INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

sustainable solutions for ending hunger and poverty

A member of the CGIAR Consortium

ENVIRONMENT& PRODUCTION TECHNOLOGY DIVISION

Agriculture is vitally important to poor and vulnerable people in developing countries, the majority of whom live in rural areas and depend on the land as a source of both food and income. Unpredictable weather, unstable markets, fragile natural resources, energy scarcity, rising population pressures, a swiftly changing climate, and poor policies and investments further compound the vulnerability of the world's 800 million people who already face regular food insecurity. Vast improvements can be made to agricultural and rural livelihoods, however, by combining appropriate and affordable food and agriculture technologies with supportive policies, institutions, and investments. The Environment and Production Technology Division of the International Food Policy Research Institute identifies ways to make that happen.

How would alternative policies, institutions, and investments affect water, land, and energy use; productivity; income; greenhouse gas emissions; and environmental services? What would those changes look like at the household and community level versus the national, regional, or global level? Through

research and outreach, EPTD aims to answer these questions and contribute to IFPRI's mission of seeking sustainable solutions to poverty, hunger, and malnutrition. The division focuses on sustainable intensification strategies at the nexus of food, land, water, energy, and environment that fall under the following themes.

OUTLOOKS AND GLOBAL CHANGE

Global changes threaten food and water security in developing countries. Rapid urbanization and income growth are increasing meat, fruit, and vegetable consumption, and crops are increasingly being used for biofuel production. These shifts, combined with slow growth in the production of many crops in developing countries, will continue to drive changes in the global food economy.

Better information, analysis, and decisionmaking capacity are required at all levels of government and civil society to ensure that poor, vulnerable people can benefit from global change. IFPRI addresses this challenge by using—or training people in developing countries to use—analytical tools such as the International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT) to examine the influence of land and water availability, rising energy prices, and demand for crop-based bioenergy on the future of food, nutrition, and natural resources. Policymakers and development agencies can use this information to assess the tradeoffs of environmental policies and evaluate the investment costs necessary to enhance global food, water, and energy security while reducing poverty and maintaining environmental quality.

Improving Crop Performance to Boost Rural Incomes

Insufficient and erratic investment in smallholder farm technology and services, rural infrastructure, and human capacity are key causes of stagnation in crop and livestock productivity in Sub-Saharan Africa. But even as the commitment to confront food insecurity in the developing world grows, many questions remain about how much and where to invest, as well as what, specifically, to invest in.

To this end, HarvestChoice (jointly implemented by IFPRI and the University of Minnesota) generates analytical tools and indicators to help guide strategic investments in and policy decisions about the crops most likely to generate benefits for the African poor through more productive and profitable farming. HarvestChoice research focuses on generating new information on the location of food-insecure people in relation to major crop-production systems; the dependence of the poor on specific crops and products; and the frequency and severity of drought, disease, and other production impediments. For more information, see http://harvestchoice.org.

CLIMATE CHANGE

Climate change exacerbates challenges to sustainable food security. As average temperatures rise globally, precipitation patterns change, and weather variability increases, farmers must adapt their production practices. Both private and public research organizations must factor these changes into their investment strategies and information delivery services. IFPRI researchers work closely with biological scientists and crop and livestock modelers to assess the potential consequences of different climate and socioeconomic scenarios. This work provides insight into potential effects of climate change around the world and the costs and benefits of alternative adaptation strategies.

Agricultural activities directly or indirectly contribute roughly one-third of global greenhouse gas emissions. However, farmers can also adopt practices that extract carbon dioxide from the atmosphere and store it above and below ground, enhancing productivity and resilience. To counteract the increased emissions produced by developing economies, IFPRI researchers are exploring a variety of agricultural activities that could be central elements in low-emissions strategies.

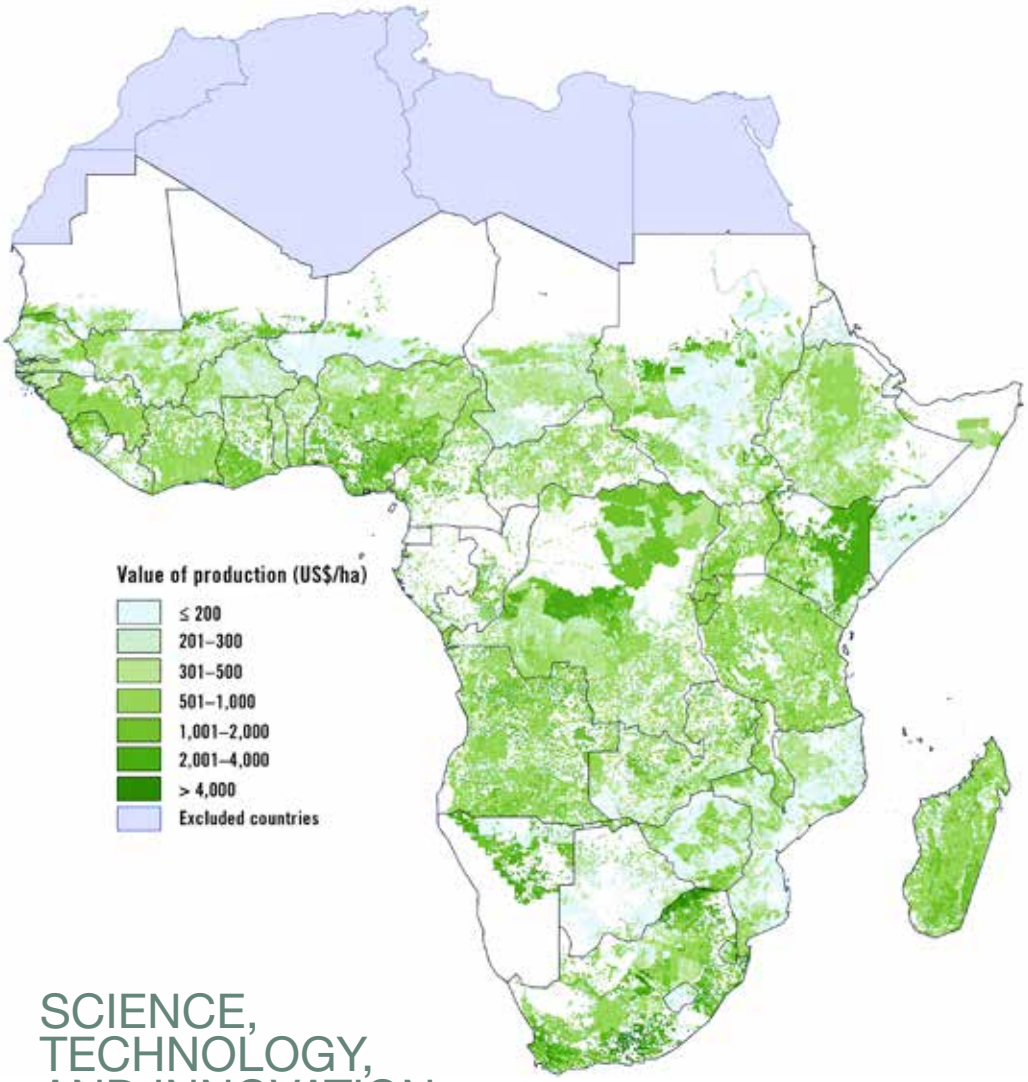
NATURAL RESOURCE POLICIES

Managing Water Resources Effectively for the Poor

Natural resource scarcity is rapidly increasing as a result of population and economic growth. If use of these resources, especially water, follows its current path, by 2050 half of global grain production and close to half of global GDP will be at risk due to water stress, with poorer countries and the disadvantaged groups within them facing the worst consequences. IFPRI's water research aims to strengthen food security by finding ways to improve overall water-use efficiency and water quality, reduce irrigated-land degradation, and increase the poor's access to water. More efficient water allocation and improved water management within various sectors, specifically agriculture, will address water scarcity and quality challenges.

Reducing Poverty by Using Land Resources Sustainably

Land is a critical asset for poor people in developing countries. IFPRI's research identifies ways to reduce poverty through the more productive, sustainable, and equitable use of land resources. Researchers analyze methods for promoting the sustainable management of cropland, grazing land, and forests; evaluate ways in which household capital endowment, rural services, and resource regulations affect land management; identify the role of incentive-based approaches in promoting sustainable land management and enhancing ecosystem services while addressing poverty; and assess the underlying policy and institutional arrangements, in addition to highlighting links between land-based resources and local livelihoods.



Strengthening Collective Action and Property Rights Institutions for the Poor

Property rights and collective action are key factors in promoting agricultural productivity and food security, achieving equitable access to critical natural resources, and sustaining the natural resource base. The Program on Collective Action and Property Rights (CAPRi) examines the formation of community organizations and property institutions and their impact on the adoption of innovation, management of natural resources, and reduction of poverty. CAPRi identifies policies that enable the creation, improved functioning, and resilience of user organizations and property institutions to assure optimal resource use and provide security for marginalized groups in developing countries, especially women and the poor. For more information, see www.capri.cgiar.org.

SCIENCE, TECHNOLOGY, AND INNOVATION POLICY

Sustained investment in agricultural science, technology, and innovation (ST&I) is critical to poverty reduction and economic growth. Evidence from the past five decades demonstrates that well-designed and effectively implemented ST&I policies enhance agricultural productivity, contribute to better management of scarce natural resources, and improve livelihoods across developing countries. Yet ST&I remains an overlooked and underfunded dimension of growth and poverty reduction agendas in many developing countries.

IFPRI draws more attention to this topic by focusing on the analysis of optimal investment, collaboration, and risk-management strategies that improve the development and delivery of scientific knowledge, technology products, and innovative approaches to improving agriculture. Policy research and capacity strengthening help improve the effectiveness and efficiency of ST&I policy design and implementation.

Managing Genetic Resources to Benefit Rural Areas

The sustainable use and management of crop biodiversity and genetic resources are fundamental to agricultural productivity and rural livelihoods. IFPRI's research seeks to strengthen local seed systems and markets by expanding the under-

Strengthening Women's Control of Assets for Better Development Outcomes

Despite evidence that women's control of assets is critical to reducing poverty, a substantial gender gap remains in asset ownership. IFPRI's research in this area (undertaken jointly by EPTD and the Poverty, Health, and Nutrition Division) aims to identify policy interventions that increase women's control of resources and to determine which combination of assets and support services will reduce poverty, malnutrition, and food insecurity. By analyzing natural, physical, human, social, and political capital, researchers address how agricultural projects affect the gender distribution of assets and the implications this has for women's empowerment and overall poverty reduction.

standing of the traits required by different types of farmers, the incentives needed to encourage private investment in seed markets, and the mechanisms that can improve the transmission of information between farmers and seed firms. Research also focuses on the costs and benefits of crop biotechnologies designed to enhance food security.

Enabling Development through Effective Biosafety Policy

The Program for Biosafety Systems (PBS) supports partner countries in Africa and Asia in the responsible development and use of biotechnology. The tools of biotechnology, when combined with the science of breeding, have created improved varieties that deliver increased value globally. Today, smallholder farmers in more than 15 countries successfully grow crop varieties developed through biotechnology. Other countries, however, have not integrated biotechnology into their agricultural systems. PBS works with stakeholders to develop and implement science-based, functional biosafety systems that can expand choices for producers, inspire confidence in consumers, facilitate trade, and promote agricultural research and development. For more information, see http://pbs.ifpri.info.

Informing Policy Decisions on Agricultural Research and Development (R&D)

More policymakers are recognizing the critical need for increased agricultural R&D investment to accelerate agricultural productivity growth. The Agricultural Science and Technology Indicators (ASTI) initiative is a key source of information on R&D statistics for low- and middle-income countries. ASTI comprises a network of agricultural R&D agencies and provides up-to-date data on and analyses of investment, capacity, and institutional trends in agricultural research. This information helps R&D managers and policymakers improve policy formulation and decisionmaking at national, regional, and international levels. This improvement will have a positive impact on agricultural R&D systems and ultimately enhance productivity growth, economic development, food security, and poverty reduction. ASTI's data and associated publications are freely available at www.asti.cgiar.org.

www.ifpri.org

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