

**ASSURING FOOD AND NUTRITION SECURITY IN AFRICA BY 2020:  
Prioritizing Action, Strengthening Actors, and Facilitating Partnerships**  
April 1–3, 2004, Kampala, Uganda

**SUMMARY NOTE**

**Parallel Session:**     **Implementing Action in Key Areas: Building Human Capacity**

**Panelist:**            *Jim Ryan*, Visiting Fellow, Economic Division, Research School of Pacific and Asian Studies, Australian National University, Australia

**Title:**                 **Harnessing Science and Technology to Improve Agricultural Productivity and Food Security in Africa**

**Date:**                 April 2, 2004

**Introduction**

My comments draw upon a recently completed study on the subject by the InterAcademy Council (IAC) at the request of Kofi Annan. A Panel of 18 eminent scientists was assembled to undertake the study and I was invited to be the Study Director. The process involved consultative workshops with the four African subregional organizations in 2003 and the commissioning of four background papers. The publications related to these are available on the IAC web site. The report is currently being printed after extensive peer review and is expected to be presented to Kofi Annan in May. This brief will highlight some of the major findings.

**Unique Features of Africa**

In endeavoring to understand why the Asian green revolution did not translate readily to Africa, the Panel noted that Africa has a number of unique features, which help explain why:

- lack of a dominant farming system on which food security largely depends;
- predominance of rainfed agriculture;
- heterogeneity and diversity of farming systems and importance of livestock;
- lack of functioning markets;
- dominance of weathered soils of poor inherent fertility;
- underinvestment in agricultural R&D and infrastructure;
- poor economic and political enabling environments;
- large and growing impact of human health on agriculture;
- low labor productivity and minimal mechanization; and
- predominance of customary land tenure.

These influence the options available to science and technology (S&T) and imply that African agriculture is more likely to experience numerous *rainbow evolutions* that differ in nature and extent among the many systems, rather than one green revolution as in Asia, where irrigated rice-wheat systems predominated. Hence, more investment in agricultural R&D per unit of productivity gain will likely be required.

**The What and The How**

These are arrayed under four headings: institutions, scientists, policies and markets, and S&T options.

*Institutions*

- A paradigm shift away from the linear research-extension-farmer mode to a participatory innovation, information, knowledge, and education quadrangle with ICT playing a key role.

- Encourage institutions and mechanisms like Academies of Science and national councils of science and technology to more effectively articulate and advocate S&T strategies and policies.
- Cultivate and stimulate the evolution of African centers of agricultural research excellence to complement and strengthen national agricultural research systems (NARS).
- Substantially increase average agricultural research intensities in NARS towards 2015.
- Integrate African programs of international agricultural research centers and vastly increase their African core-funding base.

#### *Scientists*

- Arrest the future brain drain by implementing policies that create more personally and professionally rewarding scientific opportunities, rewards and recognition in Africa — i.e., focus on retaining future graduates rather than regaining the current Diaspora.
- Broaden and deepen political support for agricultural science.
- Reform university curricula to stress more holistic production ecological and multidisciplinary approaches and ICT to better equip graduates for the innovation, information, knowledge, and education quadrangle.
- Mobilize large and sustainable funding for higher education in S&T, improving quality and minimizing dependence on external donor support, and develop an appropriate balance of graduate training in African and foreign universities.
- Strengthen science education in primary and secondary schools.

#### *Policies and markets*

- Strengthen capacity to expand both local and regional market opportunities by removing barriers, strengthening the contract systems, grades and standards and research on these.
- Institute effective intellectual property rights regimes to encourage the private sector and facilitate public-private partnerships.
- Increase investments in rural infrastructure.
- Reduce barriers to increased African trade with OECD countries, assist African countries to meet quality, safety and sanitary/phytosanitary standards and improve their international negotiating skills.

#### *S&T options*

- A strategy of market-led productivity improvement is required to strengthen the competitive ability of smallholders using ICT to provide speedy and timely market and price information, identifying new niche value-added marketing opportunities, quality literacy and promoting farmer organizations and cooperatives.
- Adopt a production ecological approach to research on smallholders, with a focus on identified priority farming systems judged to have the best scope for impacts on productivity and food security. The aim is for integrated and knowledge-intensive sustainable intensification of such systems. Biotechnology, including GMOs, will play a key role in devising new technology options to alleviate biotic and abiotic constraints along with integrated soil, water, nutrient and pest management approaches.
- Recognize the potential for rainfed agricultural systems, which will remain the dominant types for decades to come and represent the major food security and productivity challenges.
- Reduce land degradation and replenish soil fertility.
- Explore higher-scale integrated catchment strategies for natural resource management to optimize water use and safeguard biodiversity.
- Improve data generation and analysis related to agriculture, food, and nutrition security
- Promote the conservation and sustainable and equitable use of biodiversity.
- Enhance the manufacture and use of appropriate mechanical power.

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