

## Research Seminar on Knowledge for Development

Tuesday, 14 October 2003

### **Assessing the Impact of the Green Revolution**

Guest Speaker: **Robert Evenson, Professor of Economics, Yale University**

Leader: *Calestous Juma, Professor of the Practice of International Development, Kennedy School of Government, Harvard University and former Executive Secretary of the United Nations Convention on Biological Diversity*

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For the first of two seminars on agricultural systems, Professor Robert Evenson presented an overview of the Green Revolution from 1960 until 2000 and an analysis of its impact based on his article in *Science* and his lectures at the United Nations. Mark Rosenzweig, Mohammed Kamal Professor of Public Policy at the Kennedy School of Government, served as the respondent.

Professor Evenson began and ended his presentation by emphasizing the experimental and unpredictable nature of agricultural research. The MV1 crop that was released in the early phases of the Green Revolution had to be recalled because of diseases that had not been predicted in the lab. Evenson noted that it is essential that the agricultural research system be able to experiment and be allowed to fail in its experimentation in the search for innovative crop varieties and techniques. This can be facilitated by putting into place mechanisms that can work to correct unexpected consequences of experiments.

Another central theme that wove through Professor Evenson's presentation was his discussion of SubSaharan Africa. This region of the world has been more than twenty years behind in benefiting from the green revolution because of unfavorable initial conditions and weak national breeding programs. The only international agricultural research center that was established in Africa, the International Institute of Tropical Agriculture, took twenty years to fully organize themselves. The diffusion and adoption of hybrid crop varieties only began in the 1980s and 1990s in Africa. For example, sorghum adoption in India occurred twenty years before these varieties were adopted in Africa. Evenson noted that this was in part due to the establishment of the international research centers in Asia rather than Africa. Even though varieties became available in Africa in the 1980s and 1990s, Evenson emphasized that almost all of the increase in production in the second green revolution in these years was due to increases in area of crop cultivation rather than new varieties. As the price of crops has decreased there has not been a corresponding decrease in production costs for African farmers. There had also been little adaptation of modern varieties in Africa until the 1990s. This led to a debate in the seminar discussion period as to whether it would be a comparative advantage for Africa to focus on stimulating rural industrialization rather than focusing on agriculture that is hindered by poor natural conditions and the delayed adoption of green revolution crop varieties and technologies.

In discussing Africa as a region, Evenson emphasized the location specificity of crop breeding programs and technology development. Indigenous research and development are essential for getting results. This also requires the incorporation of tacit knowledge on landrace varieties and

local natural conditions and requires supportive universities, research institutes and policies. Evenson traced the success of the increases in crop productivity to the International Agricultural Research Centers (IARC) and to some national breeding programs. These centers have combined basic and applied science to respond to the challenge of crop productivity. With their success in the green revolution, these agricultural research centers are being tasked with increasingly broader mandates that may not be suited to the original institutional structure organized around improvements in crops. By tackling multidimensional issues such as alternatives to slash and burn practices, the IARC are threatened with taking on too many objectives and not being able to accomplish any of them. Public-private sector relationships were also discussed and Evenson stated that the exchange of genetic material is being impeded by intellectual property rights. In his opinion, the breeding lines of landraces need to remain a public good; however, in other aspects of the agricultural system, the public sector plays a marginal role. For example, in farm machinery, the public sector assesses the safety of the machines but the central actors are the machinery companies such as John Deere. The leadership behind the International Agricultural Research Centers was focused on producing a public good in the form of crop improvements. Evenson noted that he did not see the same leadership emerging in the gene revolution and biotechnology. The focus on public-private sector partnerships, the one-time gains achieved with gene manipulation, the European angst over GM foods, and the private sectors disinterest in Africa are challenges that the gene revolution is faced with. This next revolution in research and development for agricultural systems will have to set clear guidelines for private sector and public sector involvement.

For more information about this seminar, including speaker biography, background documents, and presentation slides, see <http://www.ksg.harvard.edu/sed/k4dev/031014.htm>.