

V ASIAN AGRICULTURE: TOWARDS 2010

Asia has two distinct cropping systems, one for favorable environments, i.e. those that are irrigated or have reliable rainfall, and one for less favorable environments (LFEs). Over the last two decades they have developed along very different courses, with cropping systems for favorable environments receiving far more attention and resources, and being significantly improved as a result. This trend of improving cropping systems for favorable environments relative to those for less favorable environments will continue to 2010.

In favorable environments, crop yields will continue to grow over the next 12 to 15 years. However, it is not simply yields that will determine whether or not there will be a real decline in area sown of the two major staples, rice and wheat. As there are only a few places in Asia where farmers grow rice or wheat for lack of options, profitability has been playing an ever-increasing role in crop choice. As a consequence, trends towards greater crop diversification will continue. Therefore, increases in the yield potential of rice and wheat will not guarantee growth in overall production. Furthermore, improvements in production technology, including those derived from biotechnology, will only be translated into cheaper food for the poor when they significantly lower the cost of production. The role of the private sector in agricultural R&D will continue to expand. It will, however, be restricted to specific crops, especially those with hybrids like maize, rapeseed, sunflowers, and vegetables, and is unlikely to be extended to major field crops such as rice, wheat, soybean, pulses, and roots.

Asia's LFEs come in many shapes and forms: areas with unreliable rainfall coupled with no access to irrigation, land with poor soil, irrigated land suffering from salinization, steep slopes prone to erosion, and dry land threatened with desertification. The increased productivity of cropping systems in favorable environments brought about by the technologies and policies behind the green revolution has indirectly benefited some inhabitants of LFEs by increasing their employment opportunities. Most inhabitants of LFEs, however, have simply fallen further behind, and in areas where access is difficult, food security remains a major concern.

BUSINESS-AS-USUAL SCENARIO

Under the business-as-usual scenario, high growth rates in the yields of food crops, especially rice, will not be sustainable. This is due to the high costs associated with maintaining growth and the continuing diversification out of food crops and into crops with higher profit margins. The high costs associated with maintaining growth are the direct results of poor management and environmental degradation. If the current institutional management policies remain unchanged, the lessening availability of water will increasingly constrain the potential for sustainable growth. As the competition for water between different users increases, water will inevitably be shifted away from agriculture, where the marginal product of water is relatively low. A simulation study conducted at the International Food Policy Research Institute (Rosegrant and Ringler, 1988) revealed that this would have a substantial impact on the global food supply. Both yield growth and crop area growth would slow down. The impact would be particularly strong on rice, as it is a water-intensive crop. The average price of rice would increase by 68 percent between 1993 and 2020, leading to a large increase in malnutrition. The study assumed that irrigated land would be lost because of land degradation, urban encroachment, and

loss of water for irrigation as water is increasingly used in nonfarm activities.

The coastal, aquatic, and wilderness resources that are essential food items and contribute to the livelihood of the poor will be mostly depleted. Furthermore, more farmers in resource-poor and coastal areas will be left further and further behind as the world continues to move towards the electronic age.

VISION 2010

A desirable vision for 2010 is one considerably different from the situation described above. It is one in which Asia is free from hunger and Asian agriculture has an increased and sustainable capacity for more equitable and greener growth. Green growth is that in which increases in productivity do not arise as a result of the unsustainable use of natural capital and the environment. Production increases should come about through higher yields per unit area, and not simply through increasing the amount of land under cultivation. Equitable growth is growth whose benefits reach all parts of the community, even the poorest of the poor. As food security on the Asian continent becomes a lesser concern at least up until 2010, more attention needs to be paid to the elimination of malnutrition.

Towards the year 2010, farmers in favorable environments and in advanced agricultural areas will enjoy a wide variety of options for crop mix and technology. This should help them reduce their use of natural resources and fossil fuels. The farmers of the future will form a heterogeneous group that contains a diverse range of interests and skills. This diversity results from the different environmental conditions faced by farmers and will be augmented by broadened crop choices and new market niches. Some farmers will engage in high-input, high-output intensive farming and some in ecological farming. Thanks to improving communications infrastructure, information about changes in technology and the market will be readily available

to farmers at a low cost. Computerized farming aiming at optimum use of input (especially in horticulture and aquaculture) will co-exist alongside more conventional methods. An increased level of farmer-to-farmer knowledge transfer will be made possible through distance media and electronic mail. Increased awareness will help farmers of the future to be constantly aware of new production technologies and enable them to select those that minimize impact on their health as well as that of consumers and the environment, helping to guarantee the sustainability of their production systems.

More technologies will be available to farmers in LFEs by 2010, enhancing their productivity and the productive capacity of their land and natural capital. Incentives would have to be provided to encourage farmers who need to make additional investments to minimize their impact on third parties or society as a whole. Increased opportunities in education and nonfarm means of generating income, e.g. ecotourism, should be made possible with improved infrastructure, particularly roads, access to mass media, and clean water.

The farming communities and groups will themselves have more control and influence on the use and maintenance of the natural resources and public infrastructure related to agriculture, as well as over the direction of agricultural R&D. This increase in control will be proportional to their increased willingness to share in the cost of maintaining local public goods and effective R&D. As a result, those local institutions that prove themselves effective in the provision of local public goods, the conservation of local common areas, and the allocation of user rights will become strengthened and duly recognized by law.

The efforts of national and the international scientific communities will continue to provide wider and deeper technological options, and to enhance the sustainable use of natural resources. Research efforts to prevent yields from declining, maintenance research, and attempts to increase yields will continue. Their approach, however, will have been modified, as research targets become more focused on farmers and specific locations, with a greater emphasis being placed on LFEs and new innovations for resource-poor regions. Natural

resources and the environment will become other important objectives for agricultural R&D. Publicly funded international and national agencies should have sufficient resources to conduct RD&E on pest control and the use of biotechnology to develop pest-resistant and mineral-efficient varieties of crops. Improvements in the efficiency of water usage will be a new addition to the research agenda. National research capabilities will require strengthening in those locations, the semi-arid and humid tropics for example, most likely to feel the effects of climate change. An equitable international system regulating the exchange of genetic resources needs to be instituted.

Civil society organizations should have acquired scientific and technological knowledge and combined this with practical field and social skills in order to achieve the twin goals of improved production and conservation. The advantage they currently possess in participatory processes could be expanded to serve the purpose of increasing the responsiveness of the public RD&E apparatus to real onsite needs. Civil society organizations will play active roles in the dissemination of technology, becoming an effective link between farmers and the public sector.

The market will continue to be a major driving force supporting agricultural development. Private-sector involvement in agriculture will continue to grow, not only in its current role in the seed and chemical industries, but into new roles in R&D, including biotechnology, mechanization, irrigation, and extension services. The fertilizer and crop protection industries will play an active role in the promotion of integrated nutrient and pest management.

Agriculture will no longer be mistakenly perceived as a sunset industry, but a vibrant life- and growth-support system. Agriculture will be viewed as a sector that offers income-generating and employment opportunities, and not as the sector of last resort.

In order for these visions to be realized, the main priority for governments will be to strengthen their policies and institutions regarding natural resources. The overextraction of open-access resources and multiple-use conflicts will have to

be resolved through a combination of economic, legal, and social instruments. Responsible agriculture and fishing will need to become the prevailing code of conduct. Conservation of natural resources and the environment has to become an additional national objective, and biophysical planning will have to be the norm rather than the exception. The public sector must continue actively to support investments in education and technology. Large infrastructure investments need to be based on rigorous cost-benefit analyses, with due recognition being given to social and environmental costs and payoffs. The public sector, however, will not necessarily continue to be a direct provider of public goods, but rather promote and facilitate private investment and adopt the role of regulator to provide a level playing field for private operations, from individual farmers to multinational corporations. Government operations will become less labor intensive, as the labor-intensive activities of maintenance and monitoring become privatized or devolved to local organizations. The public agricultural agencies will have to adopt a more flexible, adaptable managerial and catalytic role.