THE WORLD BANK GROUP

A World Free of Poverty

23063

Findings

WORLD BANK

Africa Region . Number 28 . December 1994

Findings reports on ongoing operational, economic and sector work carried out by the World Bank and its member governments in the Africa Region. It is published periodically by the Africa Technical Department on behalf of the Region.

Fighting the Population/Agriculture/Environment Nexus in Sub-Saharan Africa

Sub-Saharan Africa's demographic, agriculture and environmental problems are closely linked in a nexus of mutually reinforcing causality chains. Key linkages are found in traditional crop production and livestock husbandry methods, traditional land tenure and land use practices, traditional responsibilities of women in rural production and household maintenance, and traditional methods of utilizing woodland and forest resources. These systems and practices, well suited to people's survival needs on Africa's fragile resource endowment when population densities were low and populations stable or growing only slowly, came under increasing strain with the rapid acceleration of population growth that began when mortality rates declined sharply in the 1950s while birth rates remained high. The pace of evolution of these systems has been inadequate in the face of dramatically intensifying pressure of more people on finite stocks of natural resources. This study, **Reversing the Spiral : The Population, Agriculture and Environment Nexus in Sub-Saharan Africa**, examines the three crucial areas of interaction and offers a plan to reverse the past downward spiral.

The Three Basic Concerns

Population Growth. Sub-Saharan Africa (SSA) lags behind other regions in its demographic transition. The total fertility rate (TFR) -- the total number of children the average woman has in a lifetime -- for SSA as a whole has remained at about 6.5 for the past 25 years, while it has declined to about 4 in all developing countries taken together. Recent surveys appear to signal, however, that several counties -- notable Botswana, Zimbabwe, Kenya -- are at or near a critical demographic turning point.

Agricultural Performance. Average per capita food production has declined in many countries, per

capita calorie consumption had stagnated at very low levels, and roughly 100 million people in Sub-Saharan Africa are food insecure. Food imports increased by about 185 percent between 1974 and 1990, food aid by 295 percent. The average African consumes only about 87 percent of the calories needed for a healthy and productive life.

Environmental Degradation. Sub-Saharan Africa's forest cover, estimated at about 679 million hectares in 1980, has been diminishing at a rate of about 3.7 million ha per annum, and the rate of deforestation has been increasing. As much as half of Sub-Saharan Africa farm land is affected by soil degradation and erosion, and up to 80 percent of its pasture and range areas show signs of degradation.

Key Elements of the Nexus

Shifting Cultivation and Transhumant Pastoralism. Shifting or long-fallow cultivation and transhumant pastoralism have been appropriate under conditions of slow population growth, abundant land, limited capital and limited technical knowledge. The key to maintaining this ecological and economic equilibrium was mobility. As long as land was abundant, more land could be gradually brought into the farming cycle to accommodate the slowly growing populations.

But in most of Sub-Saharan Africa the scope for further expansion of crop land has drastically narrowed. On average, per capita arable land actually cultivated declined from 0.5 ha per person in 1965 to slightly less than 0.3 ha/person in 1990 (it was 0.3 ha/person in India in 1990).

Slow technological innovation because of ineffective agricultural research and extension systems is only part of the reason; the poor transport infrastructure throughout most of SSA; inappropriate agricultural marketing and pricing as well as dismal and exchange rate policies; and poorly conceived and implemented agricultural projects have contributed to the persistence of rural poverty.

Women's Time, and Their Role in Rural Production and Household Maintenance Systems. Most women in Sub-Saharan Africa bear heavy responsibilities for foodcrop production, weeding and harvesting on men's fields, post-harvest processing, fuelwood and water provision, and household maintenance. But the burdens on rural women are increasing, as population growth outpaces the evolution of agricultural technology and growing numbers of men leave the farms for urban and industrial jobs.

Many factors underlie the persistence of very high human fertility rates. The fundamental problem is low *demand* for fewer children. Environmental degradation, agricultural problems, food insecurity and poverty, and the heavy work burdens of woman all play a part in this respect. High infant and child mortality rates are a major factor explaining the persistent high demand for large number of children in Africa. Where girls are kept our of school to help with domestic tasks, this negatively affects their fertility preferences and their ability to make informed decisions about family planning once they reach childbearing age.

Land and Tree Tenure Systems. Traditional tenure systems in Sub-Saharan Africa, with communal land ownership, provided considerable tenurial security on land farmed by community members (although women's tenurial security is generally far less certain than that of men). As long as populations increased only slowly, customary systems also were able to accommodate the emerging need to move towards de facto permanence of land rights assignation. However, in many countries, tenure systems have not been able to adjust rapidly enough to changing economic conditions.

Most governments and development agencies have mistakenly believed that customary tenure systems provide inadequate tenurial security and that these systems are not conducive to the introduction of modem agricultural technology and market-oriented agriculture. Many governments have responded by nationalizing the ownership of land, and then allowing customary rules to guide the use of some land, while allocating other land to private investors and public projects. Often, the well-connected have used their influence to wrest land from its customary owner-occupants. The result has been reduced, rather than improved, tenurial security.

Forest and Woodland Exploitation. The heavy dependency on wood for fuel and building material has combined with rapid population growth to contribute to accelerating forest and woodland destruction. This is particularly severe around major urban centers where it has led to the appearance of concentric rings of deforestation. Commercial logging has significantly contributed to deforestation.

The degradation and destruction of forests and woodlands accelerates soil degradation and erosion, eliminates wildlife habitat, leads to loss of biodiversity, and has severe implications for local and regional climates and hydrological regimes. Deteriorating climatic and hydrological conditions negatively affect agriculture. For forest dwelling people, forest destruction threatens not merely their lifestyles and livelihood systems, but their very survival.

An Action Plan

The appropriate policy response and action program to address these problems are not easily brought into compatible focus. Many of the most immediately attractive remedies have been tried and have failed.

Some Basic Targets. For Sub-Saharan Africa as a whole, agricultural production needs to grow at about 4 percent per annum during the period 1990-2020. Daily per capita calorie intake should be increased from the present average of 2,027 to about 2,400 by the year 2010. Although the share of the population that is food insecure should be reduced from the present 25 percent to zero as rapidly as possible, it is more realistic to aim for a reduction to 10 percent by the year 2010 and to 5 percent by 2020. The rate of deforestation needs to be slowed, and the area of forests and woodlands should be gradually stabilized. Loss of remaining wilderness areas should also be minimized: about 23 percent of SSA's total land areas could be maintained as wilderness (compared with about 27 percent today). To preserve wilderness and forest areas, cropped land can only be increased from 7 percent of SSA's total land area at present to about 8.2 percent in 2020. The arithmetic of these indicative agricultural, food security and environmental objectives requires a reduction in population growth from the present average annual rate of over 3.1 percent to 2.3 percent per annum in the third decade of the next century. This will require lowering TFR by 50 percent between today and the year 2020.

Reducing Fertility Rates. A key aspect will be to increase *demand for fewer* children. Educational efforts, directed at both men and women, are needed to raise awareness of the benefits of fewer children. Women's work loads need to be eased to reduce the need for child labor. Dynamic agricultural development and improved food security will also reduce the demand for children. Kenya, Zimbabwe, Botswana and Mauritius, where the TFR is declining, provide strong evidence.

As demand for reducing fertility rises, it must be effectively met with increased supply of FP services and contraceptives. But supply must follow demand -- it cannot lead it. Where AIDS is a problem,

improved health care, FP services and education focused on preventing sexually transmitted diseases and increasing the use of condoms becomes even more important.

Promoting Environmentally Sustainable Agriculture. Farm productivity per unit area must be raised significantly to generate more output with little increase in the area farmed. To minimize negative impacts on the environment, much more emphasis is required on "environmentally benign and sustainable" technologies. Numerous such agricultural techniques have been developed and successfully applied, often through adaptation of traditional practices that have evolved in response to local agro-ecological and socioeconomic condition.

Agricultural research and extension services need to focus less on mono-crop technologies and farm mechanization and much more on the types of technologies mentioned, adapting them to local conditions and making them available to farmers in "menu" form for selective adoption. Women must become the target of such efforts to a much greater extent.

However, intensification with these technologies alone is unlikely to be sufficient in most SSA countries to achieve agricultural growth rates of 4 percent per year and more. Improved variety/fertilization/farm mechanization technologies will also be necessary. Increased use of fertilizers will be especially important to raise yields and maintain soil fertility.

Intensive and resource-conserving agriculture must be made less risky and more profitable. This requires appropriate marketing, price, tax and exchange rate policies as well **as** investments in rural infrastructure, health and education facilities. Creating parks, reserves and community-owned range land and protecting these against conversion into crop land will be important to conserve natural resources and biodiversity. So will reducing infrastructure development in forests and other fragile areas to discourage settlement in these areas. Since this will limit the scope for further expansion of cropped land and, potentially, the scope for agricultural production growth, there is a trade-off between conservation and agricultural growth. Creating additional protection areas will only be feasible and sustainable if agricultural production can be intensified at the rate suggested here (i.e. to about a 3.5 percent annual increase in farm out put per unit of land farmed). in this sense, conservation and agricultural intensification are complementary. As African farmers have shown, land scarcity leads to agricultural intensification -- if the necessary advice and inputs are available, intensification can be made sustainable and the rate of intensification greatly accelerated.

The experience of Machakos District in Kenya demonstrates that, with the right policy framework and investments, it is possible to reverse land degradation, even with a rapidly-expanding population.

Easing Women's Time Constraint and Improving Their Productivity. Initiatives in research, extension, infrastructure development, rural technology, and education are needed to ease women's time constraints and improve their productivity. Much can be learned in this regard from the experience of local and international NGOs in establishing rural water supply systems managed by women's groups, developing and popularizing locally appropriate fuel-efficient and time-saving stoves, providing improved farming and crop processing techniques and tools to women, facilitating women's access to land and institutional credit, improving village-level transport infrastructure, and providing intermediate means of transport. Such initiatives should be pursued through projects dealing with agricultural research and extension, rural water supply and transport, credit and land tenure, and in education and training policies which more effectively reach women.

Clarifying Resource Ownership. Urgent action is needed to eliminate open access systems and to

provide legal protection to traditional and private land owners. Local community or individual ownership and management responsibility of natural

resources appear to be the only workable arrangement in most of Africa. Women need equal rights to land and tenurial security as men, especially in view of the increasing number of female heads of households in many rural areas.

Wherever possible, state-owned pasture and forest lands should be returned to traditional owners and/or local communities, with clear and legally established utilization rights tied to the responsibility for conservation. Communities will need appropriate technical assistance in managing these resources.

Addressing the Fuelwood Problem. Efforts to promote agro-forestry need to be greatly expanded to have a significant impact on the agro-ecological environment, the rural energy economy and women's time. The pace of market development will accelerate if open-access sources of fuelwood are eliminated, cutting in protected areas stopped, farmers are not restricted in marketing wood production near cities, and communities and farmers have uncontested ownership of local forests and woodlands. On the demand side, there is a great need for more fuel- and time-efficient wood and charcoal stoves which can be made by women themselves of by local artisans on a commercial basis.

Infrastructure Development and Settlement Policy. The strong bias in urban infrastructure investments favoring the few major cities needs to be abandoned. Adequate transport lines to product markets are major factors associated with the intensification of farming -- even where population densities are comparatively low. Rural roads and improved tracks navigable for animal-drawn vehicles are crucial. Major efforts are also needed to promote the use of locally suitable and appropriate intermediate transport technology, especially animal-drawn implements, and of improved off-road transport.

Infrastructure development also has a major impact on the productivity of rural labor and on key determinants of fertility. Roads provide access to health facilities and schools. Better educated and healthier farmers are more productive and more likely to be innovators. Water supply and sanitation facilities have significant impact on health and labor productivity. Rural water supply, sanitation, health and education facilities and services are particularly important in terms of their impact on infant and child mortality and on female education -- both critical determinants of fertility preferences.

Natural Resource Management and Environmental Protection. Establishing conservation areas and protecting forests is conducive to promoting agricultural growth, because they protect watersheds and stabilize local and regional climate and hydrological systems. If the rate of agricultural intensification can be increased, the constraining impact of expanding conservation areas on crop land expansion can be offset and conservation will be fully consistent with agricultural growth. Protection of rural environments also ensures the sustainable provision of crucial forest products and environmental services. Particularly urgent are the establishment and maintenance of conservation areas and effective regulation and taxing of logging. Environmental Action Plans are a suitable instrument to plan these and other actions in a coherent manner.

Land use plans should identify areas to be protected, areas to be farmed, areas to be utilized for sustainable logging, and so forth. Local communities and individuals need to be directly involved in the development and implementation of such plans, and they must have outright ownership of, or

strong and legally recognized rights to, natural resources as an incentive to manage and conserve them. Mobilization of community and individual participation in natural resource management may be the most important step now waiting to be taken.

In the final analysis, however, successful agricultural intensification and much reduced fertility rates and population growth are the critical elements to preventing further degradation of the rural environment.

Water. With the major exceptions of the humid regions of Central and coastal West Africa, almost all of Sub-Saharan Africa will be facing water shortages or water scarcity early in the next century. There is an urgent need for effective hydrological planning and for prudent demand management. Water must be recognized as the critical and limiting resource it is. it must be carefully allocated, and must be protected against pollution. Planning for water use must be based on natural hydrological units such as river basins and integrated with planning for land use and other activities that affect, and are affected by, water development. Since water resources are frequently shared among countries, it is important to cooperate closely in planning for long-term water sharing.

Conclusion

Past efforts have, on the whole, failed to reverse the direction of the downward spiral that is driven by the forces of this nexus. Part of the explanation appears to be that past efforts have been pursued too narrowly along conventional sectoral lines -- matching established institutional arrangements and traditional academic disciplines -- while crucial cross-sectoral linkages and synergies have been ignored. Far more emphasis needs to be given to promoting effective *demand* for environmentally benign technologies which intensity farming, for family planning services, and for resource conservation. To address these issues requires appropriate cross-sectoral analysis and the development of action programs which address the linkages and synergies among sectors.

Kevin Cleaver and Gotz Schreiber. **Reversing the Spiral: The Population, Agriculture and Environment Nexus in Sub-Saharan Africa.** Directions in Development Series. Washington D.C. : World Bank.
