HIV/AIDS, Climate Change and Agricultural Crop Mix Strategy: The Case of Zambia

Vincent Amanor-Boadu and Yacob Zereyesus, Kansas State University

Africa's agriculture is still very dependent on human labor due to the relative size of operations, even when the operation is commercial. In most cases, the labor employed is that of the producer, implying that most African farmers are also self-employed. Since the majority of these farms are subsistence in nature, any disruption in production and productivity can result in significant food security and nutrition security challenges (Barrett, 2008; Gillespie and Kadiyala, 2005). A major source of disruption in the labor supply market in recent decades in African agriculture, especially in southern Africa, is HIV/AIDS. It is estimated that there are 22 million people living with HIV/AIDS in sub-Saharan Africa at the end of 2007 and more than 1.5 million people died from the disease while more than 11 million children were orphaned (UNAIDS, 2008). DATA (http://www.data.org/) reports that 20 percent of farmers in sub-Saharan Africa will die from this disease by 2020.

The production challenge presented by HIV/AIDS is complicated with the increasing climate change that is currently going on around the world. For example, research reports on precipitation indicate that droughts in sub-Saharan Africa are getting longer and severer in recent decades compared to previous decades (Gautam, 2006) and since most of the region's agriculture is rain-fed, it means productivity of traditional crops is under stress. In response to the labor and climate challenges, some countries are encouraging their producers to shift from traditional products to new products that are drought-resistant and address the labor intensity constraint. Such is the case in Zambia, a country that has a traditional affinity to corn and has in recent years been increasing its cassava production in response to the HIV/AIDS epidemic and the increasing severity and duration of drought.

This paper uses a system dynamic model to analyze the implications of the HIV/AIDS epidemic and the drought situation on crop mix strategy among Zambian producers. The production data was collected using a survey technique in the summer of 2007 while the climate change and HIV/AIDS information were generated using a Monte Carlo simulation approach based on reported statistics from reputable research institutions, such as UNAIDS, which collects and reports detailed national infection rate data and structured to identify the influence of demographic on crop mix strategy. The results show that entrepreneurial response to constraints defines the strategic selection of crops to minimize the effect of HIV/AIDS and drought on production. The results provide insights into how policy makers in countries with similar constraints and challenges may structure incentives to enhance the benefits from these strategic thrusts pursued by these small farmers while reducing the economic and social burden on society and the state.

Sustaining the Future through Youth Education

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Ann Religa, 4-H Youth Development – Harvey County Extension, KSU

The future of a country is dependent upon the youth. The knowledge, morals, and values these young people bring into their adult lives will shape their response to the regional and global issues facing our planet. In Africa, preparation of the young people is of the utmost importance

due to the unique and wide-spread environmental, political, and social issues these youth will inherit.

Maai Mahiu, Kenya is a town of 40,000 located at a highway crossroads. The transient nature of the population has created a community where prostitution is common and 60-70% of the population may be infected with HIV/AIDS. Environmental issues in Maai Mahiu include: food security, water quantity and quality, and waste management.

Comfort the Children (CTC) is a non-profit organization whose mission is to serve the Maai Mahiu community by building relationships in an effort to increase healthcare, education, community development and environmental awareness. One of the CTC programs includes Environmental Education Clubs at local schools. As part of the Kansas to Kenya team sponsored by Kansas State University Research and Extension, we visited three secondary-school clubs in order to become aware of the efforts and foster involvement in this initiative.

Each school is currently raising seedlings and planting trees on their property as a club project. These students are aware that without trees their fuel and food security is threatened. However, despite desire and passion there are few if any physical resources. Water for the trees is the greatest concern. Many trees die because it does not rain, and watering trees takes water from their cups. Yet, like many other countries some students lack the knowledge and concern for growing environmental issues in their communities.

Hands-on education is almost absent from Kenyan schools. This lack of interactive education is partly due to the curriculum used and mostly due to the lack of resources available to teachers and students. What is needed to continue to build the Environmental Club Program in Maai Mahiu is support and training for the environmental club leaders. Lesson plans, activity supplies, and other environmental education resources are needed. Future training could include Project WET/WILD training, mentoring from local environmental professionals, and sessions with safari guides.

Mobilizing the African Church to Respond to the Environmental Crisis

Rev. Edward R. Brown, Director, Care of Creation Inc.

Large portions of the central, east and southern Africa are overwhelmingly Christian. Kenya, as an example, claims to be 80% Christian. In addition, Christian organizations, both international and indigenous, have historically been at the forefront of responses to poverty, health issues and acute disasters. All of this would seem to suggest that the Christian church in Africa can – and should – be a major partner if not a leader in responding to the environmental crisis in that region.

Care of Creation Kenya is one example of an organization seeking to ‘mobilize the Kenyan church to respond to the environmental crisis’ through a comprehensive program that includes awareness raising and vision casting, tree planting, water harvesting and a unique Africa-developed agricultural program called ‘Farming God’s Way’. This presentation will use the Care of Creation example to highlight the opportunities and unique challenges encountered when seeking to mobilize a large faith community like the Kenyan church.

Traditional Medicine in Waste Bottles: Prospects of an Integrated Waste Bottles Management

Felix Ekejiuba

The paper investigates the relationship between community health and wastes management in Nigeria. Due to the harsh economic situation, the high cost of orthodox treatments and the associated drugs, many people presently patronize African traditional medicine. In a bid to remain healthy in midst of economic woes, many have got infections and illnesses from consuming traditional medicine bottled or stored in waste bottles which are neither sterilized nor certified clean. On the other hand, it is also a fact and popular too those dead ants or their parts and other particles are often seen in corked drinks like beer, soda and water etc. If this occurs at a higher level of brewery and bottling such as in Coca-Kola, Pepsi and Guinness etc, the people are no longer surprise when they see such impurities in the lowest level of bottling as we have it in the traditional medicine practice.

The reason for the above situation is not far-fetched. A journey around our cities shows that waste bottles make up 60 percent of our solid wastes. Our traditional medicine practitioners source their bottles directly from waste dumps or indirectly from traditional waste bottle collectors. Again, 95 percent of bottles used in our bottling companies and breweries are bottles that have been used more than once. And given the fact that our people care for the content of the bottles and not the bottles themselves, they subject empty bottles to various kinds of abuses before they get back to the bottling companies for reuse. Most often, the empty bottles are homes to ants, mosquitoes and cockroaches, some of which die and stick permanently in them.

As a result of the low level of quality control in Nigeria, community health is put at risk when these bottles are reused for bottling of food and drugs. This can account for the occasional outbreaks of diseases such asCholera, Typhoid, Dysentery and Diarrhea etc. This paper examines the prospects of an integrated waste bottle management for the country. It recommends that the government should set up an agency that will regulate and control the use of waste bottles both in traditional medicine, pharmaceutical and other bottling companies. The agency is to procure, sterilize and certify the use of waste bottles by affixing their certification mark or number on them. If this is made possible there will higher prospects for community health and environmental protection. It will also stimulate economic activities and bring about higher revenues for the government and traditional wastes bottle collectors.

"The Shosho Shamba": Demonstration Community Gardens as Teaching Tools in AIDS-Impacted Communities

H. George, L. Kulcsar, M. Religa, and
W.L. Hargrove, Kansas State University

In June, 2008, in cooperation with Comfort the Children International, we established a demonstration community garden in the town of Maai Mahiu, Kenya. Our objective was to demonstrate a range of "low tech" food production practices that could be implemented by grandmothers who are raising their grandchildren under difficult circumstances of food insecurity. Maai Mahiu is located about 30 miles northwest of Nairobi and is one of the poorest HIV/AIDS-impacted towns in Kenya. About 60% of the population is HIV

positive. Many grandmothers are in the role of surrogate head of household and trying to raise their granchildren due to the death or serious illness of their daughters. Lack of access to natural resources, especially land and water, and dire poverty are serious constraints for women whose families are food insecure. Working with a "Grandmothers' Association" organized by CTC, we developed a community garden that demonstrated vegetable production, drip irrigation, making and using compost, tree planting, and "bag gardens". All of the technologies are relatively low cost and "low tech". The technologies are easily adaptable and adoptable for the participating women. The grandmothers are implementing the technologies at their own homes and thereby improving the diets of the children they are raising.

2008 KSU/INTSORMIL/USAID Poultry Experiment in West Africa.

S. Issa and J. D. Hancock, Kansas State University, Manhattan.

In the summer of 2008, Salissou Issa returned to West Africa to initiate a regional experiment in poultry feeding. This summer-long effort served several purposes:

1. To demonstrate the nutritional merits of locally grown sorghum as poultry feed
2. To provide technical service/outreach to poultry producers in hopes of improving profitability and viability for this fledgling industry
3. Via support of a viable poultry industry, to move sorghum from its status as merely a subsistence crop to a cash enterprise adding disposable income to rural households in West Africa
4. To improve the quality of life and nutritional status of farm families in rural West Africa
5. To establish a network among research scientists at key institutes in Senegal, Mali, Burkina Faso, Niger, and Nigeria that can offer support and technical service to poultry producers throughout West Africa.

Salissou will share his results and experiences during this initial KSU/INTSORMIL/USAID regional experiment and offer insight into the problems and pitfalls of such efforts.

***Cricetomys* farming for improving animal production in developing countries**

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There is a great need to enhance food security in the developing countries. The shortage of protein-rich food resources in some areas has reached serious levels. One of the most feasible means is to develop animal husbandries, employing animal species that are not yet widely reared, or are still just hunted or collected by people for their subsistence. The *Cricetomys* rodent can be the solution to solve the problem of meat shortage in the developing countries. The *Cricetomys* genus commonly called “cricetoma” or “Gambian giant pouched rat”, weighing on average 1.4 kg, prolific and more omnivorous than vegetarian, is suitable for farming for human nutrition. The consumption of wild *Cricetomys* meat is already relatively high throughout most of Africa and the development of husbandries of those rodent species would become one of the easiest ways to increase animal production and help to protect them against over-hunting. We have developed since 25 years the *Cricetomys* farming at the University of Kinshasa, DRC, with

actually 40 animals kept in the breeding colony. The rearing techniques established can hep to disseminate that new husbandry through Africa.

Kansas to Kenya: The Nutrition and Health Improvement Team

M. Meck Higgins

The Nutrition and Health Improvement Team was one of several K-State Research and Extension teams that worked in the community of Maai Mahiu, one of the poorest HIV/AIDS-impacted towns in Kenya, through collaboration with Comfort the Children International, during June 2008. Our team´s programs were conducted with Sandy Procter, Carol George, Valerie Stull and local community health workers. With a focus on nutrition and health improvement, the team assessed children's diets and developed a plan for improved nutrition for children living at Good Shepherd Orphanage. We also developed shopping lists and menus that would provide a minimum level of nutrition to HIV-positive individuals and families with disabled children. In addition, we conducted educational workshops and home visits of selected families. One of our team members provided nutrition education at a maternal and child health clinic.

The role of agriculture in rural development in sub-Saharan Africa

R. N. Mutava

With continued increase in world population, food security is becoming a major concern. Sub-Saharan Africa is the only region where per-capita food production continues to worsen. Agriculture has the potential to reduce rural poverty, at farm level, in the rural economy, and nationally with direct and indirect, short- and long term effects. If rural poverty is to be addressed through agriculture, small-scale farmers will need to be enabled to grow and sell food. In practical terms, this would involve increasing productivity, incomes and livelihoods of small-scale farmers. In many rural areas both the farm and non-farm sectors are critical for poverty reduction, with different but complementary contributions for the rural poor. Global experience demonstrates the importance of agricultural growth for poverty reduction in poor rural areas, but also identifies the limitations of agriculture in delivering poverty reduction, and the need for complementary growth in the non-farm sector. At present most of small scale farmers lack access to productive crop varieties, credit facilities, information and adequate water resources and soil nutrients. There is a positive relationship between agricultural growth and poverty reduction since agricultural productivity is an important determinant of poverty. Increases in yields have the potential to alleviate poverty. As both sectors grow, the non-farm sector will build on the gains made by smallholder agriculture and increasingly influence real wages and food security. This review looks at interventions that have been put in place in the past and suggests interventions at the community level that will contribute towards improving the rural economy.

DECISION MAKING ON ENVIRONMENT MATTERS: ROLE OF POLITICAL AND SOCIO-ECONOMIC FACTORS AMONG LOCAL PEOPLE IN RUAHA, TANZANIA

D. Mutekanga

The paper highlights the role of political and socio-economic factors in decision making by local communities and local government on environment issues focusing on protected areas in Tanzania.

The case being studied is in Ruaha Landscape area consisting of local communities neighboring the Ruaha National Park.

Preliminary results show that among the local people, environment decisions are made and influenced by the prevailing village, local government and national political leanings; by the village's social hierarchy which is heavily dependent on individual economic capacity. This example is from a rural pastoral Tanzania community which is relatively typical of most African rural pastoral communities especially those leaving around protected areas in East, Central and Southern Africa.

The village politics are inevitably affected by the local government and national politics in terms of the political inclinations of the their representatives and whether they belong to the ruling party or not and the capacity of these leaders to deliver on their electoral promises.

The socio-economic role is strongly defined by the community members who have very strong economic background in terms of wealth they have for example number of animals and size of land they own and related factors like size of family. Even when these individuals are silent they (behind the scenes) weld a lot of power as to determine what decision will be made on an environmental issue. For this particular community the fact that they own large herds of cattle means they have strong interest in environment related issues because they agree this affects them most..

The paper concludes with policy recommendations for various levels of government from village to district and national level. It also advances some suggestions for the inter country and regional bodies like the East African Community.

HIV/AIDS among Older Adults: Risk Factors and Recommended Prevention Strategies for Rural Kenya

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The HIV/AIDS epidemic has devastated the world's population emerging as one of the greatest public health challenges in contemporary times. The epidemic affects the development and political stability of many global nations with both short and long-term economic effects on the labor force, education sector, health services and food security. Sub-Saharan Africa is the hardest hit by the AIDS epidemic with almost two-thirds (68%) of the world's adults and children living with the virus. In Kenya an estimated 1.2 –1.5 million people live with HIV/AIDS with an adult prevalence of 6.7%, which is just below that of the sub-Saharan Africa region (7.5%).

Prevention and early diagnosis of HIV is the cornerstone of combating the disease and remains the mainstay of the global response. However, despite society's increased awareness that HIV/AIDS affects all populations regardless of age, gender and sexual orientation, the older adults are largely overlooked. Current medical advances including highly active antiretroviral therapy (HAART) have brought a dramatic change in HIV related mortality. Those infected are living longer and consequently aging with the disease. However, HIV testing and prevention campaigns have targeted those considered at risk of infection, excluding older adults. There is also limited research that addresses the impact of the disease on older adults. Such gaps in research and knowledge creation contribute to societies' reluctance to view HIV/AIDS as a general population problem and compounds problems of addressing HIV as a concern for older adults.

The goal of the current study is to provide some insights on the risk factors for HIV infection among older adults in rural Kenya and strategies for prevention from an older people's perspective. Six focus groups were conducted among adults, 60 years and older, the referral cutoff point to the older population agreed on by the World Health Organization (WHO) and the United Nations. The older adults who have been affected by the epidemic may be isolated, depressed, stigmatized, discriminated against and uneducated about the disease despite their role in providing care and support of those affected by the disease within their families.

Key findings indicate economic factors, behavioral as well as socio-cultural practices that put older adults at risk of HIV infection. This age group is affected directly through sexual contacts and indirectly through interaction with persons infected with the virus including family and friends. Their HIV symptoms are hard to detect because of comorbidities associated with aging. Older adults' role in rural societies as traditional healers, birth attendants, male and female circumcisers also exposes them to the virus. Their lack of knowledge about the disease and how to adequately protect themselves is exacerbated by the unavailability of resources for universal precautions while working with those suffering from the disease. Though counseling and HIV testing are key steps toward prevention of further spread of the epidemic, ageism, stigma and discrimination prevent older adults from knowing their status. Recommended strategies include open discussions on HIV/AIDS in community forums, engagement of political and religious leaders in prevention efforts, proper training in voluntary counseling and testing among older adults, availability of services in rural communities and using an integrated approach to HIV/AIDS interventions. The social-economic impacts of the epidemic on older adults who are either infected or bear the burden of care and support for those affected requires further research.

Improving Household Nutrition in the Kivu Provinces of the Democratic Republic of Congo

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Nutritional security in many developing nations depends upon several factors including the quantity of food consumed as well as its quality, in terms of nutritional content. The Kivu provinces of the Democratic Republic of Congo (D.R. Congo) are no different. Recent studies have indicated that 42% and 47% of the rural population under the age of five in North Kivu and

South Kivu provinces suffer from iron deficiency anemia (WHO, 2009). To combat this health problem, several strategies can be pursued including supplementation, fortification, diet diversification or through biological fortification of the main food staple, the common bean *(Phaseolus vulgaris)*. The common bean has high natural variability in iron content and plant breeders are exploiting this variation in breeding programs to develop new varieties that are considered "biofortified" and nutritionally superior to currently available cultivars. In order to assess the potential benefit of biofortification, household production and consumption patterns must be assessed in order to determine the potential benefit of biofortification versus alternative strategies to improve the nutritional status of rural populations in the Lakes region of D.R. Congo.
The purpose of this research is to determine how technically efficient small-scale producers are in two provinces (North and South Kivu) in the D.R. Congo at producing two different varieties of beans: bush and climbing beans. In addition to calculating the efficiency scores, this research attempts to identify what producer and field characteristics affect these scores. We hypothesize that bean producers will be more productive than producers in South Kivu and that climbing bean producers will be more productive than bush bean producers. Technical efficiency is estimated using a nonparametric approach. A tobit model is used to examine the effect of producer and field characteristic on the efficiency score. On average, farms were 66% technically efficient. North Kivu bean producers and climbing bean producers have, on average, a higher technical efficiency score than their counterparts. Implications from this research suggest that there is room for improvement in the technical efficiency scores for producers in D.R. Congo. Based on the results, it may be more productive to continue focusing on improving the yield and nutritional content of climbing beans than to concentrate resources in extension programming to reduce production inefficiencies.

Biodiesel from tree seeds in northern Ghana.

Walter Kpikpi, Ruth Welti, Ariel Burns, and Richard Jeannotte

Northern Ghana receives rain only during a 5-month rainy season and is dry the rest of the year. Significant areas of land have been degraded via desertification and are no longer arable, while food needs are unmet. One of the limiting factors for food production is the availability of biodiesel to power tractors used in planting and to power grain milling. Non-arable land in northern Ghana does support growth of a few well-adapted tree species. Common trees include *Jatropha curcas, Balanites aegyptiaca, Azadirachta indica* (Neem), and *Delonix regia*. Data obtained by analysis at Kansas State University indicate that seeds of two northern Ghanaian tree species, *Jatropha curcas* and *Azadirachta indica,* are high in oil (25-29% and 18-23%, respectively). Preparation of biodiesel from seeds of existing plants has the potential to create economic opportunity in northern Ghana, without further stressing an already stressed environment. We are proposing that a pilot plant be established to produce biodiesel from seeds of trees that are currently growing in northern Ghana. Initially, it is proposed that seeds of Neem and *Jatropha* will be collected, oil will be pressed from the seeds gathered by local farmers, and it will be converted to biodiesel at a pilot plant located on the campus of the University of Development Studies in Navrongo. The biodiesel will be used by local farmers. In the long term, we envision biodiesel production and use occurring in many local communities, once the appropriate technologies for use of local resources are identified and optimized. We also

envision cultivating trees specifically for biodiesel production on land that is not usable for food production. The presence of these trees will aid in reclamation of this land.

Nitrogen input-output dynamics in agricultural systems in southern Africa

Laura Pereira and Mary Scholes

Sustainable agriculture has become an area of focus in Southern Africa due to the food shortage crisis in the region. Nitrogen is an essential element for increasing crop yields and so this study focused on the input-output dynamics of nitrogen in agriculture in seven Southern African countries: Angola, Botswana, Mozambique, Namibia, South Africa, Zambia and Zimbabwe for 2000–2002. Data on inorganic nitrogenous fertilizer production and consumption as well as crop production and yield data for each of the countries were obtained from the FAO database. The results showed that South Africa was the primary producer and consumer of inorganic nitrogenous fertilizers in the region. Biological nitrogen fixation (BNF) contributed more nitrogen to the system than inorganic nitrogenous fertilizers in Mozambique where it makes up 45% of the total contribution in the region. An estimate was made of whether the seven countries were becoming depleted in nitrogen. for the region as a whole. The importance of sustainable agriculture in the Southern African region for providing food security, but also for building export economies has been recognized in the NEPAD agreement. This study reviews possible options concluding that a policy of combining inorganic and organic fertilizers, agricultural subsidization and an increase in the use of the BNF potential of leguminous crops provides a sound basis for policy development.

Awareness of and Attitudes about GM Foods by Rural Western Kenya Consumers

F. Keter, H. DeGroote, and O. Nzeogwu

Sub-Saharan Africa has realized growing food insecurity due to declining agricultural production. Existing technologies cannot meet the current food demand. Unlike other developed countries, the use of biotechnology has been hindered by safety and regulatory concern. There have been efforts by few African countries (Kenya, South Africa, and Burkina Faso) to develop the necessary biosafety rules to guide in the development and testing of agricultural biotechnology. Although biotechnology may be an important tool to reduce hunger, consumer acceptance concerns is a challenge, especially in Africa where little research has been done to address it. This paper will contribute new information on consumer acceptance of GM food and specifically bioengineered maize, in rural western Kenya.

Although genetically-modified maize (GM) has high potential for increased food production in Kenya, few studies have researched rural consumer attitudes about and acceptance of GM maize. A survey of 121 rural consumers in Western Kenya conducted in April 2006 found few respondents (13.2%) aware of GM crops. Among respondents who were aware, the major sources of information were radio (37%), professional resource persons (19%), newspapers (13%), and relatives or friends (6%). A large majority of respondents (93%) believed that GM technology can offer a solution to their food problems by increasing food production (98%) and enhancing its nutritional value (71%). Respondents did express some concerns about the risks of GM crops on local varieties (38%) and the environment (18%). In conclusion, although

consumers are crucial to the acceptance or rejection of GM technology in Africa, the rural population still lacks access to the relevant information to make informed decisions. A concerted, public policy effort is needed, and the wider use of radio should be explored. Presented with a balanced view of the benefits and risks of GM technology, rural Kenyan consumers seem likely to accept the GM crops.

Convergence and Contingency in Ecological Processes in South African and North American Savannas/Grasslands

A.K. Knapp, M. Smith, S. Collins, and J. L. Blair

Though geographically distant, mesic savanna grasslands in central North America (NA) and in South Africa (SA) are both dominated by C4 grasses that co-occur with C3 forbs and woody plants. They also have similar growing season temperatures and precipitation and share the same historic and present-day drivers of ecosystem function and structure: fire and herbivory by large ungulates. Based on these common features, patterns and controls on aboveground net primary productivity (ANPP) are expected to be convergent. However, an alternative perspective is that differences in evolutionary history, soil fertility, and diversity of the flora and extant megaherbivores may result in SA systems responding in fundamentally different ways to fire, grazing and resource manipulations when compared to NA systems. To address this issue, we used identical experimental designs, where fire (annually, every 3-4 years, and unburned), herbivory (grazed and ungrazed via herbivores exclosures) and nitrogen (10 g m-2) were experimentally manipulated at sites in NA (Konza Prairie Biological Station, KS) and SA (Kruger National Park and the Ukulinga Research Farm) to assess aboveground net productivity (ANPP) responses to fire, grazing and N additions over a three year period.

The Socioeconomic Determinants of HIV: Evidence from Lesotho, Malawi, Swaziland, and Zimbabwe

E. Asiedu

This paper uses data from the Demographic Health Survey to analyze the relationship between HIV status and the Socio-Economic and Demographic characteristics of adults in Zimbabwe, Swaziland, Malawi and Lesotho. We find that the relationship between HIV/AIDS status and the demographic and geographical variables, captured by gender (male/female), age and area of residence (urban/ rural) and age are qualitatively similar for all the four countries. In contrast, the relationship between the socio-economic variables, namely, marital status, wealth and education vary across country. In addition, we construct the HIV/AIDS profile for the average adult in each of the four countries.

Water Resources Study of the Okavango Delta, Botswana using Recent Modeling Tools and GIS Technology

D. Steward

The Okavango Delta in the southwestern extension of the East African Rift System of sub-Saharan Africa forms a sedimentary alluvial fan with wind-blown aeolian deposits of Kalahari sands with one of the most biologically diverse freshwater ecosystems in the world. The transboundary surface water is contributed to from precipitation occurring during the rainy season in Angola and Namibia to arrive months later in northern Botswana during the dry season. The high evapotranspiration rates of this wetland results in salt accumulation within the delta. A wide range of publicly available GIS data is used to understand this system, and will be illustrated during this presentation. This information is used to develop a new groundwater model to examine the role of regional groundwater flow in flushing salts to help sustain this freshwater ecosystem. Implications of adaption of this platform for future studies in Africa will be discussed.

Making Peace Work in Africa: On the Political Economy of the Transition from Authoritarianism

Tony Addison

Authoritarian regimes frequently leave in their wake a series of negative legacies that have not received up to this point sufficient attention in the literature on transitions, and even less by transitional justice measures. These legacies include unproductive expenditures—expenditures that have a high opportunity cost for development, in particular spending on a repressive state apparatus (intelligence services, the military, paramilitaries etc.). These expenditures are often accompanied by undisciplined rent-seeking whereby the state fails to ensure that the economic rents generated by its controls are used for the national development project—and these behaviours then become embedded in ways that are harmful to economic development under democracy. In the worst cases, both unproductive spending and rent-seeking will result in macro-economic destabilization—characterized by capital flight, excessive debt accumulation and macro-economic crisis. Human rights abuses and, in the worst cases genocide, are rightly the centre of attention for the transitional justice community. But to these crimes must be added the negative economic impact of authoritarianism together with its attendant social fallout: the increased child mortality, the lower life expectancy, and the greater prevalence of chronic poverty. Poverty kills people as surely as a machete or a bullet, and therefore the increased poverty (and other forms of distributive injustice) that accompany most experiences of authoritarianism should be incorporated into the charges laid before perpetrators. Not to do so, is to ignore a major (social) crime, and to encourage demagogues in the belief that they will never be accountable for actions that undermine national prosperity.

Female Education and HIV-AIDS Prevalence in Sub-Saharan Africa: The Search for a Non-Medical Vaccine

Robert J. Brent

We survey the literature on the role of education and HIV-AIDS prevalence in Sub-Saharan Africa, focusing mainly on female education. The early literature still sets the stage for how

education is to be viewed for policy purposes, i.e., as a major way of reducing the spread of HIV-AIDS in Africa. The dominant / official view, first expressed by researchers at the World Bank, is that education used to be (in the 1980s and early 1990s) positively related to HIV, but that relationship has subsequently been reversed over time. The alleged reversal has been so strong that investing in education can be thought of as a "vaccine". Given the difficulty of developing an actual vaccine, this non-medical, educational vaccine can be thought to be the only one that will be available in the foreseeable future. Unfortunately, the dominant view does not square with reality. Although there are signs that for some African countries there has been a reversal, most studies still show that the relationship between female education and HIV is either perverse, i.e., positive, or at best neutral. A recent study in 2006, using HIV data as recent as 2000, found that for 31 countries in Sub-Saharan Africa, the relation between HIV and female education was still positive. It used nine measures for female education, covering female literacy, enrollments in primary and secondary schooling, non-standard (overage) students, and including also all these measures expressed relative to male education (in the form of enrollment "gaps"). No vaccine exists yet. But, this does not mean that investing in female education can not be socially worthwhile. In a 2008 Cost-Benefit Analysis of female primary education in Tanzania, education was found to decrease regional HIV rates. This came about because, although the direct effect of education on a region's HIV rate was still perverse, the indirect effect working through education's effect on regional income was in the opposite direction and large enough to reverse the net effect. So although income levels raised HIV levels, changes in income brought about changes (i.e., reductions) in HIV levels. As a result, educating a cohort of 20,507 females brought about a reduction of roughly 1,408 HIV cases. Valuing the lives saved by the present value of lifetime earnings, and valuing the costs by the present value of 7 years of tuition (and other costs), the benefit-cost ratio was in excess of 1 (i.e., between 1.3 to 2.9 in the best estimates), revealing that primary education was socially profitable in Tanzania. Notwithstanding this result that female education could be worthwhile, it is still necessary to try to understand why a positive relationship between female education and HIV could exist. So emphasis was given to the use, or non-use, by educated females of condoms. In line with a large number of studies throughout Africa showing that educated females are more likely to use condoms with non-regular partners, a 2009 study of condom use in Tanzania confirmed that females were also less likely to use condoms with their regular partners. It turned out that educated females were even less likely to use condoms with their regular partners than do less educated females. This non use of condoms with regular partners would be one reason for the female education / HIV puzzle. The policy conclusion was that educated females should be considered to be a "high-risk" group from the point of view of prevention programs. Targeting them should ensure that "inoculating" females with education would make them immune and hence produce an effective vaccine.

Sustainability and Justice in African Urbanization

G. Myers

The rhetoric of sustainable development has had substantive impacts in African cities, including the policy transformations created through programs such as the United Nations Sustainable Cities Program. Two-thirds of the cities that participate in the SCP are in Africa, for instance, and even in other African cities one can see sustainable

development discourse at work and at play. Discussions of environmental justice, on the other hand, are rare in policy or research dimensions in urban Africa, with the exception of South Africa. In this paper, I will examine the environmental justice literature in African urban studies, largely though not exclusively built around South African and Tanzanian case studies, to assess its applicability to other urban settings on the continent. My goal is to articulate an understanding of the disconnection between the out-sized presence of sustainable development rhetoric and the general absence of the environmental justice debates in Sub-Saharan African urban studies.

The Challenge of Policy Coherence: Investment and Social Protection for Food Security and Agricultural Growth in Africa

J. Tefft

Over the last fifteen years, countries in sub-Saharan Africa have achieved mixed results in improving food security and the nutritional well-being of urban and rural populations. An estimated 212 million people are undernourished in sub-Saharan Africa, representing 30% of the total population, while 37% of African children 0 to 5 years are chronically malnourished. Despite this sobering reality, a select group of countries have generated sustained agricultural growth and improved food security between 1990 and 2008. Several factors underscore their performance: preservation of social peace; macroeconomic stability and conducive business environment; effective governance institutions; stable incentives for economic actors; increased education levels, and; high and sustained levels of quality public investment in the agriculture and health sectors and rural infrastructure. The performance of the majority of SSA countries, in addition to falling short in a number of these areas, has also been tempered by an increasing number of socioeconomic crises and sudden onset natural crises, resulting in a marked rise in food-related emergencies. Diverse responses of national governments and development partners to these crises highlight an increasing incoherence between short-term policy and programmatic measures and the aforementioned policies and investment which have contributed to sustained agricultural growth and improved food security. This incongruity between short and long-term policies has been observed, for example, in protracted crises, in the 2008 high price crisis as well as in the design of social safety net programs. Increasing attention and future applied research should focus on maximizing complementarities and synergies of policies and programs at macro and micro levels while minimizing resource conflicts, distortions and political obstacles. Establishing greater consistency between longer-term agricultural policies and investment, and innovative social protection programs offers multiple avenues to promote, to protect and to diversify livelihoods in sub-Saharan Africa.

Climate Change and Society in Africa

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Africa is an engine of the World's climate. Dust from the Sahara fertilizes the Amazon forests and Gulf of Mexico hurricanes originate in the Sahel. The African climate is highly variable, intense storms and floods

alternating with periods of drought. Inevitably climate is linked to social changes, the rise and fall of civilisations, movement of peoples and change of governing regime. Amidst this variability it is important to ask to what extent social upheaval is due to the external driver of climate and how much is caused by vulnerability of society itself. This question is particularly important today because Africa is the continent likely to be most seriously affected by human-induced climate change. Africa could also have a key role in mitigating green house gas emissions through the reduced emissions from deforestation in developing countries policy currently being debated by the UNFCCC. In addition to mitigation, this policy has the potential to build resilience to climate change by enhancing traditional systems of land management.