The rise of RESILIENCE

Global food and agricultural efforts create complex issues related to natural resources, economics and society. Against this context, Caterina Batello explains to *International Innovation* how putting farmers first can lead to greater rewards when addressing global challenges that extend far beyond food production

Caterina Batello

UN Food and Agriculture Organization, Team Leader of the Plant Production and Protection Division

Could you begin by introducing yourself and outlining your role in the Plant Production and Protection Division (AGP) of the UN Food and Agriculture Organization (FAO)?

I work as a team leader dealing mainly with sustainable production systems, in connection with many other topics related to the entire food chain. We specialise in crop production within the food chain.

What is the overall vision and mission of the AGP?

AGP's vision is the sustainable intensification of crop production to eradicate hunger and poverty. Its mission is to increase sustainable crop production intensification and diversification considering natural resources, economic and social issues, through interdisciplinary collaboration with internal and external partners.

How is the FAO fulfilling its aim of supporting sustainable agricultural sector production systems? What social, economic and environmental issues are you exploring in this context?

We promote sustainable agricultural practices and movement towards sustainable production and consumption systems that take into consideration the three pillars of sustainability. We support increasing economic and environmental performance, and the maintenance of ecosystem services and biodiversity, while enhancing the social components of agricultural production and food security. This is very important to the Organization as agriculture is inextricably linked to the social and rural conditions of farmers and producers, including fishermen and pastoralists. We also think that sustainable production systems can produce fair and nutritious food for everyone, and that represents a big challenge ahead – to produce sufficient food for everyone.

What educational or training opportunities do you offer rural communities to improve coping mechanisms and resilience against potential risks such as natural disasters, food insecurity and malnutrition?

One example is Farmer Field Schools (FFS), an initiative that FAO has helped to develop over the last 30 years. This is an education programme for adult farmers, developed in the Philippines to support more effective and efficient pesticide use in rice growing systems. FFS is about helping farmers to better understand and manage the ecosystem, and the capacity of plants, insects and animals to regulate and control biological processes to ensure the healthy growth of plants. This work has brought many millions of people out of poverty by increasing their total production while reducing the amount of pesticides used, especially in rice systems.

About 10 years ago the same approach was successfully introduced in Africa. We have large programmes in around 30 countries in Africa where thousands of people have been trained daily on different practices to help improve production. This approach was initiated to help farmers with the challenge of pest regulation and was later enlarged. For example, we now

use the FFS approach in over 12 climate change projects where we introduce best practices to increase the resilience of farmers to climate change.

Can you discuss the FAO's ecosystem approach to crop production intensification? Could you explain what sustainable crop production intensification means and the context from which it emerged?

FAO has developed a strategic medium-term work plan for 2014-17 and a number of different strategic objectives, and I refer in particular to Strategic Objective 2 (SO2) to: "Increase and improve provision of goods and services from agriculture, forestry and fishery in a sustainable manner". To feed a growing population and reduce poverty and food insecurity, we have historically focused on maximising production with insufficient regard to post-harvest losses, and the damage caused to the natural resource base and other ecosystem services. We are now analysing those ecosystem services, how much they contribute to increased efficiency and the resilience of cropping systems, livestock systems, forestry and fishery.

What are your key objectives and activities in this area?

Among the key principles recognised in SO2 is the need to identify and enhance the role of ecosystem services in production systems. Complementary to all work to enhance resource efficiencies and optimise the use of inputs is the need to ensure that ecosystem functions are supported and sustained, and the biodiversity underpinning these is respected. It is recognised that when production systems are managed with an ecosystem approach, they may generate not just goods (such as food, timber and fish) but also a diversity of services and wider benefits such as water quality, temperature regulation, cultural values and conservation of biodiversity. Moreover, the long-term sustainability of production systems may depend on investments made in supporting the ecosystem services that underpin them.

Developing countries need to almost double their production by 2050 to support population growth. How can agriculture adapt to meet this need?

We have global targets and these can be met by intervening at the local level. We will be able to feed over 9 billion people by undertaking a number of localised and very specific actions in order to produce sufficient and nutritious food for all.

In some areas, water scarcity may be the major challenge, in others it may be land degradation or human migration leading to insufficient agricultural workers. The problems are very specific and it is therefore important to develop specific actions, programmes and national policies to support sustainable production. To meet those global goals, people must work together, improving governance at the national level and finding answers to specific problems at the regional level.

You have stated that agriculture needs to change beyond the 'green revolution', a series of initiatives aimed at increasing agricultural production. Can you provide some insight into this? What are the negative side effects of current farming practices and how do they need to change?

The green revolution model is no longer sufficient because it entails many negative consequences for the environment, such as pollution and soil degradation. We need to promote a model that is more strongly based on enhancing the ecosystem and the biological capacity of soils and nature to sustain production, rather than only focusing on external inputs.

Agriculture has to develop new models of production based on ecosystem services, the capacity of farmers to manage the ecosystem better, and new investments and innovations to meet this challenge.

What are the benefits of an ecosystem approach to sustainable farming?

Ecosystem services – defined as the benefits people obtain from ecosystems – is underpinned by biodiversity, encompassing the variety and variability of animals, plants and microorganisms at the genetic, species and ecosystem levels that sustain the structure, functions and processes of production systems. We will focus explicitly on the management and enabling of environments for ecosystem services that contribute to production systems, and those production systems that provide ecosystem services. For example, did you know that the total economic value of crop pollination worldwide has been estimated at €153 billion annually, 9.5 per cent of the total value of the world's agricultural food production? Animal pollinators such as bees affect 35 per cent of the world's crop production, increasing outputs of 87 of the leading food crops worldwide, or 75 per cent of all crops.

To give some examples of ecosystem services that are relevant for agricultural production, we divide them into supporting, provisioning, regulating and cultural services. The supporting services are necessary for the production of all the other ecosystem services. They comprise nutrient dispersal and cycling, and seed dispersal and primary production. These divisions are important because, if it is unclear that concepts like nutrient dispersal and nutrient cycling are at the core of sustainability and sustainable production intensification, it is difficult to develop a type of agriculture that can sustain production in the future.

Save and Grow

With the publication of *Save and Grow* in 2011, FAO proposed a new paradigm of intensive crop production, one that is both highly productive and environmentally sustainable. The challenge is to place food production and consumption on a truly sustainable footing. Following the Rio+20 Conference in June 2012 and the launch of the Zero Hunger Challenge by the UN Secretary-General, Ban Ki-moon, FAO has now published a new edition. The challenge has five elements: guarantee year-round access to adequate food; end stunting in children; double small farmer productivity; foster sustainable food production systems; and reduce food waste and loss to zero.

For more information visit: www.fao.org/ag/save-and-grow

Provisioning services describes products that are obtained from ecosystems, for example, food, crops, spices, raw material including organic matter, fodder and fertiliser, genetic resources for crop improvement and healthcare, water, minerals, medicinal resources and energy – especially hydropower and biomass fuel.

Cultural services seem a luxury afforded by rich societies, but in a world where over half the population is urban, these cultural services are very important. They include spiritual enrichment, reflection, recreation and aesthetic experience, as well as cultural life – using nature in film, painting, folklore, etc.

Regulating services are also very important but are not measurable like the others: food production may be measured in tonnes, but regulating services are more abstract. One of the big challenges in the future is to better understand and capture the value and extent of those regulating services.

We should move away from thinking that only one kilo of wheat is the real production of a healthy field. A healthy field can provide far more than that, including clean water, clean air and biodiversity. All the ecosystem services that are produced by healthy production systems should be accounted for. For example, mitigation of greenhouse gas emissions, carbon sequestration and climate regulation, waste decomposition and detoxification, water and air purification, pest and disease control, and pollinators.

Can production levels be maintained using this system?

Increased production from 1960-90/2000 created trends where increasing technologies and improved management of agricultural systems resulted in increased food production. But over the last 15 years it has become evident that this is no longer true – in many areas there are decreases in production because the natural base is depleted. It is possible for healthy systems to produce sufficient food if properly managed and if enabling policies and systems are in place, so the issue extends beyond production.

Indeed, the whole post-harvest cycle is important – we know that 30-40 per cent of total production is lost as waste. Moreover, food waste is also a big problem; 30-40 per cent is wasted when it's already in the consumer's refrigerator. So, producing sufficient food for a growing population is possible if the whole food chain is adapted to more healthy production systems.

How do the knowledge and practices of farmers need to be modified, and what are the incentives for them to adopt more sustainable practices?

This is a very important question because farmers are, and will increasingly be, at the centre of this change (see International Year of Family Farming, p36-37). They are important in terms of numbers and distribution in rural areas. The most important thing to say is that the farmers, pastoralists, fishers and foresters, are the ones who are able to manage a transition to a more sustainable agricultural production system: they hold traditional knowledge, land, resources to be invested, labour and care for the future of their families. For thousands of years, farmers have produced food and services; they know their land, its capacity and its limitations, which enables them to produce in a sustainable manner within the boundaries of its productive capacity. But they need to receive information about the innovations, new technologies and the market opportunities available, as well as adequate policy support – ie. proper payments for their production, compensation for maintaining ecosystem services in the right manner.

The role of farmers must be repositioned at the centre of this shift of agriculture toward sustainability, and everybody who eats the food produced by good farmers should understand that if they are empowered and supported, they are able to improve production and create a better overall food production system that will benefit the environment, their own livelihood and consumers' security and health.

How has the framework of crop production intensification evolved since its formation in 2010? What progress has been made so far?

When the framework was first developed, it was a concept; now, it is increasingly applied within the context of different countries, projects and actors. To give a concrete example, we have some important climate change projects (many of which I helped develop) in Mozambique, Angola, Burkina Faso, Mali, Niger and Senegal.

The farmers are at the centre of this work, as they need to be supported to increase their resilience to climate change, while simultaneously increasing their overall production capacity. The projects focus on more efficient use of fertiliser, pesticides, seeds and especially use of ecosystem services (soil biodiversity, soil fertility and all the other services they have available in their own farm or landscape that can help support their production). We have developed from a publication (*Save and Grow*) into a practical initiative, applying this work in different countries and regions and working with farmers to succeed.

Finally, where do you foresee the greatest changes occurring in the agricultural sector?

This year, our section is organising an important debate/meeting on Agroecology. Agroecology is a policy/programme in many countries in which there is an interest from the private sector, civil society and policy makers who have demonstrated willingness to move agriculture into a direction that is truly sustainable. If we succeed in developing well-aligned policies, people and food systems (in the public and private sector), then we can make the change. This is not just a possibility – it is already happening. Some countries are moving very much in this direction, but there must be a strong political will to make this happen. Farmers are ready; if they receive sufficient training, they are willing to take on the challenges.

www.fao.org/agriculture/crops/agp-home