Crop diversification
for sustainable diets and nutrition
The role of FAO’s Plant Production and Protection Division
Crop diversification for sustainable diets and nutrition

Introduction

FAO’s Plant Production and Protection Division (AGP) works to strengthen global food security by promoting sustainable crop production intensification (SCPI), which aims at producing more from the same area of land while conserving resources, reducing negative impacts on the environment and enhancing natural capital and the flow of ecosystem services.

The basic concept is the integration and harmonization of appropriate crop production practices, technologies and policies in order to increase crop productivity in a sustainable manner, thereby meeting the key Millennium Development Goals of reducing hunger and preserving natural resources and the environment for future generations.

AGP also supports crop diversification for sustainable diets, nutritional health and income generation, and supports the global food economy through the implementation of international treaties. The focus of AGP’s activities is on enhancing and strengthening:

- effective and strategic decisions that increase crop production using an ecosystem approach and nutrition-sensitive crop diversification;
- national capacities to monitor and to respond effectively to transboundary and other important outbreaks of pests;
- policies and technologies appropriate to needs of member countries to reduce negative impact of pesticides;
- conservation and sustainable use of plant genetic resources with strong linkages between conservation, plant breeding and seed sector development.

Most of AGP activities related to supporting sustainable diets and improved nutrition in developing countries focus on horticulture and high value crops. There are active linkages among AGP teams that facilitate interdisciplinary activities. AGP collaborates closely with other FAO Divisions and external partners in interdisciplinary activities, such as nutrition, food quality and safety, post-harvest technologies, food losses and waste, economics and policy.
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AGP’s work: An overview

AGP technical operations support the achievement of FAO’s Strategic Objective A, Sustainable intensification of crop production, which is composed of four Organizational Results (ORs):

- **A1** – Policies and strategies on sustainable crop production intensification and diversification at national and regional levels;
- **A2** – Risks from outbreaks of transboundary plant pests and diseases sustainably reduced at national, regional and global levels;
- **A3** – Risks from pesticides sustainably reduced at national, regional and global levels;
- **A4** – Effective policies and enabled capacities for better management of plant genetic resources for food and agriculture including seed systems at national and regional levels.

AGP’s work related to improving diets and improving nutrition – in the context of crop production and food security – is included in OR-A1 under two Organizational Outputs, namely:

- **A01G201** – Evidence-based support tools and instruments for sustainable crop production intensification, through an ecosystem approach;
- **A01G202** – Enhanced capacity of member countries to implement sustainable crop production intensification and diversification strategies for health and improved livelihoods.

Current efforts place emphasis on smallholder production units for:

- Promoting high value horticultural crops for health, nutrition and income in rural, urban and peri-urban areas in line with quality and safety standards;
- Developing and testing policy tools and approaches to assist countries in developing the horticulture sector;
- Supporting “Growing Greener Cities” strategies to address the challenges of rapid urbanization by promoting horticulture-based activities as a contribution to improved food and nutrition security, sustainable diets and nutritionally diverse crops, and better livelihoods for the urban population.

Diversification of smallholder crop production is a crucial step in food and nutrition security strategies. Diversifying production to include horticulture and high value crops allows smallholders to broaden sources of food in local diets and enter domestic markets for higher-value products. It strengthens resilience to economic and climate change.
Work related to sustainable diets, nutritional health and improved livelihoods

Growing Greener Cities: Contributing to urban food and nutrition security

Towns and cities in the world’s developing countries are growing on an unprecedented pace and scale. Poor urban households spend up to 80 percent of their income on food. That makes them highly vulnerable when food prices rise or incomes fall.

To help developing countries meet the challenges of massive and rapid urbanization, FAO/AGP launched a multidisciplinary initiative, Growing Greener Cities (GGC), under its Programme for Urban and Peri-urban Horticulture (UPH). The initiative aims at ensuring the access of urban populations to safe, good quality horticultural produce and to healthy and secure environments. Growing Greener Cities helps governments and city administrations to optimize policies, institutional frameworks and support services for UPH, to improve production and marketing systems, and to enhance the horticulture value chain.

Urban and peri-urban horticulture helps developing cities meet challenges related to sustainable diets and nutrition. First, it boosts the physical supply of fresh, nutritious produce, available year round. Second, it improves the urban poor’s economic access to food when their household production of fruit and vegetables reduces their food bills, and when growers earn a living from sales.

A survey has been conducted to compile information from some 40 countries for the First Status Report on Urban and Peri-urban Horticulture (UPH) in Africa, to be published in June 2012. This document is a decision support tool that will assist countries in targeting their investments and policies for UPH, improving livelihoods and incomes, and ensuring a healthy urban food environment.

Diversified production can help improve nutrition, strengthen livelihoods, create opportunities for local agro-processing, generate employment along the value chain, and stimulate rural economic development.

As part of an FAO nutrition-sensitive food systems approach, FAO programmes for crop diversification include among their goals improvements in the nutritional health status of low-income households, through increased production of nutrient-rich foods for direct consumption and generation of the income needed to procure the amount and variety of food families need.

Among nutritionally vulnerable households with limited land, one of the most effective diversification strategies is homestead food production. By employing household labour intensively on small vegetable gardens and fruit tree plots, homestead production improves the quality of family nutrient intake, while allowing women to fulfil domestic and child care roles. With extension support, access to land and water, credit and markets, and economies of scale achieved through the organization of women in groups, homestead programmes can generate incomes that women control, leading to better child nutrition education and health, sustainable livelihoods and community development.

Growing horticultural crops increases the supply of fresh, nutritious produce and improves poor people’s economic access to food. Access to nutritious food is a key dimension of food security. In Africa and Asia, urban households spend up to 80 percent of their food budgets on cheap “convenience” foods that are often deficient in vitamins and minerals. Horticultural foods, such as fruits, vegetables and nuts, are important for the daily diet and are among the richest natural sources of micronutrients, providing dietary fibre, vegetable proteins, lipids and other bioactive components. But in developing countries, daily fruit and vegetables consumption is just 20–50 percent of FAO/World Health Organization (WHO) recommendations.

An FAO/WHO expert consultation (2004) on diet, nutrition and the prevention of chronic diseases recommended a daily intake of no less than 400 g of fruit and vegetables (excluding potatoes and other starchy tubers) to prevent cardiovascular disease, cancer, diabetes and obesity. That level of intake can also prevent morbidity and mortality caused by micronutrient deficiencies, including birth defects, mental and physical retardation, weakened immune systems, blindness and even death. Dietary diversification through horticulture-based food intake, therefore, is a sustainable approach to fighting micronutrient malnutrition.
Impact indicators and achievements

Growing Greener Cities – UPH initiatives

A project for UPH in five cities in the Democratic Republic of Congo is helping to grow 150,000 tonnes of vegetables a year, supply fresh, nutritious produce to 11.5 million urban residents, build sustainable livelihoods for 16,000 small-scale market gardeners, and generate jobs and income for 60,000 people in the horticulture value chain.

Several countries (e.g. Botswana, Egypt, Afghanistan, Madagascar and Tanzania) have recognized the need for assistance in formulating a GGC strategy in order to secure the integration of UPH into city development plans. Countries that have already formulated a GGC strategy and related action plan have strengthened their institutional frameworks by establishing national UPH units at the level of the Ministry of Agriculture and at decentralized level in municipalities, e.g. the Democratic Republic of the Congo, Rwanda, Burundi.

Donor funding has been mobilized to support GGC-UPH initiatives, also through decentralized cooperation (e.g. Italy for Rwanda and Senegal; France for Madagascar and Egypt; Spain and UNDP for Mozambique and Afghanistan; ADB for DRC and WB for Congo-Brazzaville) and FAO-TCP and IFAD projects.

Promotion of Fruit and Vegetables for Health Initiative

The Global Fruit and Vegetables for Health Initiative (GF&VH Initiative) and the “Kobe framework for action” were established by FAO and WHO in 2004 to guide the development of cost-effective and effective interventions for the promotion of adequate consumption of fruit and vegetables for health. These have led to a series of regional workshops to promote and support implementation of fruit and vegetable programmes at national or sub-national level in developing countries.

In this process, national or local production capacities, traditional agricultural and dietary practices, prevailing patterns of nutrition, the health status of the population, and existing fruit and vegetable promotion programmes are being taken into consideration.

This framework seeks to appropriately tailor fruit and vegetable promotion programmes to target groups, aiming for availability, accessibility, affordability, acceptability (including quality, taste, safety, type of food and cultural sensitivity) and equity – i.e. including the underprivileged.

Recently, an initiative for Promotion of Fruit and Vegetables for Health (PROFAV) was endorsed by 22 Anglophone African countries in order to promote nutrition-sensitive agriculture and a horticultural crop-based approach for improving diets. The initiative aims at mapping existing national policies and programmes, documenting production and consumption, supporting programme development, and strengthening cooperation among health, education and agriculture sectors.

Under PROFAV, integration of efforts involving stakeholders in the horticulture, nutrition, health and education sectors is considered essential for the effective promotion of F&V for health. There is also need for joint efforts between the public and private sectors in commercializing and modernizing horticulture. While promotion of fruit and vegetables production has long been part of general nutrition education, there is now a need to focus on promoting availability and consumption. The importance of advocacy for nutrition and health benefits of horticulture product consumption based on, information and community education - in changing the ignorance or negative attitudes to consumption of fruit and vegetables - is now well recognized.

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Benefits of crop diversification

Food security, nutrition and health

Secure source of income, employment and high value products

Resilience of farming systems and environmental services

Horticulture for nutrition, livelihoods and sustainability
Impact indicators and achievements

Fruit and Vegetable Initiative for Health: Strengthening capacities

Cameroon and Niger have adopted policies and strategies on crop diversification including National Horticulture Master Plans. In Central and South America, the exchange of experience and lessons learned in seven countries served as the basis for defining models to assist other countries in the implementation of urban and peri-urban agriculture/horticulture programmes.

Several countries are in the process of establishing multidisciplinary platforms (agriculture, health/nutrition and education) and formulating a National Horticulture Development Master Plan with emphasis on the role of fruit and vegetables in a sustainable diet for health and with due attention to gender dimensions.

The exchange of expertise and networking among developing countries has allowed the strengthening of national capacities e.g. Bolivia and Mozambique; Egypt and Afghanistan; DRC and Burundi; and DRC and Guinea with inputs from scientific institutions and universities (e.g. Polytechnic of Milan in Senegal; University of Bologna in Cote d’Ivoire).

School gardens and microgardens

School gardens

School gardens are found in many countries, in different forms and sizes, with varying aims. In most cases, the school garden is an area of land within school grounds or nearby. Vegetables, flowers, medicinal plants, trees, bushes and many other plants are usually grown. Occasionally, small animals, such as ducks, rabbits, chickens, goats and even fish, are also kept. In cities where schools have limited space or lack access to soil, the school garden can consist of growing plants in container-based micro-garden systems. Although the term “school garden” embraces a variety of gardening and agricultural elements, they usually have two things in common:

- *Schoolchildren actively help parents* and other interested community members in creating and maintaining the garden; and
- *Schoolchildren use the garden* – for learning, for recreation and by consuming what is harvested.

School gardens are a proven means of promoting child nutrition. They familiarize children with horticulture, provide fresh fruit and vegetables for healthy school meals, help teachers develop nutrition courses and, when replicated at home, improve family nutrition as well. Over the past 10 years, FAO/AGP in collaboration with FAO’s Nutrition and Consumer Protection Division (AGN) has provided tools, seeds and training to establish hundreds of school gardens in more than 30 countries.

Micro-gardens

Since micro-garden technologies were displayed at the World Food Summit at FAO headquarters (10–13 June 2002), they have received increased attention in the context of urban agriculture. UN-HABITAT projections indicate that world population growth over the next 30 years will be mainly in urban slum areas. Thanks to their flexibility and ability to adapt to the urban environment, micro-gardens can relieve malnutrition, alleviate poverty and facilitate the access of poor urban dwellers to nutritious vegetables – indeed, they are increasingly a core element of emergency interventions to restore the productive capacity of displaced people. Micro-gardens are being integrated into food aid and school feeding programmes in order to complement children’s diets with fresh and nutritious vegetables; they also open up the way for home-
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People with no land and no income are dependent on food distribution for their survival. However, micro-garden systems can change their lives. Starting with an area of just 1 m² and 1–3 litres of water per day, a family can grow a broad range of vegetables, including: leafy vegetables (e.g. cabbage, ceylon spinach and watercress); root and tuber vegetables (e.g. carrot, potato and onion); and fruit vegetables (e.g. tomato and hot and sweet pepper). The standard unit is a 1-m² table, assembled with wooden laths obtained from pallets or other discarded material. However, alternative containers, such as halved truck tyres, food aid bags and plastic buckets, can be usefully recycled for vegetable growing.

Micro-gardens are very popular with women, because soil preparation and weed control are not necessary, and so they require less physical effort than conventional cultivation. Furthermore, the system is highly water-use efficient: it reduces the burden of carrying irrigation water and helps to save water, which is expensive and scarce in the cities, and even rarer and more expensive in slum areas and refugee camps. For these reasons, there is a demand for micro-gardens from special interest groups and disadvantaged communities, including orphans, the disabled, the elderly, patients recovering in hospitals, and HIV/AIDS-affected persons. They are currently being introduced in schools to create awareness of the health benefits of fruit and vegetables.

Micro-gardens are gradually expanding in large cities worldwide, and technologies, materials, species and cultivars are adapted to consumer preferences and a wide variety of local conditions, for example: El Alto, Bolivia, 4 000 m above sea level in the Andes; Libreville and Port-Gentil, Gabon, at sea level in hot and humid equatorial conditions; Cairo and Alexandria, Egypt, on rooftops in a Mediterranean climate; Dakar, Senegal, in sub-Saharan Africa; and Caracas, Venezuela, in the humid tropics of South America. Micro-gardens enable the urban poor to harvest on a daily basis fresh, safe and highly nutritious vegetables to improve their livelihoods. It is encouraging to see how quickly poor families pick up the technology.

Impact indicators and achievements
School, home, community and micro-gardens

In the El Alto municipality of La Paz, AGP supported a micro-gardens programme for low-income families. Some 1 500 households were trained in organic cultivation of fruit, vegetables and herbs in small low-cost greenhouse units measuring 40 sq m. The units provide fresh vegetables all year round for home consumption and sale through neighbourhood markets. The result was a general improvement in child nutrition and family savings, which were spent on eggs and meat.

A project launched in 2010 in Nicaragua aims at creating in and around the capital, Managua, 500 micro-gardens and 12 demonstration and training centres in neighbourhoods and schools. In collaboration with Nicaragua’s Institute of Agricultural Technology, it provides drip irrigation systems and training in intensive vegetable production for low-income beneficiaries, expected to number 9 500. To ensure the sustainability of the project, beneficiaries will also be trained in operating and maintaining UPH infrastructure, including low-cost greenhouses and tunnel seedling nurseries.

In collaboration with Senegal’s Ministry of Agriculture, FAO/AGP helped introduce micro-garden technology and start community gardening centres in low-income areas of Dakar and the city of Pikine. More than 4 000 residents, most of them women, have started micro-gardens, which produce on average 30 kg of vegetables per square meter per year, enough to satisfy family needs and providing a surplus for sale. In 2008, the micro-gardens programme won UN-HABITAT’s Dubai Award for Best Practice to Improve the Living Environment. The US$30 000 prize is being used to consolidate and expand the programme.

Crop diversification for sustainable diets and nutrition
Future plans

AGP will continue to work on the three action areas outlined above. Further discussions with AGN will be useful to identify how current work on sustainable diets and nutrition security can be integrated more efficiently and better reflected in the three areas, as well as in other AGP initiatives. To impact nutrition, AGP needs to work with AGN to identify deficits in local diets and micronutrient intakes, and understand the motivations and constraints that determine household consumption decisions.

In summary, future activities on crop diversification should have a specific focus on sustainable diets in the context of nutrition-sensitive agriculture and the development of normative guidelines, tools and indicators to characterize and measure sustainable diets in different agro-ecological zones. Following the success of international meetings in Cameroon, Senegal and Tanzania, global initiatives in horticulture will continue, in partnership with WHO and regional bodies such as NEPAD, on rural, urban and peri-urban horticulture, and on the relationship between production and nutritional outcomes.

AGP will continue to encourage member countries – including authorities at local, community and municipal levels and other stakeholders in the public and private sector – to:

- Be aware of the need to improve horticulture-based systems and protect UPH activities as a component of food and nutrition security strategies and sustainable diets, especially for the benefit of poor households;
- Make available technical guidance and strengthen capacities to improve the effectiveness and sustainability of horticulture-based production and post-production systems, giving special attention to improving nutrition, livelihoods and increasing food availability, safety and accessibility;
- Provide guidance for policy decision at all levels in order to improve the efficiency of crop diversification as an integral component of the overall food supply and distribution system based on rural-urban linkages;
- Promote the protection and improvement of the rural, urban and peri-urban horticulture environment, including the watershed and surrounding agro-ecosystems.

Further reading

www.fao.org/docrep/013/i1901e/i1901e00.pdf
FAO, 2011. The place of urban and peri-urban agriculture in national food security programmes. Rome.
FAO, 2011. Strong support for horticulture development in Africa
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