argues that such sales are inefficient and harmful to local farmers.[276] Barrett and Maxwell point out the key problems with monetized food-aid:

> [B]ecause it is bulky and expensive to ship, food is a terribly inefficient way to generate cash resources for programs that fight global poverty. Additionally, monetized food aid increases the risks that food aid will displace commercial sales by American agribusinesses or will discourage food production by farmers in recipient countries. In addition, because it is sold on the open market and thus not at all targeted at food-insecure subpopulations, there is no guarantee that such food reaches the most vulnerable people that American taxpayers aim to help.[277]

Tenente convincingly argues: "the local logical change to the current foreign food aid programs is to move away from a top-down approach and instead provide the means to produce food to local rural communities in developing countries that depend on local food production for survival."[278] The E.U. already does this as its Food Aid Policy provides funding to recipient nations to

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[270] *See* DUMPING FOOD AID, *supra* note 6, at 7.

[271] *See id.* at 9, for a discussion of why some consumers are refusing even cheap food aid.

[272] *See* David Tschirley, Cynthia Donovan, & Michael T. Weber, *Food aid and food markets: Lessons from Mozambique*, 21 FOOD POLICY 202, 202-06 (1996).

[273] Theyson, *supra* note 259, at 3.

[274] Theyson, *supra* note 259, at 8-9.

[275] Celia W. Dugger, *As U.S. Foreign Dollars Buy Less, International Agencies Differ Over How to Use Aid*, N.Y. TIMES, Oct. 3, 2007.

[276] *See id.*

[277] Barrett & Maxwell, *supra* note 266 (the GAO's critiques of the inefficiencies of monetized food aid match these sentiments); *see also* FOREIGN ASSISTANCE, *supra* note 238, at 15, 37-38.

[278] Tenente, *supra* note 17, at 310.

purchase food on local markets. Such purchases may help stimulate local agricultural markets while better meeting local food preferences.[279]

Monetization is just one problem complicating the U.S. food-aid programs. The requirement that food-aid be carried on U.S. vessels, even if serving national defense purposes,[280] means the U.S. pays significantly higher costs to transport food-aid. The GAO estimates that 65 percent of the expenditures under Title II are for transport.[281] Transport costs are rising, and as a result, the U.S. is shipping less food-aid. The GAO estimates that if the U.S. had shipped as much food-aid in 2006 as in 2002, "they could have fed over 35 million more people during a typical peak hungry season lasting 3 months."[282] Costly transportation means that resources that could be used to support local food projects are unavailable.

There is, therefore, a need to amend current legislation in order to limit inefficiencies and the market-distorting effects of monetization. The following changes could help create greater opportunities for smallholder farmers in SSA:

- Consider reducing the amount of in-kind donations and allow instead for the greater use of cash payments to people facing food insecurity so they can buy food directly from local providers. The E.U. has moved in this direction under its Food Aid Policy.[283] Such a change would strengthen local agricultural markets, which in turn would create more opportunities for African farmers to sell products within their countries (and in some cases, in neighboring countries). Recognizing that such a change may create opportunities for the misuse of funds, a shift to monetary payments may allow more people to receive food-aid in a timelier manner. Furthermore, allowing food-aid recipients to buy from local producers would support the development of a more vibrant commercial agricultural sector in SSA.
- Current monetization rates are far above the mandated 15 percent minimum.[284] In order to help develop local markets for food, it would be more appropriate to limit monetization. More food should be purchased either locally or triangulated; that is, purchased in one developing country and distributed in another. Again, the E.U. has

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279 *See* DUMPING FOOD AID, *supra* note 6, at 8.

280 *See* FOREIGN ASSISTANCE, *supra* note 237, at 13, for a brief outline of the national defense argument.

281 *Id.* at 15.

282 *Id.* at 16.

283 *Id.* at 7.

284 *See* FOREIGN ASSISTANCE, *supra* note 237, at 39, 41 (the GAO estimates that 50% of non-emergency Title II food aid was monetized in 2005. 86% of Food for Progress aid was monetized between fiscal years 2001 and 2006, 51% of Section 416(b) aid was monetized between fiscal years 2001 and 2005 while only 15% of McGovern-Dole food aid was monetized between fiscal years 2003 and 2006).

moved in this direction.[285] The Bush Administration had proposed legislation allowing up to 25 percent of appropriated food-aid funds to be used to buy food in places closer to desired beneficiaries.[286] While this request was not incorporated into the 2008 Farm Bill, the law does create a four year pilot program that will allow for local purchases of some non-emergency food-aid.[287] The program allocates $60 million: $5 million for first year start-up costs followed by two years of local purchases of up to $25 million per year with $5 million for assessment during the final year.[288] By increasing local purchases this way, the Farm Bill project would help to limit market distortions while providing local farmers with additional incentives to grow for the local market. Such a change would also benefit NGOs, such as CARE, which spend considerable time and effort managing the monetization process rather than focusing on their core missions.[289]

- The current requirement that 75 percent of U.S. food-aid be carried on U.S. vessels has led to high transport costs. The GAO estimates that between 2001 and 2005 the cargo preference requirement imposed an additional $134 million of costs on the U.S. food-aid program when compared to foreign cargo rates.[290] In addition, these requirements create disincentives for foreign carriers to participate in the U.S. program because few slots are open to less-expensive foreign transporters.[291] It would be more appropriate to either remove this requirement or significantly lower the percentage requirement. This would allow for greater use of foreign carriers and create a more competitive environment so the food-aid programs could spend more of their budget feeding the hungry rather than supporting U.S. shipping interests.

Changes to current U.S. food-aid programs are needed to reduce waste and inefficiencies as well as provide greater support for the hungry in developing nations. Changes that reduce market distortions and provide incentives for African farmers to produce for local markets should be welcomed. The U.S. should shift away from the paradigm of sending surplus American agricultural commodities to developing African countries in non-emergency settings. A change to cash payments and local purchases would help to strengthen local markets, support smallholder farmers, and address some of the problems associated with food insecurity. Food-aid will surely remain a valuable tool in

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285 *See* OECD REPORT, *supra* note 249, at 21.

286 *See* FOREIGN ASSISTANCE, *supra* note 238, at 7.

287 *See* H.R. 6124 *supra* note 251, at Title III.

288 *Id.*

289 *See* FOREIGN ASSISTANCE, *supra* note 238, at 38.

290 *Id.* at 30.

291 *Id.*

addressing humanitarian needs during times crisis. But, to the extent that current programs distort African food markets, their operation should be re-examined.

Through improved regional trading terms and amendments to the U.S. food-aid programs, it would be possible to improve market access for smallholder farmers in SSA while increasing their productivity and ability to serve these markets. In the end, this may be a strategy more suitable for creating sustainable food security in SSA than the current food-aid paradigm. As Barrett and Maxwell point out:

> [w]hile there are surely particular emergencies and distribution modalities through which food aid can play an effective in stabilizing and improving food availability at the micro level of individual communities, households, and individuals, both commercial trade and more rapid domestic food productivity growth appear more effective in stabilizing developing nation food availability in the regular course of development.[292]

CONCLUSION

The small-scale farmers in Africa and in other regions, who benefited little from past innovations, need . . . a "Doubly Green Revolution": a scientific revolution that helps farming families over a broad range of agro-ecosystems achieve sustainable advances in productivity and profitability per unit of land, labor, and capital, while restoring the long-term productivity of their farms.[293]

Today, subsistence farming is reality for millions of Africans. Mired in poverty, these farmers and their families are victims of both food insecurity and tenure insecurity. They need access to improved technologies in order to increase crop yields, meet their food needs and, hopefully, sell to local, regional, and even international markets. With very limited cash income, they have traditionally been overlooked by corporations that believe they have little to offer these poor people.

Yet, despite their very limited incomes, these farmers want and need to purchase goods. Working closely with the smallholder farmers of South Africa, Monsanto realized that the farmers are willing to purchase seed, fertilizer, and herbicide in a scaled-down size. By providing what smallholders desired – good seed and supporting products in the right quantities at the right price – Monsanto is helping smallholder farmers in South Africa grow more maize, thereby improving their food security. Whether they succeed in reaching the millions of

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[292] *See* Christopher B. Barrett, *Does Food Aid Stabilize Food Availability?*, 49 ECON. DEVEL. & CULTURAL CHANGE 346 (2001).

[293] *See* Gary Toenniessen, Address at National Agricultural Biotechnology Council (NABC) Meeting Biotechnology: Science and Society at a Crossroad: Opportunities for and Challenges to Plant Biotechnology Adoption in Developing Countries 245, (June 3, 2003), in NABC Report 15, http://nabc.cals.cornell.edu/pubs/nabc_15/chapters/Toennissen.pdf.

subsistence farmers in Africa remains to be seen. While some scholars maintain that the public-sector or public-private partnerships are the only likely providers of improved agricultural inputs, the South African experience with Combi-Packs shows that in some situations the private sector will create products that help smallholder farmers increase their productivity and ensure food security.

Evidence to date suggests that the benefits of combining Combi-Packs with no-till agriculture are significant. This provides a message of hope for a better future for smallholders as their productivity rises. They experience higher crop yields, leading to improved food security and, for some, additional cash income from the sale of surplus maize. Farmers spend less time weeding and plowing, saving time and money. This in turn frees up women's time – who do most of this back-breaking work – and it provides opportunities to pursue other interests. Taken together, these changes translate into improvements in smallholders' income and standard of living, thus providing some poverty alleviation.

However, to extend these kinds of benefits to the millions of smallholder farmers in SSA, a variety of concerns need to be addressed. Among them, changes to the legal environment must be implemented to improve tenure security for farmers, support innovative activities by companies to boost agricultural production, and improve market access. Changes in other areas are also vital to the success of a Green Revolution in SSA, but addressing them is beyond the scope of this article.

Policy efforts directed towards smallholder farmers should, first and foremost, seek to improve the institutional environment in which these farmers operate. These proposed reforms address the issue of inadequate "transactions infrastructures" that exist in many developing countries. Some scholars consider such inadequacies an impediment to smallholder development.[294] Necessary institutional changes include:

- Protecting the security of land tenure for smallholders in general and for women in particular;
- Improving local IPRs environments to promote greater innovation;
- Lowering agricultural tariff rates and export taxes within Africa; and,
- Amending current U.S. food-aid legislation to allow for cash donations and local purchases of food to support the development of local markets in Africa. In addition, legislation should be amended to allow for increased use of foreign carriers to reduce transportation costs, allowing additional funds to be used to benefit the hungry around the world.

The lesson of the Combi-Pack is that alternative strategies *do* exist to bring about a Green Revolution in Africa. Contrary to expectations and predictions, the private sector is providing improved agricultural inputs to subsistence farmers. Serving this market of a billion consumers would make better sense for

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[294] *See* Kydd, *supra* note 45, at 2.

companies like Monsanto if the legal environment is conducive to innovation and investment. More importantly, if Africa's subsistence farmers are to benefit from a Green Revolution they need a legal environment that provides security and incentives to invest. For these farmers, land tenure security and improved access to regional markets are essential. With sufficient legal frameworks in place, farmers would be better able to feed both themselves and a hungry continent.

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