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POLICY
BRIEFING

NOURISHING DIVERSITY: A FIVE-POINT PLAN TO ENRICH OUR FOOD SYSTEMS

Introduction

The world's rich agricultural biodiversity is at risk, and with it our health and the resilience of our food systems. Agricultural landscapes are becoming increasingly simplified as the number of crops and crop varieties grown on farms declines. Responding to a variety of pressures, farmers have replaced many time-tested local varieties with a small number of modern ones - a pattern which is true for both food crops and animal breeds. Coinciding with the threat to agricultural biodiversity has been a trend towards the homogenisation of diets. A mere 30 crops supply 95 per cent of the calories that people obtain from food, and only four crops - maize, rice, wheat and potatoes - supply over 60 per cent.¹ Such heavy reliance on a narrow range of crops, crop varieties and animal breeds brings long-term increasing risks for agricultural production, for livelihoods, and for nutrition. It also undermines the ability of agriculture to adapt to climate change.

The increasing homogeneity of global food supplies corresponds with a trend towards greater intake of calories, animal protein and fat in people's diets, with higher proportions of ultra-processed foods that are rich in sugar, salt and fat. Higher consumption of energy-dense, nutrient-poor foods combined with lower levels of physical activity have led to epidemic levels of overweight and obesity, and is contributing to diet-related noncommunicable diseases (NCDs) such as diabetes, metabolic disorders, hypertension, coronary heart disease and cancer. Diet-related health problems now exceed those stemming from undernutrition in virtually every part of the world, and NCDs are now the leading cause of death worldwide.² Without effective measures to address them, the social and economic costs of NCDs will continue to rise, exceeding the capacity of countries to cope with them.

While more than enough food is produced globally to ensure a nutritionally adequate diet for every person on the planet, more than 800 million people - one in nine - are hungry.³ Meanwhile, some two billion people suffer from micronutrient deficiencies and another two billion are overweight or obese. While the problems of hunger, malnutrition, obesity and health-related NCDs are complex, part of the solution is to foster greater diversity in food production and consumption.

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Policy pointers

- Reorient food and agricultural policies to encourage diversity, nutrition, sustainability and affordability, rather than only prioritising a small number of staple crops.
- Use markets to support diversity in production and consumption by allowing informal markets to thrive, using procurement, and investing in innovative agri-food SMEs that promote diversity.
- Promote and maintain local crop varieties, animal breeds and under-utilised crops through developing markets for them, adjusting extension services and fostering synergies between scientific and local knowledge.
- Nurture the biocultural heritage and traditional knowledge which underpin much of the world's remaining agricultural biodiversity, including by protecting the rights of women.
- Increase awareness and catalyse change through innovative multi-stakeholder approaches like food labs, that explicitly bring in the voices and perceptions of farmers and consumers, including women and youth.

Why is biodiversity important in agriculture?

The value of agrobiodiversity vastly exceeds its role as a source of genes for crop and livestock breeding - it is vital to key ecosystem services such as nutrient and water cycling, pollination, soil health, pest and disease control, as well as the breakdown of toxins (e.g., pesticides). Planting a diversity of crops and crop varieties increases resilience, helps farmers to reduce climatic and economic risks, and can enhance productivity, stability, food security and nutrition.⁴

Climate change is expected to cause significant reductions in crop yields - up to 30 per cent for maize in southern Africa and up to 10 per cent for staples such as rice in South Asia by 2030.⁵ In this context, future food security depends upon the ability of agriculture to deal with more volatile weather conditions and to adapt to climatic change. Biodiversity has a critical role to play as it can make agroecosystems more resilient and provides options for future adaptation of crops and production systems.⁶ Equally important for adaptation is maintaining the knowledge and practices associated with agrobiodiversity.

Agricultural biodiversity is at risk

The threat to agrobiodiversity is occurring within a general rate of species extinction estimated to be 100 to 1000 times the natural rate.⁷ Approximately 21 per cent of plant species⁸ and 17 per cent of all animal breeds⁹ are at risk of extinction - a trend that also threatens agriculture.

The widespread dissemination of higher yielding crop varieties as a result of the Green Revolution significantly increased productivity, enabling food supplies to keep pace with rapid population growth, lowering food prices and raising the health status of 32 to 42 million preschool children.¹⁰ However, it had some serious unintended consequences, including for diets and crop diversity in the developing world. The shift away from traditional mixed cropping systems towards cereal monocultures has had the effect of limiting food-crop diversity and appears to be contributing to micronutrient deficiencies.¹¹

Since the 1960s, the replacement of traditional crop varieties with modern varieties has occurred at a rapid rate. By 1990, 70 per cent of the land in developing countries sown in rice and wheat was planted with high-yielding varieties, compared with 20 per cent for wheat and 30 per cent for rice in 1970.¹² The same trends are operating in animal husbandry. A small number of high-performance breeds have spread throughout the world since the mid-twentieth century, in many cases replacing local breeds. Although there is still a relatively high level of biodiversity in smallholder agriculture in developing countries, this is increasingly under threat where industrial agriculture continues to spread around the world.

There are many forces driving the erosion of agricultural biodiversity, including:

- **The prioritisation of productivity** in agricultural policies, research and extension over other considerations such as diversity, resilience and nutritional content.
- **The widespread use of monocultures** to facilitate mechanised production.
- **Supermarket demands for standardisation** that put a premium on produce that is uniform in size, shape, colour and appearance and that put pressure on producers to focus on a small number of varieties that meet these criteria.
- **Intellectual property rights regimes** that favour modern varieties and multinational seed companies and that undermine farmers' rights to use and continue to adapt their traditional varieties.
- **Subsidies for modern varieties and inputs** that lower their cost of production relative to traditional varieties produced through biodiverse farming.
- **Lack of markets for local varieties** in a context of aggressive corporate advertising coupled with changing consumer lifestyles and preferences for foods.
- **Gender inequality**, which may limit the power of women, who are often the custodians of crop diversity, to influence household production and consumption decisions.
- **Weakening traditional cultural values** that promote production and consumption of diverse crops; and rapid erosion of local knowledge and skills required to maintain and continue to breed diverse combinations of crop varieties and animals.

Diverse, high-quality diets for human health

Just as there is robust evidence for the importance of agricultural biodiversity and the need to maintain it, most nutritionists agree that diversity is a key element of healthy, high-quality diets, providing the spectrum of micronutrients essential for human health¹³ and for maintaining a healthy gut microbiome.¹⁴

On the surface at least, modern foods systems appear to be astonishingly diverse. Globalisation has ensured that a dazzling variety of foods is available, and each year thousands of new food products take their place on supermarket shelves. Yet the abundance and variety of modern food systems are deceptive. In the food industry, a few ingredients like refined flour, sugar, soy, palm oil and high fructose corn syrup appear over and over again in a plethora of ultra-processed products. What seems like variety is actually just endless re-engineering, re-combinations and repackaging of the same basic, highly processed ingredients. The rising production and consumption of ultra-processed foods (which tend to be high in salt, sugar and fat) is displacing healthier items from people's menus and contributing to the global surge in overweight, obesity and NCDs.¹⁵ The true health and

environmental costs of these products are not taken into account, which contributes to them being relatively cheap in comparison with healthy foods.

This is part of a major shift in dietary patterns, often termed the 'global dietary transition'. Today approximately 3 billion people have low-quality diets. Low levels of dietary diversity and quality are a serious problem among many poor people in developing and developed countries. But they are not simply a problem of poverty - they are an issue facing all countries and all strata of society, whether low, medium or high-income.¹⁶

What factors are contributing to the lack of diverse, high-quality diets, particularly in developing countries?

- **Availability and accessibility** of diverse and high-quality foods are often limited in impoverished rural and urban areas - in the former often driven by a shift from growing food for the household to cash crops for the market.
- **Affordability:** healthy foods like fruit and vegetables often cost more than unhealthy ultra-processed foods, which constrains the choices of low-income consumers.
- **Urbanisation and changing lifestyles:** as a larger proportion of women enter the workforce, time for cooking and shopping decreases, increasing the demand for fast foods and pre-prepared foods.
- **Changes in cropping systems:** the shift towards cereal monocultures and away from traditional mixed cropping systems has limited the availability of diverse foods.
- **The narrow focus of current agricultural policies and research** on increasing the production of a small number of staple crops with little regard to the delivery of nutrients or the need to promote diverse diets.
- **Globalisation:** while it has contributed to dietary diversity for some consumers by making a wider variety of foods available, it has also increased the availability and consumption of ultra-processed foods and the prevalence of NCDs.
- **The power of the food industry to shape people's tastes:** the giant transnational corporations which process much of our food spend enormous amounts of money on marketing and advertising their products.

Five steps towards a more diverse food system

In a context where citizens often have little input into food systems aside from their consumption choices, decision making is often disconnected from the interests of both producers and consumers. How to reorient food systems towards greater diversity, health, sustainability and inclusiveness?

The first opportunity is to realise that diverse agricultural production and diverse diets can be mutually reinforcing. Given that consumer demand and purchasing power shape the incentives that farmers have to maintain a diverse array of crops, promoting diverse diets helps to conserve agricultural biodiversity and support rural development. At the same time, diverse agricultural production can make a wide variety of foods available to consumers.

Second, food systems and the policies that affect them must be made more inclusive and responsive to the needs of farmers and consumers alike. Food system issues are too complex and involve too many stakeholders for government or any single entity to address by themselves. They require multi-stakeholder approaches which can ensure that the voices of all relevant groups are heard - particularly those marginalised groups such as smallholder farmers and women who play a critical role in safeguarding agrobiodiversity (Box 1).

Our research identifies five steps for enriching our food system, targeted at a range of stakeholders:

1) Reorient food and farming policies to encourage diversity, sustainability, and affordability

- Re-target subsidies, research and extension programmes so that they promote crop diversification rather than monocultures of a few crop varieties.
- Invest in agricultural research and extension to make a wider variety of healthy foods such as vegetables, fruits, pulses, seeds, nuts and animal proteins available to consumers at lower cost.
- Ensure that the prices of ultra-processed foods reflect their true health costs to society by using taxes and regulatory instruments.

Box 1. Food Change Labs to nourish diversity

Food Change Labs are one proven approach for bringing all the relevant stakeholders together to jointly analyse problems and come up with innovative solutions acceptable to all parties. Together with local partners, Hivos and IIED have convened Change Labs in Indonesia, Uganda, Zambia and Bolivia. In Zambia, for instance, the dominance of maize on farms and in local diets is contributing to malnutrition and undermining resilience, and addressing this problem is the current focus of the Zambia Food Change Lab. Meetings in Zambia have brought together

more than 60 stakeholders from diverse backgrounds: farmers, youth, entrepreneurs, local and national government officials and MPs, to better understand the Zambian food system, build coalitions of stakeholders, generate ideas for change, and test these innovations on the ground. Concrete next steps put forward by participants include a national symposium to raise awareness on the need for agricultural diversification, establishing a radio station targeted at farmers and assessing current levels of agrobiodiversity in one locality.

- Use dietary guidelines to champion diverse diets and limit consumption of ultra-processed foods.
- Safeguard the right of farmers to save, re-use, exchange and improve their seeds by adapting laws, policies and intellectual property rights regimes.

2) Use markets to support diversity in production

- Allow informal markets to thrive to ensure an affordable and accessible source of diverse foods for low-income consumers.
- Use procurement programmes in schools, hospitals and other public services to encourage consumption and production of diverse foods, including under-utilised crops and local crop varieties.
- Invest in agri-food businesses that actively promote diversity, such as those that distribute local seed varieties; market under-utilised crops; bring together producers and consumers (e.g. food hubs, CSAs, farmers' markets); and that encourage healthy, diverse diets (shops, restaurants, and gastronomy movements).

3) Create an enabling environment to foster local crop varieties, animal breeds and under-utilised crops

- Re-orient extension services to encourage innovation in farmer-managed seed varieties and the use of resilient and useful under-utilised crops.
- Develop markets for local crop varieties, traditional animal breeds and under-utilised crops.
- Promote combinations of scientific and local knowledge, for example through participatory plant breeding, that bring farmers, local breeders and researchers together to develop and adapt crop varieties to local challenges and needs.
- Invest in the development of Open Source Seed Systems that allow free flow of seed varieties between farmers, local breeders and local seed companies.

4) Nurture biocultural heritage and traditional knowledge

- Focus conservation efforts on sustaining both agrobiodiversity and cultural heritage pertaining to food, as well as activities that revitalise rural livelihoods.

- Support communities to design inclusive business models, market linkages and collective governance institutions.
- Create biocultural heritage territories with clear territorial rights and boundaries as a means of protecting centres of high agrobiodiversity.

5) Increase awareness and catalyse change through innovative multi-stakeholder approaches

- Use multi-stakeholder approaches such as Food Change Labs (Box 1) to create space for social innovation at the local level, allowing community members and policymakers to collaborate in the design of more sustainable, inclusive and nutritious food systems.
- Disseminate information on the need for on-farm diversity and for healthy, diverse diets through the media.

Conclusions

Maintaining agricultural biodiversity is vital for food security and nutrition, and to cope with the challenge of climate change. Improving and diversifying diets is essential to human health and to curbing the growth in noncommunicable diseases. Both are key in achieving the SDGs, particularly SDG2. At a macro level, promoting diversity entails a gradual but definitive shift from industrial agriculture - which relies on monocultures and an unsustainably small number of crops, crop varieties and animal breeds - to diversified sustainable farming systems.¹⁷ At a national and local scale, it entails raising awareness and stimulating demand for diverse and healthy foods, as markets for diverse crops and animal products need to be supported and expanded. Meanwhile, policies, subsidies, research and extension programmes need to be re-aligned to support diverse food production and consumption. Finally, the cultural underpinnings of diverse food systems - which are also under threat worldwide - need to be protected and strengthened. Multi-stakeholder approaches can help to achieve all of these ends, particularly by using and building upon citizen's knowledge and practices to re-shape food systems.

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Notes

¹ http://www.fao.org/fileadmin/templates/nr/documents/CGRFA/factsheets_plant_en.pdf. ² Imamura, F. et al. 2015. Dietary quality among men and women in 187 countries in 1990 and 2010: a systematic assessment. *Lancet Global Health* 3: e132-42. See p. e132. ³ See the World Food Programme "Zero Hunger" webpage: <http://www1.wfp.org/zero-hunger>. ⁴ Frison, E., Cherfas, J. and Hodgkin, T. 2011. Agricultural biodiversity is essential for a sustainable improvement in food and nutrition security. *Sustainability* 3: 238-253. ⁵ FAO. 2011. *Biodiversity for food and agriculture: Contributing to food security and sustainability in a changing world*. Outcomes of an Expert Workshop held by FAO and the Platform on Agrobiodiversity Research from 14-16 April 2010 in Rome, Italy, p.14. ⁶ Mijatovic, D., Van Oudenhoven, F., Eyzaguirre, P., and Hodgkin, T. 2013. The role of agricultural biodiversity in strengthening resilience to climate change: Towards an analytical framework. *International Journal of Agricultural Sustainability*, 11(2): 95-107. ⁷ Rockström et al. 2009. A safe operating space for humanity. *Nature* 461: 472-475. ⁸ RBG Kew. 2016. *The State of the World's Plants Report - 2016*. Royal Botanic Gardens, Kew, p.3. ⁹ FAO. 2015. *The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture*. FAO, Rome, p.34. ¹⁰ Evenson, R. and Gollin, 2003. Assessing the impact of the Green Revolution, 1960 to 2000. *Science* 300 (5620): 758. ¹¹ Graham R. et al. 2007. Nutritious subsistence food systems. *Adv Agron* 92: 1-74. ¹² IPES-Food. 2016. From uniformity to diversity: A paradigm shift from industrial agriculture to diversified agroecological systems. International Panel of Experts on Sustainable Food Systems, p.15. ¹³ Tontisirin, K., Nantel, G. and Bhattacharjee, L. 2002. Food-based strategies to meet the challenges of micronutrient malnutrition in the developing world. *Proc. Nutr. Soc* 61, 243-250. ¹⁴ Helman, M. and Greenway, F. 2016. A healthy gastrointestinal microbiome is dependent on dietary diversity. *Molecular Metabolism* 5: 317-320. ¹⁵ Canella, D. et al. 2014. Ultra-processed food products and obesity in Brazilian households (2008-2009). *PLOS ONE* 9(3): 1-6. ¹⁶ Global Panel on Agriculture and Food Systems for Nutrition. 2016. *Food systems and diets: Facing the challenges of the 21st century*. London, UK. ¹⁷ See note 12.