



GENETIC RESOURCES FOR FOOD SECURITY AND NUTRITION

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OVERALL GOAL

Conserving genetic resources for food and agriculture and promoting their use in support of global food security and sustainable development for present and future generations

Genetic resources for food and agriculture (GRFA) –the diversity of plants, animals, aquatic resources, forests, micro-organisms and invertebrates – are the strategic reservoir on which all our food production systems depend.

When these resources are eroded, humankind loses potential means of adapting our food production systems to new socio-economic and environmental conditions. It is because of their genetic variability that plants, animals, micro-organisms and invertebrates are able to adapt and survive when their environments change. Maintaining and using a wide range of diversity – both diversity among species and genetic diversity within species – therefore means maintaining capacity to respond to future challenges.

Making best use of genetic diversity

GRFA are essential to maintaining and improving food production. Farmers, livestock keepers, pastoralists, managers of fisheries and forests, and breeders alike also need access to GRFA to address threats caused by diseases and pests or changing climates. Access to GRFA and improving the capacity to use them are therefore critical to achieving and sustaining food security.



Food and Agriculture
Organization of the
United Nations

COMMISSION ON
GENETIC RESOURCES
FOR FOOD AND
AGRICULTURE

The Commission on Genetic Resources for Food and Agriculture

The Commission on Genetic Resources for Food and Agriculture is the only international forum that specifically deals with biodiversity and GRFA (i.e. plants, animals, aquatic resources, forests, micro-organisms and invertebrates). The Commission with its 178 member countries promotes a world without hunger by fostering the conservation and sustainable use of biodiversity for food and agriculture.

Conserving genetic diversity

Conserving the diversity of GRFA requires different complementary strategies, including maintaining ecosystems and their continued use by farmers as well as their conservation in *ex situ* collections (e.g. gene banks).

Maintaining GRFA is a global task that requires collaboration and cooperation at all levels between all relevant stakeholders.





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GRFA: Making a difference to food security and nutrition

In all sectors the lack of genetic diversity increases the risks to food security and nutrition as has already been the case in the past, e.g. the potato blight which resulted in devastating famine in Ireland in the mid-19th century; the Southern corn leaf blight which destroyed up to 15 percent of corn farms in the United States in the 1970's; the rust attack on Cuba's sugarcane in the 1980's; the drop in production of Italian shrimp farms in the 1980's due to the loss of genetic diversity through inbreeding, the Samoa taro crisis and the Banana fungal disease black Sigatoka in Central America in the 1990's.

The use of diversity and of desired traits selected from this diversity, on the other hand, improve food security and nutrition: Remarkable recent examples include sweet potato varieties for East Africa with increased pro-vitamin A; a variety of common beans with extreme drought tolerance, high yield and yield stability and good taste in Nicaragua and nutritious varieties of tomatoes and onions that resist pre-and post-harvest pathogens in hot, humid regions.

For livestock, the wide range of breeds offer a pool of potential adaptive and functional traits allowing farmers, livestock keepers and pastoralists to make the choice best fitting their production environment and constraints. The adaptedness of Maasai zebu cattle to hot climates is related to their coats, hides and skins, haematological characteristics, growth and physiology and other characteristics; they show more resistance to drought than exotic breeds. The Black Bedouin goat of the Near East and the Barmer goat of India have a great ability to withstand dehydration. Locally adapted breeds of ruminants in areas of high tsetse fly challenge show consistent tolerance to this disease.

Traditional breeding of Nile tilapia (a freshwater fish) from different areas of Africa created the GIFT Tilapia, a widely known and much appreciated fish.

The colossal forest genetic diversity allows for breeding and domestication of wild food plants that can support the increasing demand for food such as the Tamarind, Safu and Moringa trees.

IN A NUTSHELL

GRFA contribute to food security and nutrition through:

- Maintaining and increasing productivity to feed a growing population in the face of challenges from pests and diseases, drought and water stress, climate change and reduced labour availability;
- Improving food quality by enhancing nutritional content, storability and meeting consumer preferences;
- minimizing risks and improving food production in a diversity of production environments that require different species, varieties and breeds;
- Strengthening the stability and resilience of production systems by ensuring that producers have a range of options available to them;
- Helping communities and producers recover from disasters such as floods and hurricanes; and
- Providing adaptation options for future changes in production conditions and needs.

MAKING A DIFFERENCE

FAO's intergovernmental Commission on Genetic Resources for Food and Agriculture strives to halt the loss of GRFA by promoting their conservation and sustainable use, including their exchange and the fair and equitable sharing of the benefits arising from their use. Through its work the Commission facilitates a multi-sectoral evidence-based dialogue that promotes a better integration of food security and nutrition in its field of intervention. While the Commission is a global intergovernmental body, its work ultimately depends on the active contribution of farmers, breeders, consumers – in fact, everyone involved in the production and consumption of food.



Among the main achievements are the adoption by the FAO Conference of the International Treaty on Plant Genetic Resources for Food and Agriculture in 2001, as well as the development of relevant instruments and guidelines, which are the basis of many national strategies and policies on conservation and use of GRFA.

IN PRACTICE

The Commission guides the preparation of global assessments of the status of conservation and use of GRFA, agrees on policy action, supports the national implementation of globally agreed action plans and instruments, and monitors through National Focal Points the implementation at national level.

Global assessments, based on country reports and scientific studies, provide information on the state of GRFA, their use and on drivers of genetic erosion which may differ from country to country. They help identifying knowledge gaps and research opportunities. The Commission's "State of the World" reports lay the foundation for global instruments, such as codes of conduct, guidelines or Global Plans of Action.

Global Plans of Action provide an internationally agreed set of activities to be implemented at country, regional or global level through which governments and other stakeholders contribute to the conservation and sustainable use of GRFA. These include activities designed specifically to contribute to improving food security and nutrition at country level.

FAO technical divisions provide technical and policy support to countries in the implementation of Global Plans of Action and in the development of other instruments such as technical guidelines.

Cross-sectoral matters

Amongst the cross-sectoral matters addressed by the Commission are:

Access and benefit sharing. The Commission is committed to ensuring that the special features of biodiversity for food and agriculture are adequately reflected in international policy-making and national legislation regulating access to GRFA and the sharing of benefits derived from them.

Nutrition. In 2015, the Commission endorsed the 'Voluntary Guidelines for Mainstreaming Biodiversity into Policies, Programmes and National and Regional Plans of Action on Nutrition'. The Guidelines recognize the strong links between biodiversity, agriculture, food, nutrition and health. Indeed, taking advantage of variety-specific differences in food composition can make a difference between nutrient deficiency and nutrient adequacy in populations and individuals, and contribute to combating malnutrition. The Guidelines aim at assisting countries to integrate biodiversity into their nutrition and nutrition-related policies, programmes and activities (e.g. food-based dietary guidelines, nutrition education, dietary assessment and nutrition policy development) in view of addressing malnutrition in all its forms.

Climate change. GRFA will play a central role in adapting agricultural and food production to climate change. While climate change is a threat to GRFA, GRFA provide a crucial tool to adapt to the effects of climate change. In 2015, the Commission endorsed the 'Voluntary Guidelines to support the integration of Genetic Diversity into National Climate Change Adaptation Planning'.



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Partnerships. The Commission seeks to strengthen cooperation and partnerships between FAO and other relevant intergovernmental and non-governmental bodies. This includes working to increase the involvement of civil society and producer organizations, including organizations representing women and small-scale producers, breeding institutions and industries, and the public and private sector organizations involved with GRFA.

CHALLENGES

The Commission strives to halt the loss of GRFA, and to ensure world food security and sustainable development by promoting their conservation and sustainable use, including exchange, access and the fair and equitable sharing of the benefits arising from their use.

Exchange of GRFA for sustainable food production and food security

Ensuring that appropriate GRFA with relevant traits are available and accessible is crucial for food security. In most countries, a significant part of the genetic diversity used in food and agriculture originates from other countries. Ensuring access to GRFA, while also ensuring that benefits derived from them are shared in a fair and equitable manner has increasingly become a challenge for policy makers and practitioners.

Diversity of GRFA, sustainability, adaptability, and resilience of production systems for food security

Production systems should be sustainable, adaptable and resilient in order to support food security, improve livelihoods and enhance environmental health. Achieving these objectives will require improving the delivery of ecosystem services within production systems at the same time as maintaining and improving productivity. Improving both food security and sustainability will require new collaborations between those involved in the different aspects of food production and use of GRFA.

The FAO Commission on Genetic Resources for Food and Agriculture promotes a world without hunger by fostering the use and development of the whole portfolio of biodiversity for food and agriculture important to food security and nutrition as well as rural poverty alleviation.

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