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"Resilience of agricultural systems against crises"

Plant Breeding and Food Security: Targeting the Needs of Resource-Poor Farmers in Plant Breeding Programs for Marginal Areas

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Abstract

We establish the internationally agreed definition of food security, which rests on the three conditions of food availability, access to food, and issues of food utilisation. We then outline how decentralised and participatory plant breeding approaches (PPB) can effectively address each of these aspects, based on experiences gained in various geographical regions. In the past, conventional plant breeding programs have mainly concentrated on increasing food availability. Other aspects of food security have attracted far less attention in most breeding programs. Furthermore, poor farmers working under marginal conditions do not "automatically" profit from breeding work done under more favourable conditions. Rather, plant breeding for marginal environments requires that the specific set of conditions which is typical for such environments will be addressed.

Participatory breeding methods can contribute to all three aspects of food security – availability, access and utilisation. Even under marginal conditions, yields can increase substantially and periods of food shortage can be curtailed, and not at the expense of other factors such as yield stability or food quality.

Several studies suggest that farmers can increase their revenue or make cost savings through the implementation of PPB. Informal rural seed networks combined with PPB measures play an important role in assuring access to food, particularly for the poorest members of farming communities. Owing to its decentralised organisation, PPB programs generate many different varieties for different production conditions and purposes. The approach tends to enhance food diversity and to maintain traditional knowledge that can help counteract food shortages and malnutrition.

Thus, the unique potential of PPB for improving food security is the impact it can make in those very situations where people are afflicted by food insecurity. Progress can be achieved for specific production conditions and user groups, not simply through breeding in its narrowest sense, but by bringing the context, the objectives and the direction of the breeding programme more sharply into focus. PPB approaches can form part of comprehensive strategies to adapt farming systems to climate change by increasing the options available to farmers for flexible adaptation to shifting circumstances.

Keywords: Food security, marginal environments, plant breeding

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