


ORGANIC AGRICULTURE



FAO INTER-DEPARTMENTAL
WORKING GROUP ON
ORGANIC
AGRICULTURE





The fact sheets in this package provide an overview of the crucial connections that link organic agriculture to farmers, their traditions, their resources, their communities and the global markets with their potential for export and trade. The fact sheets also provide insight into the many ways that organic agriculture contributes to rural livelihoods and sustainable use of natural resources.

Organic agriculture contributes to food security by improving household food self-sufficiency or by building farmers' self-reliance:

with its blend of modern science and traditional knowledge, organic agriculture can convert low-input and subsistence farms into more productive systems with increased capacity to manage locally available resources;

the market for certified organic agriculture products provides income opportunities to farmers; and

organic agriculture's focus on efficient use of natural resources and biodiversity, and on recycling of renewable resources, helps sustain a healthy environment.

Enhanced food production, income generation and ecological conservation set the path towards sustainable development.



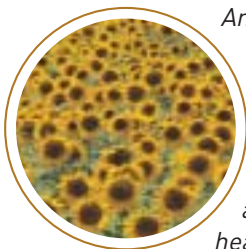


AN ECOLOGICALLY AND SOCIALLY FRIENDLY FOOD SYSTEM

An Internet search for “organic agriculture” yields more than half a million sites in less than one second.

The International Federation of Organic Agriculture Movements (IFOAM), a private body that sets standards for organic agriculture, has 750 member organizations in more than 100 countries.

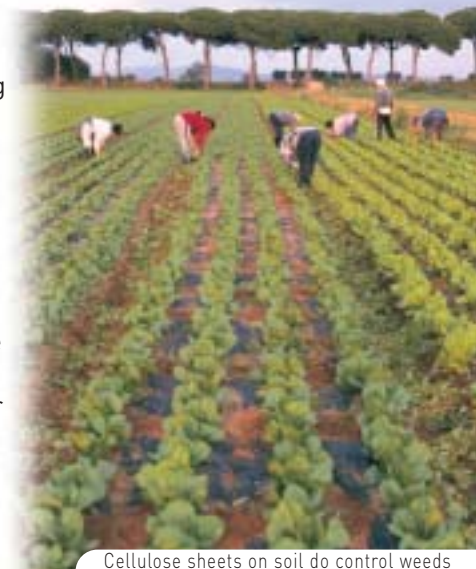
Codex Alimentarius Commission, the United Nations body that oversees the world’s food standards, deliberated long and hard to define organic agriculture as a “holistic production management system that avoids use of synthetic fertilizers and pesticides, minimizes pollution of air, soil and water, and optimizes the health and productivity of independent communities of life, plants, animals and people”.



Organic agriculture has its roots in traditional agricultural practices that evolved in countless villages and farming communities over the millennia. By trial-and-error local farmers passed their best results from generation to generation. The modern face of organic agriculture emerged in the late 1960s, when farmers and consumers began to recognize that the enormous amount of chemicals being used in both crop and animal production could have dire consequences for the earth and its people.

Although its initial modern image was of health nuts and hippies, **organic agriculture has moved into the mainstream. It is now the fastest growing food sector.** From coffee in Mexico to tea in China, from shrimp in Thailand to beef in Argentina, from cotton in Uganda to olives in Italy – today’s organic farmers build on the past, using modern scientific research to guide them in upgrading their traditional farming methods.

Science can now explain how and why those methods worked, opening avenues for even further improvement. New information emerges constantly from scientific research, uncovering nature’s incredible secrets like pieces in a gigantic ecological puzzle – bees pass through natural foot baths in their hives that reduce mould in strawberries; bats, long considered crop pests, actually provide many services such as



Cellulose sheets on soil do control weeds

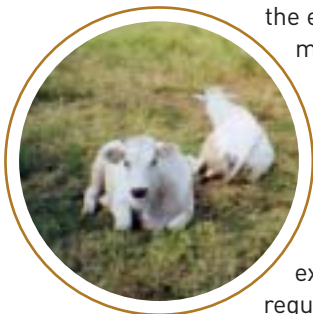
organic agriculture: **WHAT IS IT?**



pollinating, dispersing seeds and controlling insects; earthworms, bacteria and fungi serve as soil “engineers” and create conditions for water and

nutrients to circulate. The more farmers know about these puzzle pieces, the better their ability to manage the natural elements and benefit.

The organic movement exists amidst controversy. Doubters express concerns that without synthetic fertilizers and pesticides there will not be enough yields to feed the earth’s growing population, that the market is driven by developed countries



whose strict regulations cannot be met by developing-country producers, that organic agriculture’s labour-intensive production methods increase drudgery. Movement supporters point out that crop yields often decline after extended chemical use, increased labour requirements of organic agriculture

balance with decreased expenditures for inputs, organic products do not have to be certified to be legitimate, and that there is no way to put a monetary value on conserving the earth’s biodiversity and fragile ecosystems as well as its local cultures and culinary traditions.

Absence of synthetic inputs is not the only prerequisite of organic agriculture. In fact, traditional systems that are “negligent”, that carelessly mine soil nutrients or overgraze pastures, would not qualify for any organic status, even if there



are no inputs present. Traditional farms do not need to be certified to be considered “organic”; when farmers follow organic management principles, thus producing food while conserving natural resources, they qualify as “non-certified organic”.

The type of production methods organic farmers choose depends on more than agro-environmental conditions.

It also depends on socio-economic situations, such as their labour and investment capacity and on the targeted market. Organic farmers put great efforts into study and training, seeking out developments appropriate for their farms, adapting them, and eventually going through inspection and certification to access markets, all aimed at creating a sustainable system throughout the food supply chain. The goal is for fields and animals to produce to their maximum and for farmers to protect the quality of their air, soil and streams.

As the organic food system grows, so does its ability to connect people with their environments.





F A I R A N D E T H I C A L A G R I - C U L T U R E

In the midst of a globalized economy, small farmers tend to get lost. With the advent of free trade, with wealthy countries subsidizing their farmers so their exports undercut local farmers' prices, with agricultural lands in the hands of a few powerful owners and multinational corporations controlling most of the world's food supply, with the emergence of patents for biotechnology and seeds, and with the existence of policies that favour imports over domestic production, small-scale agriculture itself is facing degradation.

In their struggle against seemingly helpless poverty, small farmers out of desperation become agents of their own destruction, overexploiting natural resources because of land scarcity and lack of economic opportunities. Some abandon their land altogether and go to the cities looking for other ways to earn money, leaving behind the only way of life they understand.

developed because small farmers experimented, innovated, adapted and worked together. They shared their seeds and new ideas about how to improve production. Today's organic agriculture has the same evolution, recognizing there is no one way to address a problem, every case has a specific response, and the concerned farmer is the one who knows best. Farming methods evolve to match local environments, responding to unique biophysical and socio-economic constraints and opportunities.

Increased trade, with its exchange of goods, capital and labour, has also meant the erosion of small farmers' knowledge and collapse of rural institutions. Too often,



The organic agriculture movement offers farmers new possibilities for helping themselves. Although considered modern, organic agriculture actually is based on traditional agriculture knowledge and culture. Over the centuries, traditional agriculture



Farmers and extensionists in a diversified taro field, Samoa



decisions on what to grow or how to farm have been decided by outside "experts".

Organic agriculture, with its emphasis on local resources and local ecological knowledge, brings farmers together in their communities.

The market demand for organic products, as well as the opportunity to develop agri-tourism for city dwellers who appreciate a healthy,

diversified rural landscape, have created new income opportunities for organic farmers.

Organic farmers' and consumers' groups work to support markets, cut out monopolies and increase farm incomes.

Organic farmers, both in developed and developing nations, recognize the need to join with their neighbours, set up support

networks, share what they know, pool their resources, establish themselves as an organized force and, of course, provide quality products.



Organic boxes manufactured by disabled persons, Canada

Consumers increasingly demand both environmentally friendly and socially just products which means that organic certification also requires proof of fair wages, healthy working conditions and the workers' right of association.



Organic edibles in urban backyards, Victoria, Canada

With the organic movement, it is more important than ever for farmers to be connected. Organic farmers cannot operate in isolation because in order to maintain the integrity of their air, water and soil, they depend on their neighbours' farming practices.



Organic gardens for poor urban dwellers

The deep roots of the organic agriculture movement connect farmers, consumers and their markets, improving economic conditions and creating a vibrant rural community.



Photos: FAO / R. Chidwell and M. Scialabba

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PROVIDING MORE FOOD AND INCOME FOR SELF-RELIANT FAMILY FARMS

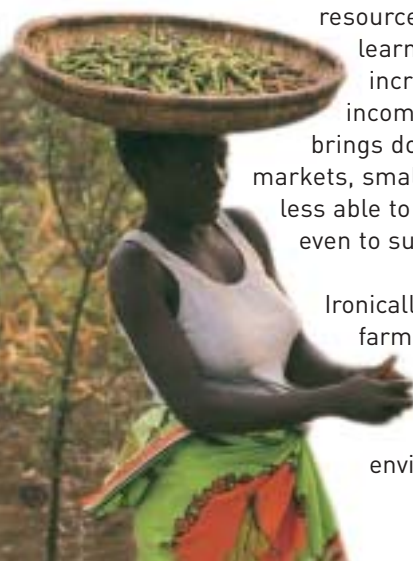
Modern agricultural methods have brought spectacular increases in productivity – from fields, from animals and from people. But in spite of all the research that has gone into increasing crop yields, growing larger animals, and saving labour through chemical herbicides, pesticides, fertilizers and new technologies, and in spite of the fact that food production has increased dramatically, almost 800 million people still go hungry.

The reason? The answer is quite simple. Most farmers in developing countries are poor. They either cannot afford or cannot find the necessary inputs to improve their production, and they are not connected to markets to buy or sell food. So as the large landholders who have the resources to purchase the inputs and learn to use them are able to increase their holdings and their incomes, and as international trade brings down prices even in local markets, small farmers become less and less able to compete or, in some cases, even to survive.

Ironically, one solution for these small farmers has been on their farms for centuries. What is now called “organic agriculture”, put forth as a modern solution to environmental problems caused by

chemical-dependent farming, is actually an improved form of the farming traditionally practiced by small farmers – farming that relies on efficient use of available resources such as soil, water, local breeds and varieties of animals and crops, and a mix of modern and traditional ecological knowledge.

For countless generations, small farmers in developing countries have inherited and managed complex farming systems adapted to their local conditions. These individual farming systems have helped them survive harsh environments, meet their family’s food needs, contribute to local/regional markets and still conserve their natural resources. Many of these farmers would be amazed to know that what they learned from their parents is now part of a modern, global movement.



Compost application on potatoes, Guinea



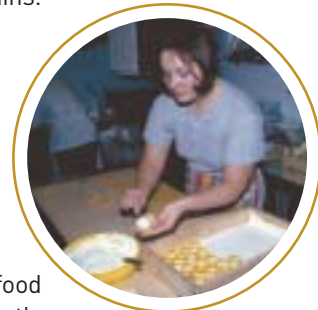
Another irony is that many small farms that never had the advantage of technological advances could now be considered “organic”, although “organic by default”. **An estimated 450 million farms were by-passed by Green Revolution technologies such as mechanization, irrigation, improved seeds and breeds, and synthetic fertilizers and pesticides.** These include countless low-level technology systems which feature polycultures, agroforestry, integrated crop-livestock systems and productive agro-ecosystems well adapted to local conditions. The absence of these technologies does not automatically make farms organic, but makes it easier for interested farmers to upgrade their farms to organic by adding modern scientific organic practices to their traditional farming methods.

agricultural productivity, the reality is that multicropping increases yields significantly. A diversified organic farming system increases farm production by 20 to 60 percent as compared to a traditional low-input system and, at the same time, improves stability by improving soil and water quality and the ecological services that support agriculture. These methods may not achieve the same yields as the high input systems, but they provide a path to increase both yields and incomes. Farmers can use available resources without fear of major losses, such as those incurred by farmers who often see their expensive inputs washed away by unexpected rains.



Kitchen of an organic restaurant

It all adds up to a direction for improving food security that is highly promising. Farmers do not need to be certified to know that if they adopt organic agricultural systems and yields become healthier, more dependable and plentiful, their ability to feed their families, either with the food they produce or income from products they sell, will also increase. **Even in areas with poor resources and no access to markets, farmers can improve their family food supply if they have access to extension or training to re-learn to farm organically,** and are willing to replace the external inputs with their own labour. The result will be an improved return on their labour investment in terms of better income.



Organic bread sold at street fair

Organic agriculture stresses diversification and adaptive management which significantly decreases vulnerability to weather vagaries or other factors. In spite of a misconception that agro-ecological systems cannot increase

The success of organic agriculture in improving food security is there for those who wish to see it. What is needed now is more studies to increase understanding of why it works and to develop methods for scaling up and sharing what has been learned.





C R E A T I N G A N U T R I E N T C Y C L E

Well-managed organic farms are easy to recognize. The soil looks soft and dark from the addition of compost. Often, there is mulch on the ground. Occasional weeds appear between the crop rows. Flowers and hedges are planted near or between the fields to encourage pollination and provide habitat for the helpful insects that feed on crop pests. The landscape is diversified because trees and animals are often integrated with the cropping system. In addition, in the fields, farmers and their neighbours work together. **Organic agriculture enhances people's ability to live in harmony with nature and to derive economic benefit from their land.**

Forty percent of the earth's land is agricultural cropland, managed forests or pasture, so it stands to reason that if agriculture does not exist in harmony with the rest of the earth's environment, the potential for widespread environmental degradation caused by loss of habitats and forests, and by pollution of air, soil and water from agricultural chemicals, looms quite large.

This enormous piece of the earth's real estate both affects, and is affected by, climate change and quality of soil, water and air.

Inappropriate agricultural practices account for 28 percent of the soil erosion of the past 50 years. Scientists warn that as global warming becomes more and more of a

recognizable reality, cultivation zones will shift, and pests and diseases will mutate and proliferate. Through intensification of livestock systems, nitrogen fertilization and irrigation, agriculture contributes to more than 20 percent of global anthropogenic greenhouse gas emissions.

Soil fertility is the cornerstone of organic management.

Because organic farmers do not use synthetic nutrients to restore degraded soil, they must concentrate on building and maintaining soil fertility primarily through their basic farming practices. They depend on multicropping systems and crop rotations, cover crops, organic fertilizers and minimum tillage to maintain and improve soil quality. The natural fertilizers they use, such as green manure, farmyard manure, compost and plant residues, build organic content and increase the soil's capacity to circulate nutrients, air and water. As crops use soil nutrients, they can be replaced with natural rock



Analysis of organic soil quality



Compost application, Wuhan, China

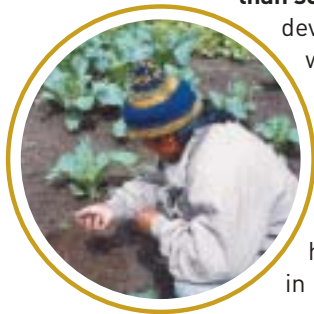


Field of organic tea, Sechuan, China

minerals such as potassium, phosphate, calcium, magnesium and other trace elements from external sources. Organic agriculture stresses careful management to meet crop needs and avoid excess application of manure and other organic matter that could cause nitrate leaching.

In Europe, soils managed organically have 30 to 40 percent more biomass and 30 to 100 percent more microbial activity than soils managed conventionally.

In some developed countries, government waterworks encourage conversion to organic agriculture to reduce the cost of purifying drinking water. In many developing countries, organically managed soils have substantially less erosion and better moisture holding capacity – an essential factor in rain-fed agriculture.



In organic agriculture, the restricted use of mineral fertilizers reduces the use of non-renewable energy (fossil fuels) and reduces the emissions of agricultural greenhouse gases

(carbon dioxide, nitrous dioxide and methane). Moreover, mixed farming and soil building allow for increased biological activity by providing support for micro-organisms, earthworms, fungi and bacteria. Soils enriched with fauna and flora not only increase nutrient cycling and agricultural productivity but stabilize soils against erosion and floods, detoxify ecosystems and may even help counteract climate change by restoring “soil’s capacity for carbon sequestration”.



Coconut husks used as mulch in vanilla farm, Niue

The positive impact of organic agriculture practices on air, soil, water and biodiversity offers opportunities to implement international environmental agreements such as the Convention on Climate Change (the Kyoto Protocol), Convention on Biological Diversity (Decision III/11 on the conservation and use of agricultural biological diversity) and national strategies to implement the Convention to Combat Desertification.





RETAINING WATER, CONSERVING SOIL AND RESTORING DEGRADED LAND

Desertification, or the degradation of drylands, is caused by overcultivation, overgrazing and deforestation, and results in soil exhaustion and soil erosion. It diminishes soil productivity, reduces food production and deprives land of its vegetative cover. It also has negative affects on areas not directly involved, because desertification can also lead to floods, soil salinization, deterioration of water quality, and silting of rivers, streams and reservoirs.

increases thanks to a high level of organic matter and permanent soil cover, allowing a substantial reduction in the amount of water needed for irrigation.

Although there has been little specific research on organic agriculture's potential for combating desertification, several practical trials of organic agriculture systems in arid areas have found that organic agriculture helps bring degraded lands back to fertility and create suitable microclimates in dry areas. For example, 70 ha of desert land near Cairo were converted into fertile soil, able to support livestock and



Organically managed soils are more resilient both to water stress and nutrient loss. Because of this, they have the potential to counter soil degradation. Organic farmers feed their fields with organic matter that enhances degraded soils. Micro-organisms have a good feeding base and create a stable soil structure. Water and nutrient retention capacity



Acacia albida trees and compost raise soil fertility, Senegal



Burning of cow manure to fertilize potato field, Guinea

bees, through organic and biodynamic agricultural methods including composting, mulching and cover cropping. In Kenya and Ghana, organic agroforestry projects were found to fight drought, control erosion and retain moisture.

Other trials studied organic agriculture's ability to counter erosion. In the tropics, even flat lands erode with the use of

herbicides and the lack of soil cover. **In organic agriculture, permanent soil cover is an intrinsic part the system.**

Locally adapted leguminous crops have been found to restore degraded soils very quickly, suppress weeds, fix nitrogen and prevent erosion. When

properly set up and adapted to soil and climatic conditions, they do not compete with the main crops for nutrients or water.



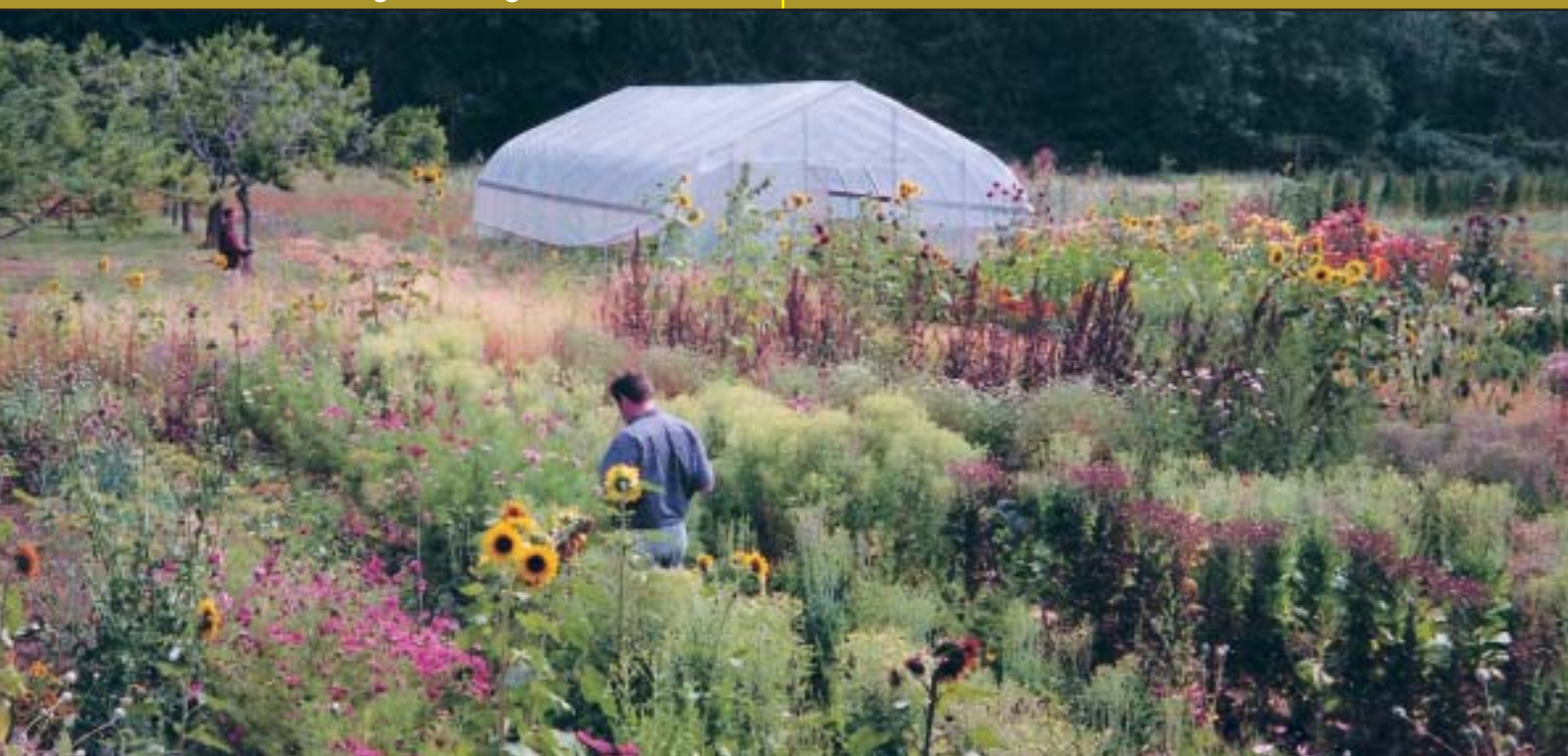
Even though the adoption of organic agriculture seems a viable alternative in arid areas, there is a range of constraints to adopting organic agriculture systems or even individual techniques. These

include a lack of knowledge, scarce availability of organic materials, insecure land tenure, the perception of organic agriculture as being old fashioned, and the fact that extension services promote a way of farming dependent on chemical inputs.

In countries suffering desertification, the promotion of organic agriculture through education and training could be key to bringing degraded land back into production.

More importantly, sound soil management practices can prevent land degradation and further agricultural encroachment in fragile areas.





CELEBRATING TRADITIONAL VARIETIES, ADAPTED BREEDS AND SPECIALTY PRODUCTS

Organic agriculture requires an enormous commitment from farmers – commitment to a form of agriculture that is knowledge and labour intensive, requiring understanding of local varieties and breeds and of local environmental conditions. However, it is also economically advantageous for farmers to use these local products that are resistant to disease and extreme conditions, and thus more likely to survive, to make it to market.

Many of today’s so-called modern farmers have turned to monocropping systems that require store-bought improved seeds and breeds and massive amounts of synthetic inputs and veterinary products meant to increase yields and supply markets. Tragically, many of the varieties that represent an important gene pool for resource-poor farmers are vanishing, replaced by high-yielding, chemically dependent hybrids, and more recently genetically modified organisms, developed by large seed companies.

Valuing and improving farmers’ indigenous knowledge is a very important part of today’s organic agriculture movement. Traditional farming, fishing and forest communities not only understand and can apply good ecological theory in decision-making, they understand global environmental threats and their potential impact on their livelihoods. Farmers are not trained scientists, but they are ecologically literate. Their knowledge has been acquired through on-farm experimenting, observation of natural processes, and sharing.

Throughout the centuries, farmers have developed local breeds and species of plants and animals, nurtured them and adapted them to local conditions. They saved their own seeds for



The organic agriculture movement, with its focus on quality, nutrition, resistance to stress factors such as poor soils, harsh climates or diseases, its reliance on locally adapted plants and animals, and its goal of increasing yields, stands as an oasis in the midst of that world. **Organic farmers must commit to establish a minimum level of biodiversity to compensate for the restriction on synthetic input usage.**



Potato varieties, Lima, Peru



planting from year to year. When their crops were inundated by pests or there were harsh weather conditions, they saved the seeds of the most resistant plants so that their resistance would be manifest

in future generations. In difficult climatic conditions and in the absence of veterinary services, farmers bred local animals to survive adversity and resist diseases. **The primary production strategy of organic farmers is to maintain traditional plants and animals that may yield less in the short run but will be more resilient and better able to survive in the long run.**



Diversified organic farming systems have built-in insurance policies – if one crop fails, others will provide sufficient food for the family. Wild species also provide services within organic systems such as pollination, pest control and maintenance of soil fertility, all of which increase biodiversity and, in turn, support agricultural production.

Consumer demand for traditional and specialty products creates new market opportunities and ensures the



economic viability of traditional products. For example, the commercial revival of organic quinoa and naturally coloured cotton from Peru, of organic chocolate processed according to an ancient Mayan recipe in Mexico, of local rice varieties in Indonesia, and of native poultry in South Africa has created connections between marginalized producers and the market. **Organic agriculture's economic valorization of endangered genetic resources is key to the survival of poor rural communities in marginal areas as well as of under-utilized species and varieties.** An organic market can add value to both the local area's economy and its biodiversity.





CONNECTING AGRICULTURAL LAND AND WILDLIFE HABITATS

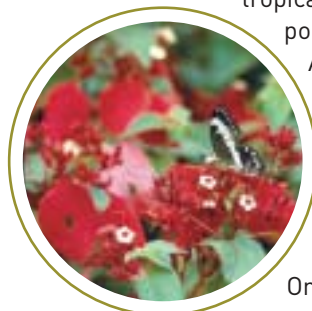


Setting up protected areas such as national parks or nature reserves is a common solution to the problem of conserving biodiversity. But a protected zone that provides a safe environment for plants and animals is just one small piece in a complex, global environmental puzzle. If that piece does not fit snugly with other pieces of the environment, then the gaps will

defeat the purpose of the protected area. After all, birds and animals cannot read warning signs, seeds blowing in the wind do not stop spreading because there is a chain link fence, insects burrowing through soil never know they have entered or left a protected area, and seeping water does not carry a compass.

In other words, if protected zones border conventional agricultural lands, there is no way to stop the seepage of pollutants, there is no way to warn birds and bees not to land on fields sprayed with potentially dangerous chemicals.

Moreover, many of the world's recognized ecoregions are in tropical and semi-tropical regions, populated by people living in poverty.



Agriculture, as practised today, has the potential to cause serious threats in many of these regions. Forty percent of the earth's land is agricultural and another 12 percent is protected.

Organic agriculture offers a solution for connecting all of the pieces. Organic farming methods can reduce the detrimental effects of conventional farming and, in fact, can help restore natural

resources and increase production. **With its focus on crop rotations, natural inputs, local breeds and species, and family activities, organic is a natural link between agricultural practices and the biodiversity that needs to be protected.** If farm land bordering and connecting protected areas employs organic methods, there is no reason to fear the loss of wildlife or contamination of air, water and soil. These buffer zones are critical to the success of conservation in the protected areas.



Eco-forestry within organic farm



Biodynamic farm in buffer zone of Circeo national park, Italy

Organically farmed areas not only provide safe buffer zones between protected areas, they increase the impact of the protected area itself. Many studies document benefits in terms of protected and

improved habitat for native wildlife. From micro-organisms in the soil to migrating birds, endangered species not only return, they often flourish in organic settings. **The absence of synthetic pesticides and the presence of hedges and higher crop density on organic farms mean safe access to food and shelter for wildlife species.**



Organic coffee under forest cover

In addition, organic farms can operate safely within certain types of protected areas. There are numerous examples of successful organic agriculture inside protected areas such as Muraviovka Park, Russia (wetlands), Yaoluoping National Resource Reserve, China (mountains), Monte Azules Biosphere Reserve in Mexico (tropical forests), and the Meso-American Biological Corridor that stretches across seven countries.



On organic farms, wild patches between rows are kept for pest predators



Most protected areas traditionally belonged to local villagers, so organic agriculture allows local people to maintain some management control over land they consider theirs. **Organic farmers protect land through their farming practices, reap its benefits for themselves and, at the same time,**

they conserve and improve their natural environment which benefits the entire planet.



Photos: FAO / R. Faidutti - M. Mizzol - N. Schlabbe

Collecting vitamin C rich fruits from forest, Guinea Bissau



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GUARANTEEING THE VALIDITY OF THE ORGANIC SYSTEM

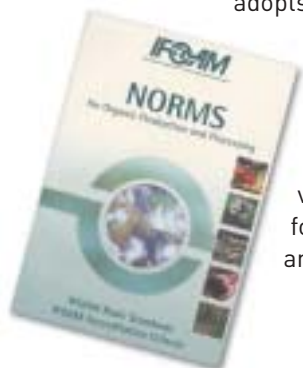
With organic products, the label tells a big story. Informed consumers know that the label will tell them everything from the name and type of organization that certified the product's "organic" validity to the type of standards that the product met throughout its growth and processing. These standards make organic agriculture the food industry's most well defined food supply system.



Certification bodies ascertain that products meet the standards set by either private or public institutions. In countries that have organic legislation, certification bodies are approved and supervised by the government. Some also are accredited by the International Organic Accreditation Service (IOAS), an independent non-governmental organization that authorizes certifiers who follow the voluntary standards of the International Federation of Organic Agriculture Movements (IFOAM).

Administered jointly by the Food and Agriculture Organization of the United Nations (FAO) and World Health Organization (WHO), the Codex Alimentarius Commission develops and adopts international food standards,

guidelines and related texts that serve as the basis for many national standards. It governs such crucial issues as food labelling, residues of pesticides and veterinary drugs, food hygiene, food import and export inspection and certification systems.



In 1999, Codex adopted guidelines on the *Production, processing, labelling and marketing of organically produced foods* that provide a description of the "organic" system and the "organic" labelling claim in order to ensure fair trade and to facilitate the development of the organic sector.

The private sector equivalent of the Codex Alimentarius guidelines is the *International basic standards for organic production and processing*, created by IFOAM. Both the Codex and IFOAM guidelines cover the production of plants, livestock and bees; the handling, storage, processing, packaging and transportation of products; and a list of substances permitted in the production and processing of organic foods. IFOAM also has provisions for fibres, aquaculture and non-wood forest products.



Food quality control, Kenya

The Codex and IFOAM guidelines for organic agriculture are minimal, intended to guide governments and private certification bodies in setting standards. In other words, they are “standards for standards” meant to:



- protect consumers against deception and fraud;*
- protect organic products from misrepresentation by non-organic products;*
- ensure inspection and compliance throughout the process of production, processing, storage, transport and marketing;*
- harmonize provisions for the production, certification and labelling of organic produce;*
- facilitate the establishment of equivalence agreements between importing and exporting countries; and*
- enhance organic agricultural systems locally and globally.*

Governments can use these guidelines to develop their own national organic agriculture programmes, tailored to their specific needs. Most national standards, such as those of



Argentina, European Union countries, India, Japan, Tunisia and the United States of America, set forth regulations which are legally binding. In the major organic markets (i.e. Japan,

European Union countries and the United States of America), certifiers are approved and supervised by the national governments.



Labelling of organic pears

The private sector, and certification bodies in particular, have so far been the main agents in guaranteeing the validity of the organic system, ascertaining that farms are inspected according to agreed upon organic standards before products are certified “organic” for labelling. **It is a system that aims at ensuring credibility and building consumer trust.**





ESTABLISHING GAME RULES, TRADE RULES AND COMPLIANCE RULES

The rapid growth of organic agriculture production and trade has been accompanied by an increase in governmental regulations. **Regulations establish rules for organic farmers and processors through standards, give credibility to certification bodies through approval and supervision, protect consumers against mislabelling and fraud through conformity and surveillance**, and eventually can facilitate trade through equivalence agreements with export countries. Regulations usually include provisions that further promote organic agriculture such as support to research, production and marketing.

competition among organic producers and to gain credibility among consumers. EU Member Nations support the Regulation with domestic legislation, creating their own inspection and certification schemes. Member Nations are required to meet the Regulation's minimum requirements, but they may enact stricter legislation.

In the last decade, many developing countries and countries in transition used Regulation 2092/91 as a model for designing their own national legislation, to assure they will meet EU import requirements and thus enhance their export opportunities.

Along with the European Union, Japan and the United States of America are the main organic markets. Japan began implementing its organic agriculture regulations in 2001, the United States of America in 2002. While similar in many respects, there are also several dissimilarities, both in coverage and substance. This means that exporting countries must be aware of the variations in specific requirements in order to access the different markets. Of course, this need to comply with several regulatory systems increases costs at the production, certification and accreditation levels.



Sampling soil of organic olive grove to test fertility

At the regional level, the European Union (EU) legislation on organic production, Regulation 2092/91, was adopted in 1991 and is amended yearly. The Regulation sets mandatory standards for organic agriculture with rules on production, labelling and inspection. The aim is to ensure fair



Control of conformity authorizations by organic certifier



Organic certifier sampling pears for pesticide residue analysis

According to a survey conducted by IFOAM in 2002, about 40 nations have completed the process of enacting their organic legislation, including detailed standards and institutional arrangements. Another 15 or so nations are in the process of developing organic legislation. Government regulations have grown steadily, but often in an uncoordinated manner. **The resulting variation in production, inspection and certification systems hinders farmers' access to regulated organic markets and the proliferation of organic labels can be confusing to consumers.**



Compliance with foreign organic standards is not always suitable to agro-ecological conditions of exporting countries. Inspection and certification costs may be out of reach for small producers. Alternative systems, more relevant to small farms and local marketing, are being developed by the private sector. Many countries have developed Internal Control Systems and in the United States of America, a Certified Naturally Grown labelling programme has been created.



Standards, inspection, certification and accreditation (or the organic guarantee system) ensure credibility. There is need for a more harmonized approach to regulate the sector, to ensure that organic rules and standards are designed and applied consistently and fairly, taking into account all stakeholders' interests. **Flexible requirements to establish equivalency among regulatory systems is the main challenge ahead for the organic agriculture community.**

FAO, together with the United Nations Conference on Trade and Development (UNCTAD) and IFOAM are looking into ways to harmonize the organic guarantee system. FAOLEX, FAO's database on food and agriculture legislation, contains regulations and standards dealing with organic agriculture in some 30 countries and the EU, which are accessible online through the organic agriculture website.





CONNECTING FARMERS AND CONSUMERS

Farmers' reasons for adopting organic agricultural practices are often the same reasons consumers have for buying organic products. Both farmers and their customers know that organic farming methods that avoid synthetic pesticides and fertilizers and minimize pollution of soil, air and water, are good for the environment and produce food that is perceived as healthier. But beyond the benefit to the earth and its inhabitants, farmers also must consider another benefit before entering the organic world – the financial benefit. What about the bottom line? Independent of their environmental motives, farmers need sufficient financial returns, i.e. is it worth it?

Organic is the fastest growing food sector, in both land use and market size. Yet, official statistics are non-existent and global assessments are scarce. National statistics gatherers rarely recognize organic production as worthy of being reported separately. Organically produced commodities are not identified as such in international trade. Organic products consumed or marketed locally often are not submitted to certification. In addition, when there is no organic market, certified organic products sell as conventional produce and are not reported in organic data.



Organic box scheme

Global retail sales for certified organic products are estimated to reach US\$23-25 billion in 2003, but no specific numbers exist for organic production, consumption, trade or prices. Organic agriculture's share of food and beverage sales may be small, 1 to 2 percent, but its move from specialty food stores onto supermarket shelves, where up to 15 percent of some products in specific markets are organic, indicates the movement has mainstreamed. This increased exposure also forewarns the potential for multinational food companies and retailers to become major players in organic food supply, in terms of contracting production, supermarket offers and international trade. If they are to compete, small producers in developing countries need access to the required know-how for production, post-harvest handling and marketing, as well as to affordable certification systems.



Annually, Biofach gathers the world organic markets

organic agriculture **MARKETS**



Organic section in a supermarket, Italy

Organic products receive better prices in the market.

But going organic to take advantage of the added value requires a long term commitment. It takes time to cleanse land of chemicals used in modern farming practices and to learn techniques of good organic management.

Evolving issues such as farm subsidy policy, expensive certification processes and demand-supply balance affect prices. The intricate cropping system is knowledge and labour intensive and thus more expensive in the start-up phase. Consumer markets are growing but reactive, driven by food safety concerns. The higher retail prices of organic products are affected by economic swings. In addition, organic agriculture is most successful when it relies on local species, varieties and breeds that are more resistant to disease and grow better in local environments, but are not well known to consumers. On the other hand, organic farmers do not have to pay for synthetic inputs. In addition, **they often establish producer-consumer groups to provide direct food marketing through such activities as farmers' markets or home deliveries to subscribed customers, which increases profits.**



Organic supermarkets are emerging

On the other hand, **they often establish producer-consumer groups to provide direct food marketing through such activities as farmers' markets or home deliveries to subscribed customers, which increases profits.**

A high volume of marketed organic produce is channeled to general food shops, including supermarkets, by wholesalers and distributors.

The increase of market share of organic products is greatly dependent on the involvement of general food retailers in the organic food market because it lowers costs and thus expands the consumer base.

In order for the organic sector to thrive, it needs more than growing markets. It needs governmental and intergovernmental policies to harmonize standards; provide development support through research and advisory systems, education and consumer information; regulate use of synthetic inputs; and implement global environmental treaties.



In addition, public and private investments in organic agriculture research are needed to balance the research and extension programmes that promote intensive use of synthetic inputs.



Organic farmers' street market

Specialized organic shop, Madrid

Photo: FAO / H. Sidani and M. Gualabba

info: www.fao.org/organicag

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SATISFYING CONSUMERS OF A GROWING MARKET

At first glance, the market for organic products in developed countries appears to offer great export opportunity to developing countries, but in reality, the situation is quite complex. In order to be successful, an exporting country needs to maintain a competitive price while meeting organic and health standards and providing the same quality as conventional products.

In most developed countries, the demand for organic fruit and vegetables has been growing at 20 to 25 percent a year for the past decade and further market expansion is

forecast, although at a slower rate. The share of organic products in the fruit and vegetable market of these countries is estimated between 3 and 7 percent.

Domestic organic production in developed countries is expected to rise, but it is unlikely to meet demand for many products, thus providing export opportunities. However, consumers traditionally prefer to buy locally produced organic fruit and vegetables, and they tend to distrust the certification procedures of organic products imported from developing countries.

With this in mind, **the best export opportunities for developing countries appear to be fresh organic tropical products and off-season temperate-zone produce as well as some processed fruit and vegetables.** In addition, strong promotion efforts are needed to build consumer trust in the validity of imported organic products.

Farmers considering conversion to certified organic production should bear in mind the need for adopting new production and management methods.



Farm pick-up for Community Supported Agriculture, Canada



organic

HORTICULTURE MARKETS



It can take two to three years for converted fields to be certified as organic, which makes long-term planning and careful cost-benefits analysis indispensable. Yields tend to be lower during conversion and possibly after.

One attraction of organic agriculture is the premium price paid for the products, but the price difference between organic and conventional products is expected to decrease.

Therefore, both producers and exporters should assess carefully the potential of their product in the targeted market and identify competing suppliers.

There are many steps that must be taken before organic fresh fruit and vegetables can be exported successfully:



Learn organic farming methods: organic agriculture requires knowledge of the alternative practices that make organic farms successful without using synthetic inputs.

Obtain certification: certification can be obtained locally for countries that have national organic standards and control systems that are equivalent to the organic rules of the country to which exports will be sent. For countries that do not meet these conditions, farmers and producers need to work through an accredited organic certification organization or an importer specialized in organic produce.

Set up production infrastructure: for fresh produce to arrive in good condition in the country of destination, good post-harvest handling, such as cold storage, and good infrastructure and logistics, including harbours and airports, are necessary in the exporting country.

Establish trade relations: exporters must have good and reliable relations with an importer, trader or wholesaler in the target market in order to be successful. The importer will be aware of current developments in markets and regulations.

The Horticulture Group of the FAO Commodities and Trade Division undertakes market studies and economic and financial comparisons of organic and conventional fruits and vegetables.



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Edible Nasturtium flowers attract pollinator

Photos: FAO, J.N. Faidutti and N. Kizilabas



ADAPTING RESEARCH AND GENERATING KNOWLEDGE

The modern organic agriculture movement evolved in developed countries, mostly in temperate regions. Now, with growing interest in organic cultivation as a management method for agricultural production in tropical and subtropical countries, **greater attention needs to be given to developing standards and guidelines for organic agriculture applicable to tropical products and ecosystems.**

Motivation for converting to organic management can include market demand, lack of access to inputs, environmental concerns, social concerns or personal philosophy. In addition, farmers' production targets need to be considered in terms of both quantity and quality, weighing the costs of production against the expected returns. Clear and objective information about both the potential and the constraints of organic agriculture is essential for any farmer contemplating conversion.

Export marketing opportunities for developing countries include those organic horticultural products that are not produced domestically in temperate countries, such as spices and tropical fruits and vegetables.



Tropical and subtropical fruit production takes place in settings ranging from traditional home gardens to large plantations, making it

difficult to prescribe organic husbandry practices that are suitable for all. Nonetheless, any fruit growers contemplating organic conversion need to have a clear understanding of all aspects of organic production and marketing before taking investment decisions.

A challenge for organic fruit producers is the maintenance of economic feasibility while complying with organic standards. This means dealing with crop-specific problems without using substances prohibited by organic standards. Alternative approaches are needed, for instance, to control ripening of pineapples without chemicals, or to control banana or citrus pests and diseases. Furthermore, conversion to organic agriculture requires innovative solutions that guarantee purity of



Organic tropical fruits farm, Samoa



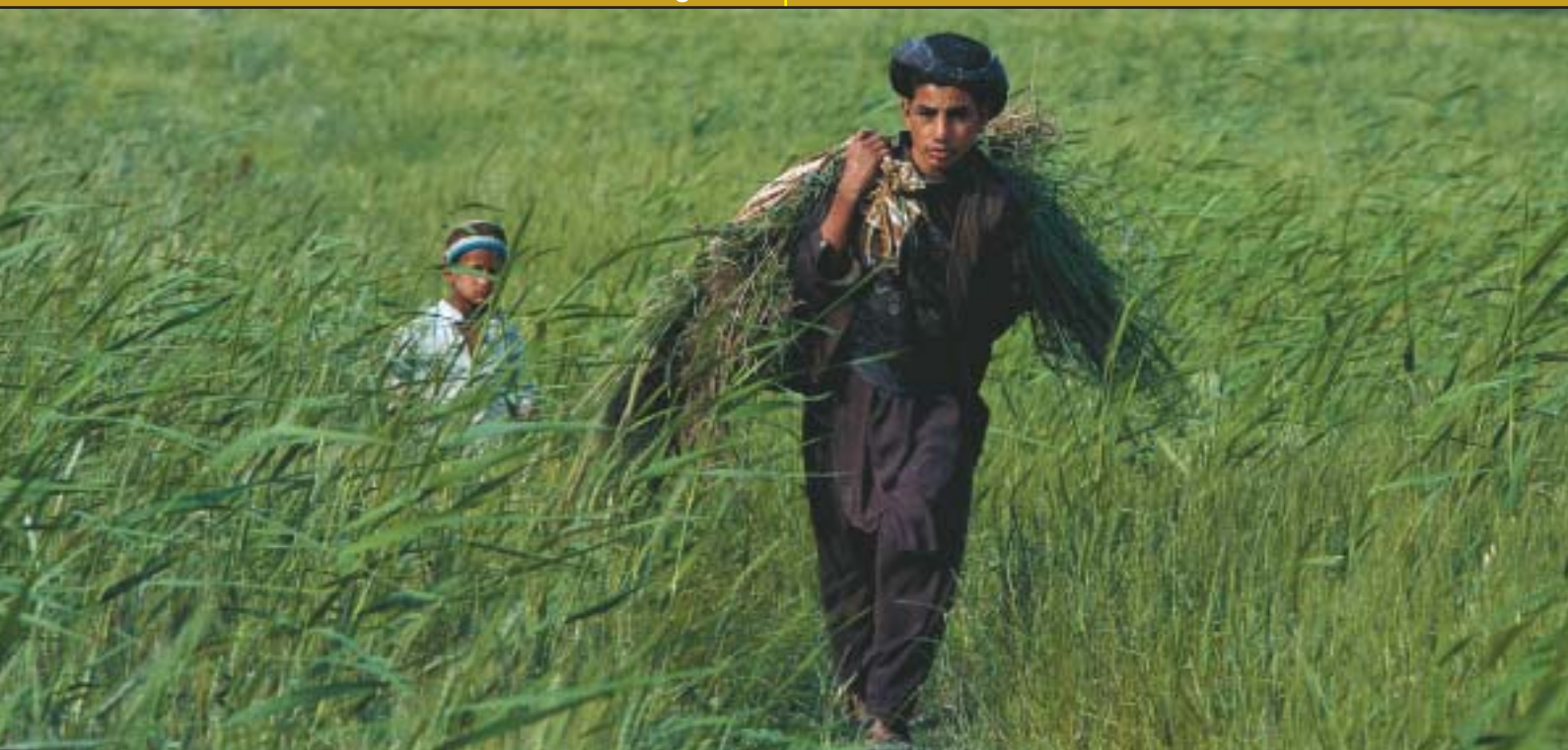
Organic horticulture makes optimum use of crop residues, green manure and biological nitrogen fixation, but this does not replace all nutrients removed by crops. Nitrogen supply needs to be supplemented by the provision of other essential plant nutrients that usually cannot be replenished sufficiently by organic matter in acid tropical soils. **Considering the nutrient demand of perennial fruit crops over time, it is important to have adequate methods to maintain soil fertility, especially levels of phosphorus, potassium and micronutrients, in such a way that yields can be sustained.** There is a strong need to set up networks for sharing empirical experience and scientific results of various organic methods of fertilization, in order to get a more complete picture of long-term successes that can be shared with organic farmers.



seeds and planting material and provide assurance against the risk of pest and disease spread. Some of these problems might have partial local solutions while others require specific research to identify or generate the appropriate permitted management practices.

The Horticulture Crops Group of the FAO Plant Production and Protection Division is currently collaborating with national agricultural research and extension institutions, universities and IFOAM to develop technical guidelines for organic cultivation of fruit in tropical and subtropical regions.





PUTTING PREVENTION AHEAD OF CURE

Pest control in organic agriculture begins by making sensible choices, such as growing crops that are naturally resistant to diseases and pests, or choosing sowing times that prevent pest and disease outbreaks. Careful management in both time and space of planting not only prevents pests but also increases populations of natural predators that can contribute to control of insects, diseases and weeds.

Organic agriculture requires informed decision-making about a range of pest management practices which are being developed. This decision-making and field management process, known as Organic Pest Management (OPM), is an outgrowth of Integrated Pest Management (IPM).

Although the latter allows usage of synthetic inputs, both systems emphasize prevention through such methods as:



Bitterwood spray repels aphids on lettuce, Italy



- growing resistant varieties of crops;*
- growing in the proper season for the variety;*
- improving soil health to resist soil pathogens and promote plant growth;*
- rotating crops;*
- encouraging natural biological agents for control of disease, insects and weeds;*
- using physical barriers for protection from insects, birds and animals;*
- modifying habitat to encourage pollinators and natural enemies of pests; and*
- using semi-chemicals such as pheromone attractants to monitor and trap pests.*

organic PEST MANAGEMENT



For curative practices, OPM limits itself to those products approved by certification bodies. But even among these products, there are differences in costs, applicability and access to be considered by

farmers. There has been a great deal of research into OPM, and farmers' networks and organic agriculture associations encourage exchanges of experiences. **Products are approved based on their low risk for environmental and health impact as well as effectiveness in controlling target pests.**



Tagetes minuta used to control soil nematodes, Italy

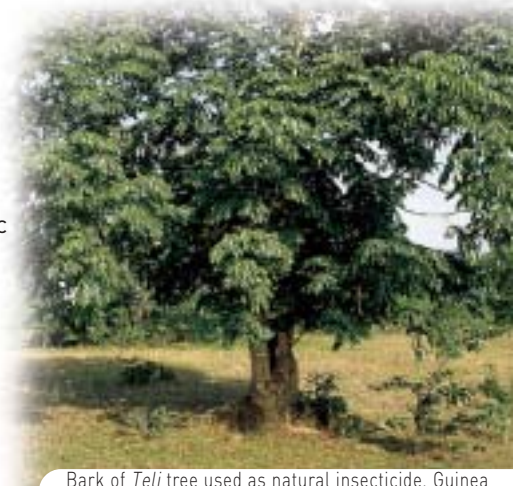


Neem tree leaves used as natural insecticide

It is important to point out that some products allowed for OPM may be hazardous to applicators. For example, red chili mixtures or garlic oil which are used as pest repellants can be irritating to the skin. Applicators should have proper protective gear and application equipment.

At this point, most organic products, such as larvae of pest predators, are imported by developing countries. There is a need to promote local production to reduce import dependency. Wider accessibility and low tariffs should be encouraged. **Farmer education in OPM can be improved with better written materials, better field courses and, of course, exchange visits to meet with and learn from successful farmers.**

IPM programmes use "farmer field school" methods to teach ecological approaches to pest management. Similar types of group study are applicable to OPM, especially when combined with testing new methodologies, crops and marketing. Study groups and mutual support groups could also be used for peer review of practices within a specific organic labeling scheme. For example, California Certified Organic Farmers uses peer review to ensure that members using its organization label adhere to its more strict standards and develop mutual support systems. Such practices already are followed by several organic associations but could be more widely adopted.



Bark of Teli tree used as natural insecticide, Guinea

FAO's Global Integrated Pest Management Facility initiative, called "Agricultural Conversion 2015: Detoxing Pest Management", is surveying organic pest management and various non/low toxic pest management products.



Preparations of Chrysanthemum flowers control soil pests, Bolivia





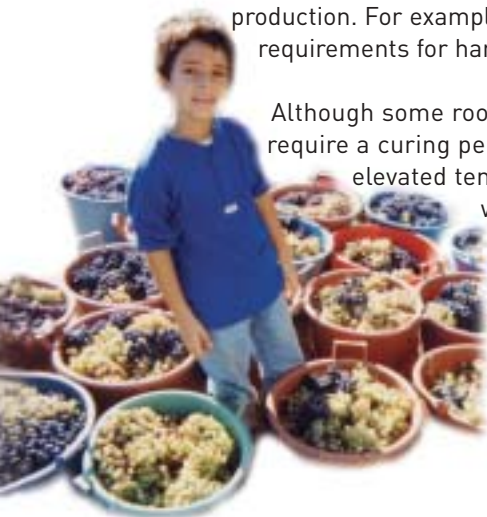
MAINTAINING THE ORGANIC CLAIM THROUGHOUT THE FOOD CHAIN

An organic label on a product represents more than proof of organic production. It shows that the entire food chain – from the farm to the table – adheres to organic standards. For example, processed food may lose its organic claim if it contains ingredients of non-organic origin or if the produce is transported in containers which have chemical residues.

The steady increase in market demand for organic fruits and vegetables in recent years has presented an export opportunity for farmers in developing countries who practice low-input agriculture. However, they must overcome significant hurdles in order to benefit from this opportunity.

Apart from regulations that apply to the production of organic produce, certain post-harvest activities need to be modified to comply with organic regulations. Many post-production operations for organic produce are identical to non-organic production. For example, there are few specific requirements for harvesting organic produce.

Although some root, tuber and bulb crops require a curing period at ambient or elevated temperature to promote wound healing and ensure optimum storage life, there are no specific requirements for curing, storing or transporting organic produce.



Most markets require strict attention to the size, grade, quality and maturity of produce, whether it is organic or not. Fruit and vegetables must be cleaned and graded to comply with these regulations. Although all types of packaging are authorized, there is an expectation that careful thought will go into choosing packaging with regard to its environmental impact. Degradable packaging material is increasingly requested by conscientious consumers.





Cleaning biodynamic greens

All harvested fruits and vegetables should be placed as soon as possible in a storage area that is kept at the appropriate temperature. However, **organic products need to be stored and transported with proper identification and physically separated from non-organic products.**



Organic cheese making

As for processing, freezing is the only processing method that keeps produce in a state similar to the fresh crop. Organic foods can also be processed by drying; with the use of approved processing aids such as: ascorbic

acid, citric acid, tartaric acid and salt; blanching with high temperatures to destroy micro-organisms; pasteurizing to destroy micro-organisms that could contaminate the product after blanching; and with heat treatments that conserve products by destroying or inactivating enzymes and killing micro-organisms.

Juice is an ideal product for the organic market. It offers a simple and natural way to process

fresh produce, preserves the majority of vitamins and minerals, and largely resolves the problem of storage.

Canned produce must be prepared in a way that retains, as closely as possible, the

characteristics of fresh produce. Other

forms of processing include conservation with sugar which is principally used for fruit jams and purees, and by fermentation which is a chemical change caused by enzymes, bacteria or micro-organisms.



There are very few approved organic post-harvest treatments for pests and diseases. Hot-water (45-55 °C) immersion, steam and forced hot-air treatments are sometimes used as organic control methods after harvest.



Organic wheat milling

The Post-Harvest Management Group of the FAO Agricultural Support Systems Division has produced guidelines on "Handling and Processing of Organic Fruits and Vegetables in Developing Countries".



Organic balsamic vinegar barrels



SUPPORTING HEALTHY PASTURES FOR THE ENVIRONMENT AND LIVESTOCK

Increasing human and livestock populations, as well as increased cropland and intensification of cropping systems, affect the sustainability of natural grassland ecosystems. As grassland ecosystems are usually in fragile environments unsuited to intensive exploitation, farmers, herders, ecologists, policy-makers and economists need to look for a way to combine grassland production and protection.

Many answers can be found in the organic agriculture system. **Organic production methods and certification standards applied to grasslands contribute to the maintenance of the ecosystem, add value to grasslands products, assure income generation to their users, and promote animal welfare.** Yet organically certified and managed grasslands account for only a small fraction of the grasslands worldwide.



Grasslands, which are immensely different in their climatic needs, physical conditions, cultural and historical roots and economic situations, contain 24 percent of the world's vegetation and cover about 4.6 billion ha (42.8 percent of the earth's surface) of which 9 million ha are organically certified. Grasslands are of prime importance in global carbon budget, maintenance of flora and fauna biodiversity, control of desertification, maintenance of soil fertility, and the living conditions of the population.

Grasslands can be natural, made up of indigenous species and managed with few external inputs. Or, they can be temporary, used in rotation, alternating between cropland and grassland and intensively managed.

Natural grasslands produce with very few or no external inputs, maintain soil fertility and ground cover, and contribute to the maintenance of biodiversity and ecosystem functions. Most natural grasslands are relegated to the more marginal lands of the South American pampas, the Eastern European and North African steppes, high mountain areas, the Sahelian, Soudano and savannah zones of Africa, and North American prairies.

In terms of meeting organic objectives, **temporary grasslands** offer a number of advantages including easier maintenance of high clover content, easy exploitation of residual fertility by arable crops, minimized weed development and better possibilities to provide regular, clean worm-free grazing. However, establishment costs are high.



Natural grasslands, Lake Chad



Free-range pigs in temporary pasture, Switzerland

Organic farms in regions with climate, soil type and topography well suited to cropping are likely to have a mixed crop/grassland system, while permanent grasslands are more frequent in fragile environments and low potential



Natural pasture, Burundi

areas. Because organic standards restrict crop and livestock inputs, **farmers need to employ preventative approaches to crop and livestock husbandry such as crop nutrient supply, weed control and animal health if they are to build and maintain a viable organic system.**

Well-managed grasslands used for extensive grazing, such as those in Australia and Argentina, offer opportunities to add value to livestock products on the market through organic certification.

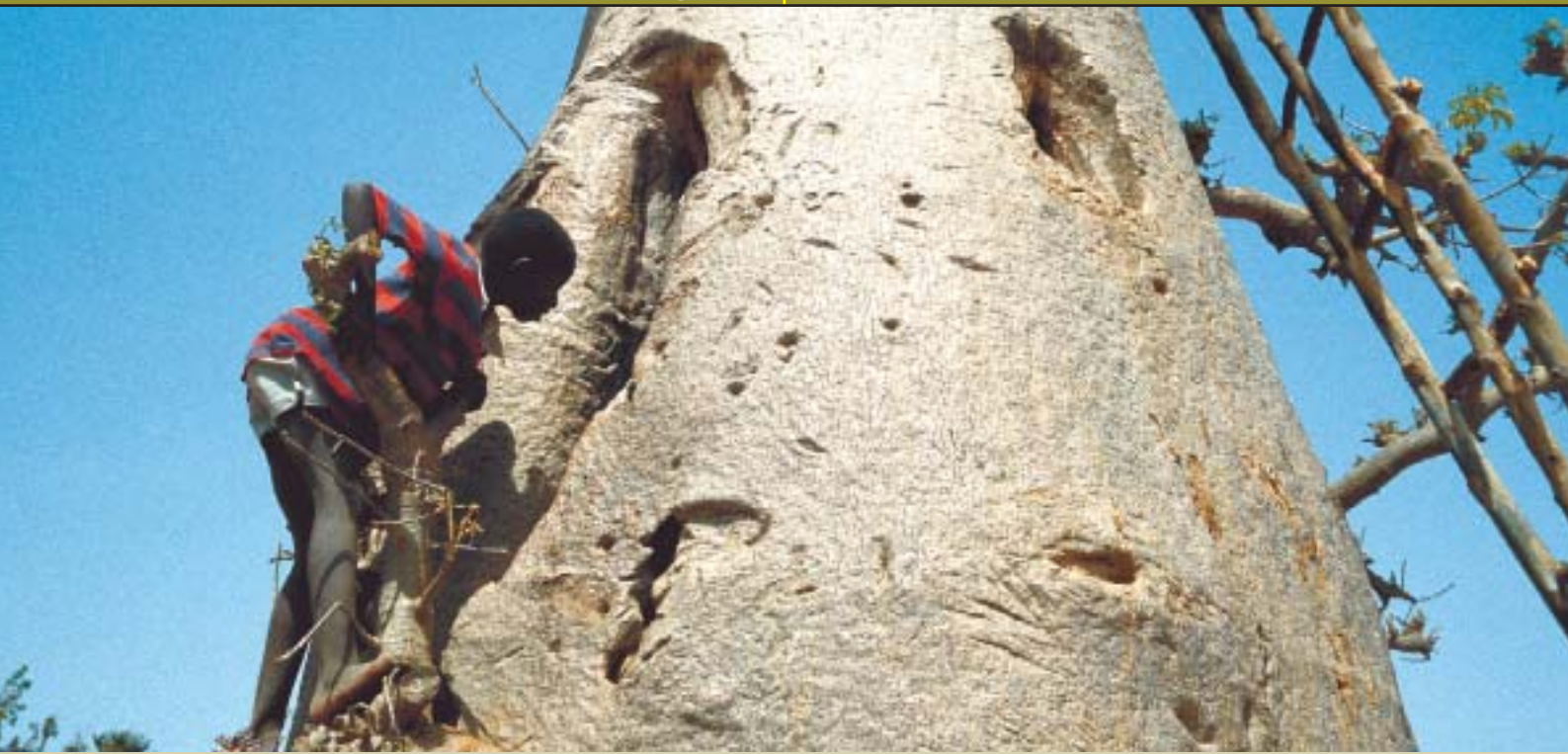
ORGANIC RESTRICTIONS	IMPLICATION FOR GRASSLAND MANAGEMENT
No soluble nitrogen	Emphasis on legumes
Minimal use of mineral phosphorus and potassium	Emphasis on efficient nutrient cycling within the farm
No synthetic herbicides	Design management to minimize weed invasion
Minimum amount of purchased feed, minimum proportion of forage in ruminant diets, prohibition of certain high protein feeds	Maximize livestock nutrient supply from forage produced on the farm, especially high protein forage
No routine preventative use of veterinary medicines	Manage grazing to minimize build-up of parasite and disease problems

Implications of the organic standards on grassland management

The Grassland and Pasture Crops Group of the FAO Plant Production and Protection Division is looking into alternatives for certification in communal pasture systems and is preparing “Guidelines on organic pasture production in arid and semi-arid communal rangelands”.



Natural grasslands, Caucasus



PURER THAN PURE, POLLINATION SERVICES

Natural. Pure. Healthy. Sweet. Honey, no matter where in the world and in both ancient and modern times, has always been associated with these four characteristics. However, there now seems to be something even more natural, more pure, healthier and sweeter than honey. Today's producers, consumers and markets have "organic" honey.

Organic beekeeping is a recent phenomenon, growing in response to the global changes in beekeeping management, particularly the spread of *varroa* and its treatments.

Conversion to organic practices has barely started in a few countries. It has a chance to grow if it is associated with agricultural practices that recognize bees' importance beyond the production of honey, such as their role in pollination and therefore the maintenance of the ecosystem and agriculture production levels.

Certified organic beekeeping represents a small percentage of all beekeeping (0.6 percent in some European countries), and is almost non-existent in developing countries. At the same time, **much of the exported honey from developing countries, even if not certified, is produced under very close to, if not better, conditions than organic European honey.**



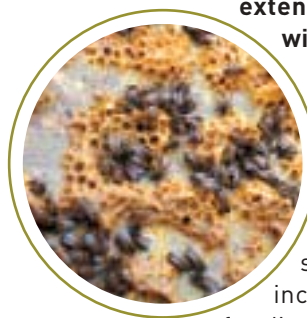
Beehives in organic field, Italy

As with the rest of agriculture, for the past 50 years beekeeping has increasingly relied on chemicals to solve disease problems and to adjust to selection and production pressures. This approach, together with globalization of trade, has allowed the spreading of once-rare bee diseases, such as the *varroa* mite. As a result, beekeepers began experimenting on their own, developing an array of chemicals for disease control inside the beehive. Those chemicals eventually found their way into many honeys.



Beehive on a village forest, Guinea

Converting production to have organic certification is not a major obstacle for honey coming from forests or extensive cultivation areas in countries without major honey bee diseases.



In addition, it is relatively easy to control compliance with residue analysis and equipment control. However, if there are serious disease problems, converting to organic production means substantial increase in cost, due to increased losses and labour required for disease control management.



Organic beekeepers have to ensure that the food of their bees is free from pesticides and residues. In general, beehives need to be surrounded by an area with a radius of at least 3 km² in which only organic or similar agriculture or clean wild habitat exist, far away from other polluting sources such as cities, industrial complexes or highways. In addition, regulations cover origin of bees, stock replenishing, feed materials, medicines, equipment and harvesting methods.



Flamboyante bush provides habitat to pollinators

Organic beekeeping for various products (mostly honey and wax, but also pollen, propolis and royal jelly) has to follow principles similar to those for other organic livestock production. Management methods, food sources, material choices, and disease control and prevention are closely regulated.

No doubt there will be a growing market for organic honey, although there may be a decreasing number of beekeepers in the developed world who can comply with the organic rules.



With the growth of organic agriculture in general, there is hope that organic beekeeping will grow, particularly since pollination and bee forage are essential elements of organic practices.

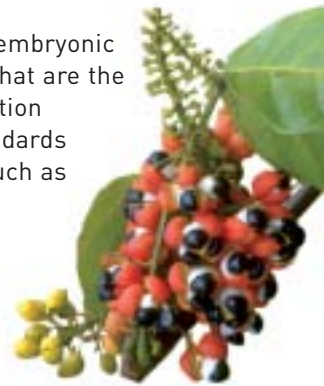




HARVESTING WILD AND SEMI-DOMESTICATED SPECIES

As an outgrowth of the expanding market for organic food products, mechanisms are being developed to certify organically produced non-wood forest products (NWFP). NWFP are defined as biological goods, other than wood, that come from forests, other wooded lands and trees outside forests. This can include wild or semi-domesticated products, such as edible nuts, mushrooms, fruits, herbs, spices, gums, aromatic plants, bush meat and fodder, as well as plant or animal products for medicinal, cosmetic or cultural uses.

Organic certification of NWFP is still embryonic compared to the cultivated products that are the main focus of existing organic production systems. However, many organic standards provide specific sections on NWFP, such as IFOAM's *Basic standards for organic production and processing*.



Guarana is a tonic food

Organic certification promotes economically viable and environmentally friendly use of natural resources. The certification mechanisms that already exist for monitoring and evaluating production or commercialization of agricultural and timber products can be expanded and adapted for certifying organic NWFP.



Hundreds of millions of people, mostly in developing countries, derive a significant part of their subsistence needs through the use of NWFP. Income generated through local, national and international trade in NWFP is estimated at US\$11 billion annually.



Harvesting medicinal herbs (*Combretum Glutinosum*) in the wild, Senegal



There are four main certification schemes relevant for NWFP:

Organic certification focuses on criteria such as the renunciation of synthetic fertilizers and pesticides. Under these criteria, wild and semi-domesticated NWFP such as pinenuts, mushrooms and herbs could be considered organic.



Forest management certification assesses the ecological aspects of resource management, both at the forest and species or product level, and ensures the sustainable production of forest resources.

Social certification, such as fair and ethical trade, assures that labour conditions are acceptable and benefits are shared equally among those involved in production and trade.

Product quality certification covers production standards that focus on the product as well as on the way it is processed and manufactured.

Organic systems are based on precise standards of production that work towards supporting optimal agro-ecosystems. These standards focus mainly on ecological aspects of production.

In order to be recognized as organic products, wild harvested or semi-domesticated products should meet the following criteria:

harvesting plan is in place and up to date;

harvest must not have negative influences on growth and production, should not be destructive to the environment or biodiversity, and should not cause depletion of population or soil erosion;

harvesting areas must be clearly defined with identifiable boundaries;

buffer zones must be delineated around the harvested area to avoid contamination from external sources; and

prohibited substance should not have been used for at least three years preceding harvest.



Children collecting fruits of *Santaloides Afzeli*, Guinea



Karité and wild edibles fruits, Burkina Faso





BETTER USE OF THE AQUATIC FOOD CHAIN

Although no official statistical data are available concerning the global production of certified organic aquaculture products, it is estimated that total production in 2000 was about 5 000 metric tons, primarily in European countries.



Small ponds recycle farm nutrients

This modest quantity represents only about 0.01 percent of global aquaculture production and about 0.25 percent of European aquaculture production. Little or no production data is available for countries outside Europe, but in many countries, producers are trying to develop organic aquaculture using national or private standards for production of a variety of species.

As with other organic foods, **consumer demand for organic seafood products from aquaculture is growing. The market is still small but species such as trout, salmon, carp, shrimp and oysters are now available** from organic sources and the production increase is significant, with typical growth rates of 25 percent per year. Current demand is concentrated in Western markets, especially in Europe,

but increasing popularity of organic products should bolster demand for organic seafood in the world's largest seafood markets, Japan and the United States of America. Organic seafood prices are typically 25 to 30 percent higher than those of non-organic products, which explains much of the growing interest in production. Production is expected to continue to grow and, when supported by adequate marketing strategies, should enable farmers to produce and sell profitably to a growing number of well-paying consumer segments.

Even though draft standards have been developed, many issues relevant to organic aquaculture still are being discussed and negotiated, such as replacing fishmeal and fish oil in the diets of cultured aquatic organisms, addressing chemical drift and contamination of the water, defining parallel organic feed principles for terrestrial livestock, retaining the integrity of the organic product from farmer to consumer, and converting conventional aquaculture systems into organic systems.



Pristine river water flows in organic trout farm



Salmon with organic label gill tag

The low production in organic aquaculture has in part been due to the absence of internationally recognized and universally accepted regulations and standards.

The organic aquaculture sector has 20 to 25 private and public certifying bodies with standards that vary considerably from country to country, certifier to certifier, and species to species. To a large extent, these reflect the differences between individual certifiers, farmers and other interested stakeholders in the interpretation of what organic aquaculture really means and entails, and highlight the urgent need for the adoption of a set of basic principles and production and certification standards.

Technical areas which require further research and development in organic fish farming include the following:

nutrition: acceptable residue levels in fish feeds, replacement of fishmeal and fish oil with alternative protein and lipid sources, use of natural antioxidants and synthetic amino acids, nutrient fluxes and associated environmental issues;

holding facilities: selection of construction materials, stocking densities, the role of oxygenation, and water quality; and

post-harvest: slaughter, handling, transport and processing.



Though certified organic aquaculture in developing countries is still in its infancy, these countries are the producers of more than 90 percent of global aquaculture production. The bulk of this production targets low cost freshwater species which feed low in the aquatic food chain. **Conversion to organic aquaculture would recycle valuable nutrients, with positive benefits for the environment and society.**

The FAO Fisheries Department provides expert advice and supports activities related to organic aquaculture. As a specific initiative of the European Inland Fisheries Advisory Commission, the ad hoc Working Party on Organic



Organic off-shore salmon farm, Ireland

Fish Farming has been established to assemble material on the status of organic fish farming and market conditions, define research needs and review several technical areas.



FAO has proclaimed organic agriculture as one of its Priority Areas for Interdisciplinary Action. The medium-term objectives of the Organic Agriculture Programme are to support FAO Member Nations by increasing their capacity to effectively produce, handle, process, inspect, certify and market organic foods and fibres.

There are three main areas of work:

strengthening the ability to exchange information and to set up organic agriculture networks, in order to ensure that producers, operators and governments have access to the reliable and quality information needed for informed decision-making, for directing research and extension, and for making investments;



developing and disseminating knowledge and tools that support organic plant protection, soil and nutrient management, animal husbandry and post-harvest operations, especially in developing countries and market-marginalized areas; and

assisting governments in designing the types of legal and policy frameworks that provide support to farmers by facilitating the marketing and trade of certified organic products that meet international inspection and certification standards.

The Organic Agriculture Programme is implemented by the Inter-Departmental Working Group on Organic Agriculture, which regularly makes the results of its work available through its Web site. www.fao.org/organicag



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FURTHER INFORMATION ABOUT ORGANIC AGRICULTURE IS AVAILABLE AT: WWW.FAO.ORG/ORGANICAG



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