

Good Agricultural Practices¹

Introduction

The FAO Good Agricultural Practices initiative offers a mechanism to implement concrete actions towards achieving Sustainable Agriculture and Rural Development (SARD) called for within Chapter 14 of Agenda 21. Preparatory meetings for the UN World Summit on Sustainable Development (2002) have placed great emphasis on the importance of sustainable agriculture contributing to food security and natural resource management. Action by all stakeholders can be facilitated by a framework and methodology for Good Agricultural Practices.

The purpose of this initiative is for FAO to encourage and assist farmers, food processors, food retailers, consumers, and governments to play their full parts and assume their responsibilities in the search for sustainable agricultural production systems that are socially viable, economically profitable and productive, while protecting human health and well being, animal health and welfare, and the environment.

Although methodologies such as Integrated Pest Management and Conservation Agriculture have evolved to address specific production issues, and food quality standards are established through the *Codex Alimentarius*, the agricultural sector lacks a unifying framework to guide national debate and action on policies and methods to achieve sustainable agriculture. A statement of clear principles of Good Agricultural Practices could provide the basis for concerted international and national action for developing sustainable agricultural production systems.

The need for action is evident from the widespread concern over the biological, ecological, economic and social aspects of sustainability of existing agricultural production systems. Enormous gains in productivity and efficiency have been achieved through technology, innovation, and mechanization but at some cost to the environment. At the same time, the struggle for food security with inadequate inputs and technology in developing countries is exhausting the natural resource base without satisfying the need. In addition, concern is growing in all parts of the world over the safety of agricultural and livestock products.

There is the need for a rapid transition to sustainable production systems and management of the natural resources upon which humankind relies. Such systems will closely integrate biological and technological inputs, will more completely capture the costs of production, sustain productivity and ecological stability, and restore consumer confidence in their products and methods of production.

Benefits will accrue to:

- small, medium and large-scale farmers, who will achieve added value for their produce and better access to markets;
- consumers, who will be assured of better quality and safer food, produced in sustainable ways;
- business and industry, who will gain profit from better products; and
- all people, who will enjoy a better environment.

To attain these goals, there is an urgent need to raise awareness among all stakeholders and governments, in particular farmers and consumers, on what constitutes sustainable agriculture. Governments and private institutions need to enact and implement supportive policies. Farmers will respond to incentives of improved market access and added value by adopting those production methods that satisfy the demands of processors and consumers. For this, individual farmers require unambiguous guidance of what is required and how it can be implemented. Farmers must be efficient and competitive but at the same time they must receive adequate prices for their products.

To meet this need, it is proposed to develop a framework of guiding principles for Good Agricultural Practices within which agriculture can best proceed to meet the needs of society. They will serve as the basis for the development of guidelines for production systems within specific agro-ecosystems.

Accordingly, the aims of this initiative are to:

¹ This revised version is the result of consultation with the focal points for SARD Major Stakeholder Groups defined in Agenda 21, including business and industry, farmers, indigenous peoples, NGOs, and trade unions.

- Develop a framework of guiding principles within which guidelines for good agricultural practices for production systems can be developed, collaboratively by the public and private sectors.
- Focus existing knowledge, options, and solutions into effective risk management guidelines available for use as policy instruments.
- Form the basis for an awareness campaign and basis for action within SARD to draw all segments of society into the debate, into the action, and into the transition to a sustainable agriculture.

In addition, it is intended to address the social and labour elements on which Sustainable Agriculture and Rural Development should be built and against which achievements should be measured

FAO has initiated a process of discussion and consultation to identify the potential roles and benefits for governments and stakeholders, seek an understanding and agreement on the principles of Good Agricultural Practices, and prepare a strategy for moving forward to develop guidelines for production systems.

The next stage is to embark on the development of specific guidelines, involving the participation of farmers and other experts, bringing together scientific and technical expertise to identify effective risk management strategies (such as H.A.C.C.P.²). It is recognized that local, national and international quality assurance schemes or codes of practice will be voluntary and market driven, and arise from the food industry and/or farmers organizations. It is FAO's role to support these developments with comprehensive, unbiased, professional expertise and to advise governments on their scientific validity and policy implications.

² The Hazard Analysis and Critical Control Point system.

Framework for Good Agricultural Practices

The concept of Good Agricultural Practices is the application of available knowledge to the utilization of the natural resource base in a sustainable way for the production of safe, healthy food and non-food agricultural products, in a humane manner, while achieving economic viability and social stability. The underlying theme is one of knowing, understanding, planning, measuring, recording, and managing to achieve identified social, environmental and production goals. This requires a sound and comprehensive management strategy and the capability for responsive tactical adjustments as circumstances change. Success depends upon developing the skill and knowledge bases, on continuous recording and analysis of performance, and the use of expert advice as required.

The framework portrays the guiding principles of good agriculture within 11 elements of resource concerns, disciplines and practices. Using the framework, detailed management guidelines can be prepared for individual production systems within specific agro-ecosystems.

1. Soil

The physical and chemical structure, and biological activity, of soil are fundamental to sustaining agricultural productivity and determine, in their complexity, soil fertility. Soil management will maintain and improve soil fertility by minimizing losses of soil, nutrients, and agrochemicals through erosion, runoff and leaching into surface or ground water. Such losses represent inefficient and unsustainable management of these resources, in addition to their potential deleterious off-site effects. Management also seeks to enhance the biological activity of the soil and protect surrounding natural vegetation and wildlife. Good agricultural practice will:

- Manage farms in accordance with the properties, distribution, and potential uses of the soils, maintaining a record of the inputs and outputs of each land management unit.
- Maintain or improve soil organic matter through the use of soil-building crop rotations and appropriate mechanical and conservation tillage practices.
- Maintain soil cover to minimize erosion loss by wind and/or water.
- Apply agrochemicals and organic and inorganic fertilizers in amounts and timing and by methods appropriate to agronomic and environmental requirements.

2. Water

Agriculture carries a high responsibility for the management of water resources in quantitative and qualitative terms. Careful management of water resources and efficient use of water for rainfed crop and pasture production, for irrigation where applicable, and for livestock, are criteria for good agricultural practice. They include maximizing the infiltration of rain water on agricultural land and maintaining soil cover to avoid surface run-off and minimize leaching to water tables. The maintenance of adequate soil structure, including continuous macropores and soil organic matter, are important factors to achieve this. Efficient irrigation methods and technologies will minimize losses during the supply and distribution of irrigation water by adapting the quantity and timing to agronomic requirements to avoid excessive leaching and salinization. Water tables should be managed to prevent excessive rise or fall. Good agricultural practice will:

- Maximize water infiltration and minimise unproductive efflux of surface waters from watersheds.
- Manage ground and soil water by proper use, or avoidance of drainage where required, and by build-up of soil structure and soil organic matter.
- Apply production inputs, including waste or recycled products of organic, inorganic and synthetic nature by practices that avoid contamination of water resources.
- Adopt techniques to monitor crop and soil water status, accurately schedule irrigation, and prevent soil salinization by adopting water-saving measures and re-cycling where possible.
- Enhance the functioning of the water cycle by establishing permanent cover, or maintaining or restoring wetlands as needed.
- Manage water tables to prevent excessive extraction or accumulation.
- Provide adequate, safe, clean watering points for livestock.

3. Crop and fodder production

Individual annual and perennial crops, their cultivars and varieties, are chosen to meet local consumer and market needs according to their suitability to the site and their role within the crop rotation for the management of soil fertility, pests and diseases, and their response to available inputs. Perennial crops are used to provide long-term production options and opportunities for intercropping. Annual crops are grown in sequences,

including those with pasture, to maximize the biological benefits of interactions between species and to maintain productivity. Rangelands are managed to maintain plant cover, productivity, and species diversity. Harvesting of all crop and animal products removes their nutrient content from the site and must ultimately be replaced to maintain long-term productivity. Good agricultural practice will:

- Select cultivars and varieties on an understanding of their characteristics, including response to sowing or planting time, productivity, quality, market acceptability, disease and stress resistance, edaphic and climatic adaptability, and response to fertilizers and agrochemicals.
- Devise crop sequences to optimize use of labour and equipment and maximize the biological benefits of weed control by competition, mechanical, biological and herbicide options, provision of non-host crops to minimize disease and, where appropriate, inclusion of legumes to provide a biological source of nitrogen.
- Apply fertilizers, organic and inorganic, in a balanced fashion, with appropriate methods and equipment and at adequate intervals to replace nutrients extracted by harvest or lost during production.
- Maximize the benefits to soil and nutrient stability by re-cycling crop and other organic residues.
- Integrate livestock into crop rotations and utilize the nutrient cycling provided by grazing or housed livestock to benefit the fertility of the entire farm.
- Rotate livestock on pastures to allow for healthy re-growth of pasture.
- Adhere to safety regulations and observe established safety standards for the operation of equipment and machinery for crop and fodder production.

4. Crop protection

Maintenance of crop health is essential for successful farming for both yield and quality of produce. This requires long-term strategies to manage risks by the use of disease- and pest-resistant crops³, crop and pasture rotations, disease breaks for susceptible crops, and the minimal use of agrochemicals to control weeds, pests, and diseases following the principles of Integrated Pest Management. Any measure for crop protection, but particularly those involving substances that are harmful for humans or the environment, must only be carried out with full knowledge and appropriate equipment. Good agricultural practice will:

- Use resistant cultivars and varieties, crop sequences, associations, and cultural practices that maximize biological prevention of pests and diseases.
- Maintain regular and quantitative assessment of the balance status between pests and diseases and beneficial organisms of all crops.
- Adopt organic control practices where and when applicable.
- Apply pest and disease forecasting techniques where available.
- Decide on interventions following consideration of all possible methods and their short- and long-term effects on farm productivity and environmental implications in order to minimize the use of agrochemicals, in particular to promote integrated pest management (IPM).
- Store and use agrochemicals according to legal requirements of registration for individual crops, rates, timings, and pre-harvest intervals.
- Ensure that agrochemicals are only applied by specially trained and knowledgeable persons.
- Ensure that equipment used for the handling and application of agrochemicals complies with established safety and maintenance standards.
- Maintain accurate records of agrochemical use

5. Animal production

Livestock require adequate space, feed, and water for welfare and productivity. Records of livestock acquisitions and of breeding programmes will ensure traceability of type and origin. Stocking rates are adjusted and supplements provided as needed to livestock grazing pasture or rangeland. Chemical and biological contaminants in livestock feeds are avoided to maintain animal health and/or to prevent their entry into the food chain. Manure management minimizes nutrient losses and stimulates positive effects on the environment. Land requirements are evaluated to ensure sufficient land for feed production and waste disposal. Good agricultural practice will:

- Site livestock units appropriately to avoid negative effects on the landscape, environment, and animal welfare.
- Avoid biological, chemical, and physical contamination of pasture, feed, water, and the atmosphere.

³ The principles of Good Agricultural Practices for crop protection also apply to risk management relating to the use of Genetically Modified Organisms (GMOs)

- Frequently monitor the condition of stock and adjust stocking rates, feeding, and water supply accordingly.
- Design, construct, choose, use and maintain equipment, structures, and handling facilities to avoid injury and loss.
- Prevent residues from veterinary medications and other chemicals given in feeds from entering the food chain.
- Minimize the non-therapeutic use of antibiotics.
- Integrate livestock and agriculture to avoid problems of waste removal, nutrient loss, and green house gas emissions by efficient recycling of nutrients.
- Adhere to safety regulations and observe established safety standards for the operation of installations, equipment, and machinery for animal production
- Maintain records of stock acquisitions, breeding, losses, and sales, and of feeding plans, feed acquisitions, and sales.

6. Animal health

Successful animal production requires attention to health of livestock which is maintained by proper management and housing, by preventive treatments such as vaccination, and by regular inspection, identification, and treatment of ailments, using veterinary advice as required. Good agricultural practice will:

- Minimize risk of infection and disease by good pasture management, safe feeding, appropriate stocking rates and good housing conditions.
- Keep livestock, buildings and feed facilities clean and provide adequate, clean bedding under housed conditions.
- Ensure staff are properly trained in the handling and treatment of animals.
- Seek appropriate veterinary advice to avoid disease and health problems.
- Ensure good hygiene standards in housing by proper cleansing and disinfection.
- Treat sick or injured animals promptly in consultation with a veterinarian.
- Purchase, store and use only approved veterinary products in accordance with regulations and directions, including withholding periods.
- Keep detailed records of all sickness, medical treatments, and mortality.

7. Animal welfare

Farm animals are sentient beings and as such their welfare must be considered. Good animal welfare is recognised as freedom from hunger and thirst; freedom from discomfort; freedom from pain, injury or disease; freedom to express normal behaviour; and freedom from fear and distress. Good agricultural practice will:

- Provide adequate and appropriate feed and clean water at all times.
- Avoid non-therapeutic mutilations, surgical or invasive procedures, such as tail docking and debeaking.
- Minimise transport of live animals (by foot, rail or road) and the use of livestock markets.
- Handle animals with appropriate care and avoid the use of instruments such as electric goads.
- Maintain animals in appropriate social groupings where possible; isolation of animals (such as veal crates and sow stalls) should be discouraged, except for injury and sickness.
- Conform to minimum space allowances and maximum stocking densities.

8. Harvest and on-farm processing and storage

Product quality also depends upon implementation of acceptable protocols for harvesting, storage, and where appropriate, processing of farm products. Harvesting must conform to regulations relating to pre-harvest intervals for agrochemicals and withholding periods for veterinary medicines. Food produce should be stored under appropriate conditions of temperature and humidity in space designed and reserved for that purpose. Operations involving animals, such as shearing and slaughter, must adhere to animal health and welfare standards. Good agricultural practice will:

- Harvest food products following relevant pre-harvest intervals and withholding periods.
- Provide for clean and safe handling for on-farm processing of products. For washing, use recommended detergents and clean water.
- Store food products under hygienic and appropriate environmental conditions.
- Pack food produce for transport from the farm in clean and appropriate containers.
- Use methods of pre-slaughter handling and slaughter that are humane and appropriate for each species, with attention to supervision, training of staff and proper maintenance of equipment.

- Maintain accurate records regarding harvest, storage and processing.

9. Energy and waste management

Farms require fuel to drive machinery for cultural operations, for processing, and for transport. The objective is to perform operations in a timely fashion, reduce the drudgery of human labour, improve efficiency, diversify energy sources, and reduce energy use. Farming produces by-products, some of which are potential pollutants of soil, water, or air. The production of these by-products should be minimized while others are resources that can be recycled. Good agricultural practice will:

- Establish input-output plans for farm energy, nutrients, and agrochemicals to ensure efficient use and safe disposal.
- Adopt energy saving practices in building design, machinery size, maintenance, and use.
- Investigate alternative energy sources to fossil fuels (wind, solar, biofuels) and adopt them where feasible.
- Recycle organic wastes and inorganic materials, where possible.
- Minimize non-usable wastes and dispose of them responsibly.
- Store fertilizers and agrochemicals securely and in accordance with legislation.
- Establish emergency action procedures to minimize the risk of pollution from accidents.
- Maintain accurate records of energy use, storage, and disposal.

10. Human welfare, health, and safety

Farming must be economically viable to be sustainable. The social and economic welfare of farmers, farm workers, and their local communities depends upon it. Health and safety are also important concerns for those involved in farming operations. Due care and diligence is required at all times. Good agricultural practice will:

- Direct all farming practices to achieve an optimum balance between economic, environmental, and social goals.
- Provide adequate household income and food security
- Adhere to safe work procedures with acceptable working hours and allowance for rest periods.
- Instruct workers in the safe and efficient use of tools and machinery.
- Pay reasonable wages and not exploit workers, especially women and children.
- Purchase inputs and other services from local merchants if possible.

11. Wildlife and landscape

Agricultural land accommodates a diverse range of animals, birds, insects, and plants. Much public concern about modern farming is directed at the loss of some of these species from the countryside because their habitats have been destroyed. The challenge is to manage and enhance wildlife habitats while keeping the farm business economically viable. Good agricultural practice will:

- Identify and conserve wildlife habitats and landscape features, such as isolated trees, on the farm.
- Create, as far as possible, a diverse cropping pattern on the farm.
- Minimize the impact of operations such as tillage and agrochemical use on wildlife.
- Manage field margins to reduce noxious weeds and to encourage a diverse flora and fauna with beneficial species.
- Manage water courses and wetlands to encourage wildlife and to prevent pollution.
- Monitor those species of plants and animals whose presence on the farm is evidence of good environmental practice.