Food and Agriculture Organization of the United Nations

BIODIVERSITY IN ACTION

#3

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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Biodiversity for food security and nutrition

"Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" *(FAO, 1996).*

The loss and erosion of biodiversity for **food and agriculture** (BFA) in the Europe and Central Asia (ECA) region pose a substantial and increasing threat to the availability of and access to healthy, nutritious and diverse diets, particularly among vulnerable and marginalized populations. Biodiversity loss and erosion and climate change pressures impact nutrition and health outcomes and impose risks related to poverty and social tensions, making it more challenging for countries to achieve social, economic and environmental sustainability in agrifood systems and build resilience to multiple stressors.

The health of humans and the environment requires diversity.

All dimensions of food security depend on BFA

Biodiversity is a determinant of food security and environmental sustainability. From a human health perspective, it is a source of variety in essential foods, nutrients, vitamins, minerals and medicines. From a planet health perspective, it underpins pollination, soil fertility and other ecosystem services indispensable to food production (WHO, 2020).

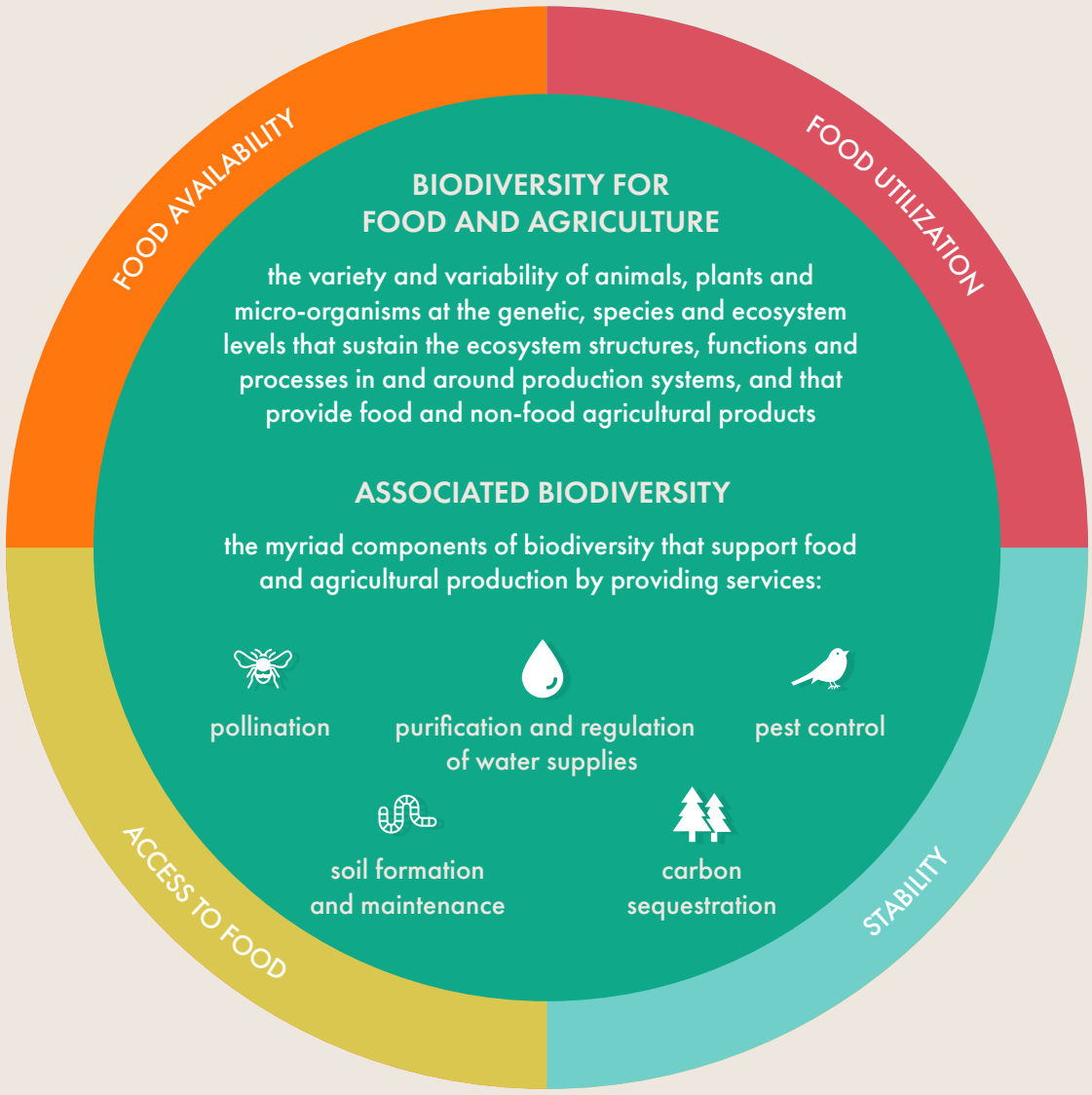

Figure 1. Interdependance of BFA and food security

Source: Adapted from *How the world's food security depends on biodiversity* and *Biodiversity for Food and Agriculture*.

FOOD AVAILABILITY depends on the production and distribution of adequate quantities of a sufficiently wide variety of good-quality foods to meet people's nutritional needs. Food production and supply depend on a multitude of components of biodiversity, both wild and domesticated. In recent decades, the focus of intensive selection on a few species, breeds and varieties has contributed to the loss of genetic diversity, placing at risk the capacity of food systems to respond to future challenges.

FOOD UTILIZATION relates to how food products are combined and processed to provide healthy diets. The nutrient composition of foods varies not only across plant and animal species but also across varieties and breeds within species. In addition, safe and nutritious diets depend not only on food products themselves but also on other services provided by biodiversity. For example, many people rely on their local ecosystems to purify water supplies and provide fuel-wood. Microorganisms are essential in many food-processing activities, such as the making of breads and cheeses, and in food preservation, such as through fermentation.

ACCESS TO FOOD depends on making sure that food is distributed and available locally and is affordable to all people. Physical, social and economic constraints to food acquisition may need to be overcome so that everyone – including the poorest and most marginalized – can obtain the food they need when they need it. In addition to providing people with the means to grow, gather and hunt food to eat, biodiversity can provide incomes for use in buying food or reinvesting in food production, storage or processing, thus improving access to food overall.

STABILITY is the continuous availability, access to and good use of food over time. Biodiversity contributes in many ways to the stability of food supplies. Various kinds of plants and animals provide food at different times of the year and in varying environmental conditions. Some are particularly well adapted to coping with threats such as hot or dry weather or pest or disease outbreaks. For many people, wild biodiversity provides a backup source of food when production from domesticated plants and animals is disrupted. Whole ecosystems contribute to the stability of the food supply in many ways, including by reducing the risk of flood or storm damage or providing habitats for a diverse range of wild pollinators and other wild species, thus reducing the risk of fluctuations in the provision of pollination and other ecosystem services. From a long-term perspective, the conservation of biodiversity makes it available for future generations and for use in addressing hitherto unforeseen challenges.


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Sustainable diets

Sustainable diets are diets with low environmental impacts that contribute to food and nutrition security and to healthy life for present and future generations. They are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable as well as nutritionally adequate, safe and healthy, while optimizing natural and human resources (Burlingame and Dernini, 2012).

Risks for nutrition and health

Among the many impacts of the COVID-19 pandemic on national economies and households have been regional increases in food insecurity. Central Asia, the Western Balkans and the Caucasus have been hit hard, with three countries (Armenia, Kyrgyzstan and Tajikistan) experiencing especially high percentages of people unable to afford a healthy diet. At the same time, the regional prevalence of adult obesity and overweight among children is much higher in the region than in the world as a whole (FAO *et al.*, 2023). Unhealthy diets are an underlying cause of both undernutrition and overnutrition. Undernutrition and micronutrient malnutrition – also known as hidden hunger, a deficiency of micronutrients mostly caused by an overreliance on basic crops, such as cereals, roots and tubers – persist alongside the spread of obesity, with negative impacts on women, children and other vulnerable groups. The reduced availability of sustainably harvested wild species increasingly restrains access to healthy and nutritious diets, especially among marginalized rural populations.

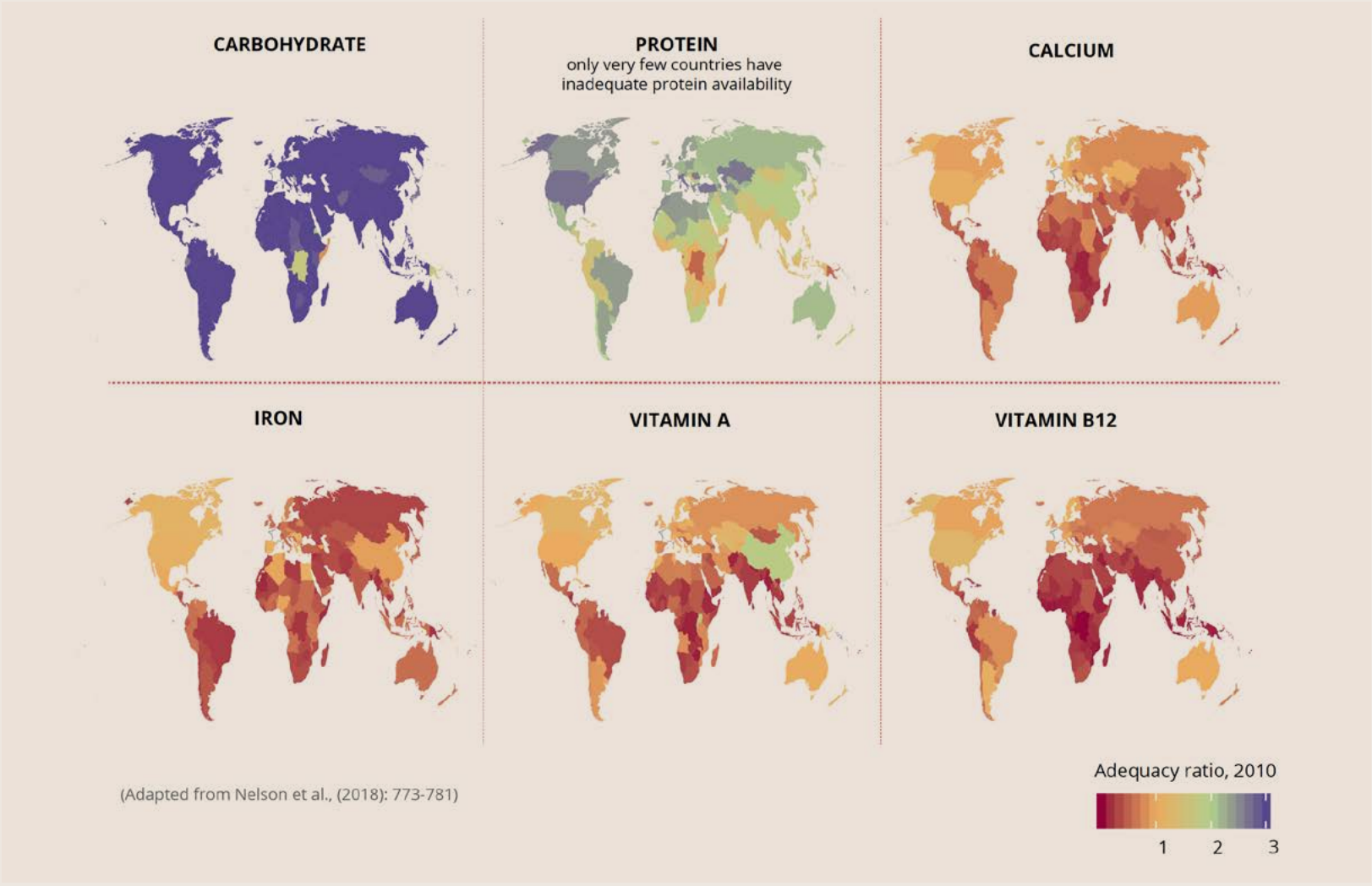


Figure 2. Nutrient deficiencies around the world

In this figure, 'adequacy ratio' refers to the ratio of average nutrient availability from a number of modelled commodities to the requirement of a representative consumer as defined by age- and gender-specific requirements. A value of 1 means that average availability is equal to the representative consumer requirement.

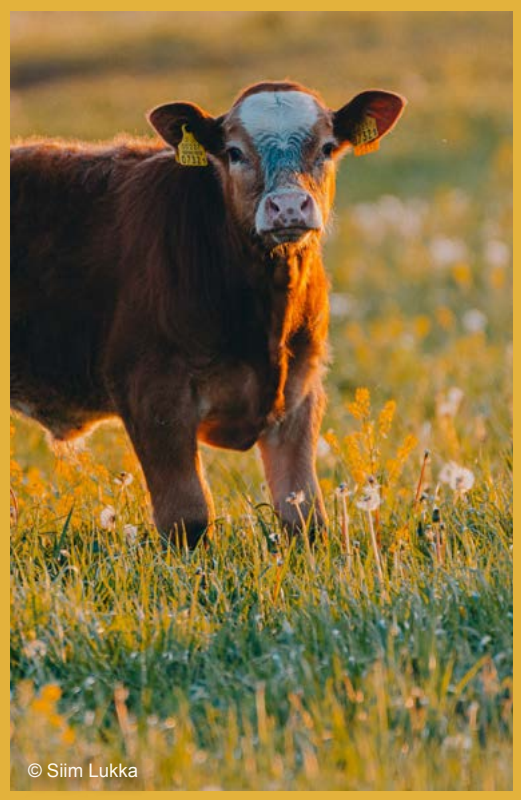
Source: **IPES-Food**, 2022. *The politics of protein: examining claims about livestock, fish, 'alternative proteins' and sustainability.*

The key challenge facing agrifood systems is to provide diets that are actually nutritious – not just sufficiently high in calories (Nelson *et al.*, 2018). Continued reliance on just a few crops, varieties and breeds neither provides nutrition security nor contributes to sustainability. Low-diversity diets that are inadequate in micronutrients increase the risk of malnutrition, while homogeneous and monocultural agrifood landscapes – those dominated by a limited number of species, varieties, breeds and foods – negatively impact both human and environmental health.

The solution to feeding a growing population is not just to produce enough food, but to produce enough nutritious food.

Protecting, conserving and sustainably using BFA remains fundamental to food production that is stable, diverse and more resilient. Enhancing dietary diversity in production systems and improving the diversity of farming approaches in agroecosystems is necessary for improving diets and ensuring food and nutrition security (FAO, 2021; Nicholson, Emery and Niles, 2021; Willett *et al.*, 2019)

Benefits for food and nutritional security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Varietal diversity

Each variety or breed has a unique composition of macro- and micronutrients. Example local varieties include the Akhaltsikhis Tsiteli Doli and Javakhetian Dika wheat varieties in Georgia and the Ukrainian Whitehead, Grey Ukrainian and Brown Carpathian cow breeds.


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Species diversity

The larger the dietary species richness, the larger the likelihood of nutrient adequacy, thanks to the unique nutritional characteristics of each species. For example, various fruit species (apple, peach, quince, persimmon) provide different nutrients.


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Functional diversity

Each food group (for example, cereals, vegetables and pulses) has a unique nutritional value, and these combine to contribute to a diet balanced in macro- and micronutrients.

Source: Adapted from Jones *et al.*, 2021.


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Gender, nutrition and the biodiversity for food and agriculture

Rural women are at the centre of the food production and consumption system. Their connection to natural resources and agroecosystems is deeply rooted in culture and tradition, and relationships are based on values rather than commodities. The key role of women's knowledge in conserving BFA – including farmers seeds, local varieties, and neglected and underutilized crops – is widely recognized. They are the primary custodians of seeds and related knowledge, including for nutritional diversification, and they care for the intergenerational transmission of agricultural practices and seed heritage.

Yet in the region, especially in Central Asian countries, women are more food insecure than men and suffer from more forms of malnutrition (including undernutrition and micronutrient deficiency) (FAO *et al.*, 2023), influencing the health status of their children. Thus, enabling the rights of women to control and manage genetic resources for food and agriculture, seeds and other productive resources and recognizing their contributions as BFA custodians are important to increasing their access to healthy diets and ensuring sustainable livelihoods for women and other vulnerable groups.

Ensuring fair and adequate access to food and food production resources is in line with the Universal Declaration on the Eradication of Hunger and Malnutrition, which recognizes "the key role of women in agricultural production and the rural economy" (Art. 4), the Convention on the Elimination of All Forms of Discrimination against Women, which obliges States to "take into account the particular problems faced by rural women and the significant role that rural women play in the economic survival of their families, including their work in non-monetised sectors of the economy" (Art. 15) and the United Nation Committee on the Elimination of Discrimination against Women's General recommendation No. 34 (2016) on the rights of rural women, which considers "the rights of rural women to land, natural resources, including water, seeds and forests, and fisheries as basic human rights" and commits participating States to implement agricultural policies that support rural women farmers and ensure that rural women have effective access to agricultural resources, including high-quality seeds, and respect and protect traditional agricultural practices

Traditional and underutilized species

A very high level of genetic diversity has been naturally created and accumulated over centuries within traditional varieties and breeds often rich in such nutrients as proteins, dietary fibres, minerals, polyphenols, vitamins and other bioactive compounds (Ali and Bhattacharjee, 2023; WHO, 2020). Despite their nutrient-dense properties and wide range of nutrient statuses – and despite efforts to incorporate these appealing, inexpensive and easily available species into sustainable agriculture systems – many of them remain underutilized, neglected and undervalued in people's diets.

And helping improve sustainable diets is just one part of the equation.

Alongside safeguarding wild relatives of crops, livestock and fish, the use of traditional and currently underutilized or neglected varieties and breeds can help preserve cultural dietary diversity, boost BFA (in terms of diversity in genes, species and ecosystems) and preserve unique agronomic, ecological and nutritional traits. This conservation is critical to finding useful traits for breeding varieties and breeds adapted to new conditions, offering tremendous potential for protection against pests and diseases and for building agroecosystem resilience to drought and climate change. The resulting range of high-quality food sources can help ensure food and nutritional security.

Nutrition, seeds and emergencies

The COVID-19 pandemic and the war in Ukraine have shown how global events can cause restrictions on food imports, increase the cost or destabilize the flow of critical agricultural inputs (such as seeds and fertilizers) and cause high volatility in food prices. The average cost of a healthy diet in the ECA region and in almost all ECA subregions increased after the pandemic (FAO *et al.*, 2023), significantly worsening people's access to food – especially in the wake of low domestic and global harvests. This also exacerbated existing inequalities and worsened outcomes for vulnerable groups with an already tenuous hold on productive assets and income sources, placing them at risk of becoming increasingly unable to meet their dietary needs.

Seeds are a critical resource for ensuring food security, especially in emergency and recovery situations. A high dependence on imported seeds, common in the ECA region, poses a major concern and necessitates immediate action, given how the multiple permacrisis of climate change, land degradation, environmental pollution and the increasing frequency and intensity of unpredictable natural and human-caused events are already weakening the stability of national agrifood systems.

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Farmers and smallholders are the foundation of food production in the region. Complete access to seeds – in terms of quality, quantity, adaptability to local conditions, variety and seasonality – better enables farmers and smallholders to produce food for their own consumption and for sale. Adequate food and nutrition security relies on farmers and communities being free to make agricultural choices that match well with local cultural values, traditional practices and production resources. Seed diversity ensures food diversity and thus contributes to more affordable, healthy and nutritious diets.

Unlike the conservation of wildlife biodiversity, the conservation of BFA – including genetic resources for food and agriculture that may be used for breeding the varieties and breeds more resilient to emerging conditions – requires active engagement with the people who have the knowledge and traditions to manage it dynamically: farmers and rural communities. The availability of more diverse and heterogeneous seeds adapted to local conditions increases the resilience of agrifood systems to external shocks. In other words, a farmer's right to seeds is fundamental to ensuring food security in times of crises.

Recognizing the role of farmers and smallholders as BFA custodians and ensuring their access to genetic resources and fair and equitable distribution align with the international commitments of the Member Nations in the region. The International Treaty on Plant Genetic Resources for Food and Agriculture demands that countries pursue fair agricultural policies that promote the development and maintenance of diverse farming systems that enhance the sustainable use of agricultural biological diversity, genetic biodiversity and plant genetic resources for food and agriculture (Art. 6.2) and obliges them to protect and promote farmers' rights, including the right to save, use, exchange and sell farm-saved seed and propagating material (Art. 9).

The FAO role in BFA mainstreaming for nutrition and health in the Europe and Central Asia region

The ongoing war in Ukraine, with its socioeconomic destabilizing effects and unfolding humanitarian crisis, is exacerbating existing regional challenges for better nutrition, including a lack of access to healthy affordable diets, inefficiencies in the distribution of food, limitations undermining the reduction and prevention of food loss and waste, changes in behaviour among food systems actors, and changes in food production and consumption patterns. What is more, inefficient supply chains continue to create difficulties for the urban and rural poor and vulnerable groups in accessing nutritious and diverse foods.

To respond to these challenges, the FAO helps Member Nations in the Europe and Central Asia region address food insecurity, reduce all forms of malnutrition and transform food systems by promoting nutrition-sensitive value chains and healthy diets through the alignment of trade, food safety, and sanitary and phytosanitary policies, facilitating the One Health approach.

The three FAO Regional Initiatives help in this regard. ☞

Regional Initiative 1

Empowering smallholders, family farms and youth through inclusive rural transformation, digitalization and innovation

Smallholders and family farms, which are the predominate farm structures in the ECA region, play a key role in both producing food and safeguarding BFA. Farming agroecosystems rich in plant, animal and microorganism diversity are more resilient to pest and disease outbreaks and climate change effects and have better soil quality and water supply. Hence, they provide for more stable yields, resulting in fewer harvest losses and increased food production. The role farmers play in maintaining a living reservoir of diverse genetic resources for food production is critical for breeding novel adaptive and resistance genes to ensure the diversity of healthy diets in any future scenario. By facilitating rural livelihoods – with an emphasis on smallholders, women and youth – Regional Initiative 1 aims to increase the inclusiveness of agrifood systems for enhanced equitable access to safe and nutritious food and healthy diets for all and to improve sustainable outcomes for BFA use and conservation.

Regional Initiative 2

Transforming food systems and facilitating market access and integration

By addressing food insecurity and malnutrition from a sustainable food systems perspective, Regional Initiative 2 incorporates the conceptual connection between sustainable production and consumption for healthy and safe nutritious diets. It supports countries in transitioning towards more sustainable diets that promote the use in food production of animal species, crop varieties, landraces, and wild and underutilized plant species that are rich in micronutrients and create favourable conditions for increased access to market for such products by shortening food supply. Nutrition education and food-based dietary guidelines that consider both the health and environmental impact of diets can help increase dietary quality through such avenues as the use of traditional and local foods composed of nutritionally rich species and varieties.

Regional Initiative 3

Managing natural resources sustainably and preserving biodiversity in a changing climate

To incentivize agrifood systems that provide for the sustainable use and protection of BFA while delivering healthy sustainable diets, Regional Initiative 3 supports Members in mainstreaming and integrating BFA into food security and nutrition policies, practices and other instruments across all sectors. By strengthening the science-policy dialogue, this initiative aims to help national policymaking better consider risks related to biodiversity loss and genetic erosion and the dietary health advantages of traditional, undervalued and underproduced BFA. Through the Regional Programme on Seed Systems, Regional Initiative 3 facilitates enhanced food security and nutrition, with actions aimed at supporting seed systems, promoting genetic variability, increasing the profile of landraces, harmonizing policy for the full implementation of farmers' rights to seeds, and building the national capacity of breeders and seed producers for the transition to biodiversity- and nutrition-sensitive food systems.

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More information is available at:

Biodiversity
https://www.fao.org/platforms/green-agriculture/en

Managing natural resources sustainably and preserving biodiversity in a changing climate
https://www.fao.org/europe/work-in-the-region/regional-initiatives/natural-resources/en

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