Extended Abstract

Issues in food security and agricultural biotechnology

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Food security is defined as the situation in which all households have both physical and economic access to adequate and safe food for all of their members so that they can live a healthy and productive life. The factors of food security thus include food availability, stability, and accessibility.

Among the challenges facing food security in Indonesia—and in most developing countries—is the high growth rate of the population. Compounding this problem is the decreasing availability of productive land for agriculture because of very high conversion rates. In many Asian countries, the importation of food commodities such as rice, soybeans, corn, fruits, vegetables, and animal products has increased. The main obstacles to fulfilling the requirements of the food supply are the lack of good-quality seeds, lack of domestic production of animal feed materials, limited development of fish culture (especially marine culture), and high dependency on rice for food. Moreover, we still face the problems of malnutrition, especially vitamin A deficiency, iron-deficiency anemia, iodine deficiency, and calorie–protein malnutrition. There has been slow progress in food diversification and a limited role of the food industry in postharvest preservation, storage, and product development. At the same time, there are numerous problems of food safety, such as the use of non-food-grade additives and outbreaks of food poisoning and food-borne diseases, while there is a lack of awareness of the importance of food safety by consumers and producers. In addition, the economic crisis has resulted in reducing the rate of economic growth to less than 5%, thus contributing to the decline in rice production and the increase in rice importation and affecting the system of food distribution and marketing.

To improve food availability and security, the aim therefore is to stabilize national food availability, strengthen national food stocks, improve distribution systems, and eliminate food insecurity. This should be supported with an appropriate agricultural development strategy directed toward improving productivity and efficiency in the agricultural sector to enable it to compete globally. In addition, there is a need to diversify food consumption and improve food safety.

As one of the potential solutions of food security, the role of agricultural biotechnology cannot be overemphasized. Biotechnology can add value to agriculture through decreased use of pesticides, reduced agricultural losses from pests and diseases, improved nutrient efficiency, and improved productivity. The development of agricultural biotechnology should be directed toward improving food and nutritional security, enhancing production efficiency, promoting sustainable agriculture, reducing environmental impact, empowering the rural sector through income generation and reduction of economic inequity, increasing crop productivity, reducing crop damage and food loss, improving food safety, and enhancing orphan crops. However, many constraints on the development of agricultural biotechnology in developing countries also need to be considered, especially the limiting factors such as finance, technical capital, infrastructure, biosafety regulation, intellectual property protection, and public perception. Societal concerns, food-safety issues, and environmental impact must also be addressed. To capitalize on the potential of biotechnology, we must address consumer concerns by honest and open communication, building trust in technology with facts and information instead of promotion and advocacy, backed by a strong regulatory oversight.

Although biotechnology is not a panacea for the attainment of food security, it could be a very useful tool in conjunction with other traditional technologies. We should weigh all options and choose the most effective solution.

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