



Agricultural diversity boosts food security

Diverse agricultural systems can sustainably improve food security and supply a varied, healthy diet for people, according to a recent analysis of the benefits of agricultural biodiversity. The food-based approach, when integrated with other strategies, can be used to tackle malnutrition, micronutrient deficiencies and the impact of climate change on farming.

According to the United Nations¹, 925 million people were hungry in 2010. Food security is an increasing problem and further disruption to food production is expected under climate change. This study reviewed existing evidence of agricultural diversity's impact on agricultural productivity, pest and disease control, ecosystem services, nutrition and health and the potential effects of climate change on farming. Diversity in agriculture can take many forms, for example, diversity of crops, landscape diversity and genetic diversity within species.

Increasing pest and disease resistance in farming improves yield and predictability, which in turn enhances food security. Research suggests that agricultural diversity can boost resistance by, for example, planting a mixture of different crops or planting different varieties of the same crop together. Research in Germany has found that planting a mixture of barley varieties, instead of only one variety, provided better disease control.

Ecosystems found at farm level and across landscapes provide the essential goods and services that support agricultural production, such as water supply and regulation, pollination services (e.g. from bees) and nutrient cycling. Less diverse agricultural systems mean some of these services have to be supplemented by farmers. Promoting diversity at all scales enhances the natural resilience of ecosystems, which makes them less vulnerable to external shocks, such as extreme weather.

There are well established links between a nutritious diet and health, mental ability and productivity. In the past, efforts have concentrated on specific initiatives, such as fortifying food (e.g. putting iodine in salt), giving supplements (e.g. vitamins) or increasing the micronutrient levels in crops ('biofortification') to improve the nutritional intake for those with deficient diets. However, evidence suggests a varied diet, supplied from a diverse agricultural sector that includes a variety of local foods, provides better nutrition and improved health and wellbeing. In addition, producing a range of local alternative foods has been linked with higher income generation and better environmental protection for farmers, providing added benefits.

Given that climate change is likely to cause more variable weather patterns with an increased likelihood of extreme weather events, diverse agricultural systems are expected to be more adaptable and resilient to these changes. Future breeds and varieties of plants and animals, suited to a changing climate, will be based on current biodiversity. In addition, farmers could use the collective pool of plants and animals to develop their own varieties best adapted to local conditions.

1. See: The State of Food Insecurity in the World www.fao.org/publications/sofi/en/

Source: Frison, E.A., Cherfas, J. and Hodgkin, T. (2011) Agricultural Biodiversity Is Essential for a Sustainable Improvement in Food and Nutrition Security. *Sustainability*, 3:238-253. This study is free to view at: www.mdpi.com/2071-1050/3/1/238/pdf

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