

Agricultural innovations and their impact on agro-biodiversity



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Agriculture and agrobiodiversity sustain human life. Today, more than a decade after the 1996 World Food Summit, there are 820 million more hungry people around the globe than there were in 1996.¹ If we are to keep the promise of the Summit, 31 million people must be removed from undernourishment every year until 2015. At present the number is climbing at a rate of about 4 million people per year. The proportion of people suffering from lack of food has, however, decreased as the global population has increased over the last decade.¹

In addition to the issue of absolute hunger, there is 'hidden hunger' that results from the lack of micronutrients available to people around the world, especially in sub-Saharan Africa. Agrobiodiversity offers the best solution to overcoming that 'hidden hunger'. Reduced yields of traditional crops, increasing reliance on farm-based subsidies and the decreasing market value of many traditional crops have taken their toll on agro-biodiversity at the rural and household levels.² The decreasing availability of land, labour, water and energy mean that engaging in agriculture is increasingly challenging.

Research, institutional and policy settings for technological innovations in agriculture are, however, changing rapidly. Innovations now require plurality of systems and multiple sources.³ Linking technological progress with institutional and market changes is the need of the hour. Some key recent conclusions emanating from technological innovations include that: genetic improvements are successful, but not everywhere; there is a need for management and system technologies to complement genetic improvement; more investments are needed into research and development; the use of available technologies such as Information and communication technology have still not permeated some parts of the world to improve the efficiency of agricultural systems; and innovative partnerships are key. Sharing of data and information and infrastructural developments and deployment will help to ensure better reach and impacts of available innovations.

Innovations and impacts

The characteristics of the various paradigms of agricultural innovation are changing rapidly, thereby having distinct effects, including, a move away from key innovators being scientists to potentially any of a range of actors, including farmers; the intended outcomes of interventions changing from mere technology transfer and uptake to enhanced capacities to innovate; and the changing role of policy from setting priorities and allocating resources to being an integral part of innovation capacity and strengthening the enabling environment.⁴

Technical and technological innovations

Some regions such as sub-Saharan Africa continue to experience limited gains from the green revolution owing to the slow adoption of new and improved varieties by the farmers; agro-ecological heterogeneity; lack of infrastructure and lack of public policies that encourage better use of land and adoption of technologies; and poor market structures and related policies. Although the Consultative Group on International Agricultural Research, for example, invests some 35 per cent of its resources (twice the amount of investment in genetic improvement) in sustainable production systems the

- 1 State of Food Insecurity in the World, FAO, Rome, 2007.
- 2 FAO. 2004. *The market for non-traditional agricultural exports*. Rome: FAO.
- 3 Janssen and Braunschweig 2003 Trends in the Organization and Financing of Agricultural Research in Developed Countries: Implications for Developing Countries. ISNAR Research Report no. 22. The Hague: International Service for National Agricultural Research (ISNAR).
- 4 Adapted from Andy Hall, 2007, IDS Conference, University of Sussex, United Kingdom of Great Britain and Northern Ireland.

adoption and use of those systems remain limited, warranting an assessment of agricultural policies in these regions.

Public funding that contributes to about 94 per cent of current investment in agricultural research and development is scarcely able to match investments needs. There is limited private sector investment in research and development in agriculture in many developing countries, which is a cause for concern. Globally, research in agriculture is focusing more on maintaining yields than on improving them. In the absence of national policies on investment in agricultural research and development commercial interests may erode the thin base available to farmers in the form of agro-biodiversity.

Innovative ideas such as participatory plant breeding offer sustainable solutions to address the need for improved research and development in agriculture. Through participatory plant breeding, for example, farmers will be trained to be more efficient in the use of their varieties and to improve them to suit local agro-climatic conditions in addition to providing them with an opportunity to be mainstreamed into commercializing and protecting their varieties through mechanisms such as 'farmers' rights'.

Investing in innovations

Mis-investments are pervasive in many countries.⁵ Mis-investments include spending on private goods such as subsidies and transfers and call public spending into question. Reviews of public expenditure show that public budget allocations for subsidies and transfers are as high as 75 per cent in India, for example, and as low as 26 per cent in Kenya. Interestingly, as economies grow these allocations also grow. It should be noted, however, that not all subsidies are inefficient. Some countries such as Viet Nam are using evidence-based assessments to focus on spending in core public goods in their medium-term expenditure plans. Sound estimates of the effects of expenditure in agriculture coupled with rational political economy would help many countries not only to attract more investment but also to use their national budgets more efficiently. We must provide sound advice on the need to balance development economics with welfare economics and a greater understanding of the best use of funds to assist agriculture to take advantage of the benefits of reform and avoid the costs arising from an inability to adjust.

Policy innovations

Recent studies have demonstrated that there is a particular trend with respect to the changing nature of food security and consequent policy reform. The general direction is towards greater openness and competition in national markets with respect to domestic and international trade. Countries, however, differ in their institutional and infrastructural set ups and their capacity to deal with these changes. Policy reform should focus on developing and sustaining rural infrastructure, developing non-farming employment options, transitional compensatory measures and improving productivity and market access to rural people. Trade and related domestic policy reforms do not always run contrary to food security and the agricultural sector, although may appear to do so owing to the lack of subtlety in the design and sequencing of actions to implement the reforms. Countries require an innovative and responsive policy package that is designed to offset the negative impacts of liberalization.

⁵ Agriculture for development policy brief, 2008, World Bank, Washington, United States of America.