

AGRIBUSINESS SERIES

Export handbooks

GOOD AGRICULTURAL PRACTICES

GUIDE FOR SMALL AND
MEDIUM SIZED AGRIBUSINESS
OPERATORS



Inter-American Program for the Promotion
of Trade, Agribusiness and Food Safety

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GOOD AGRICULTURAL PRACTICES

GUIDE FOR SMALL AND MEDIUM SIZED
AGRIBUSINESS OPERATORS

Alejandra Díaz

Inter-American Program for the Promotion of Trade,
Agribusiness and Food Safety

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Editorial coordination: Daniel Rodríguez Sáenz

Translator: Susana Raine

Layout: Ana Catalina Lizano

Cover: Zona Creativa

Díaz, Alejandra

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The Inter-American Institute for Cooperation on Agriculture (IICA), through its Agribusiness Competitiveness Directorate, seeks to assist the countries in identifying and tapping market opportunities, supporting the efforts of public and private institutions that promote the competitive development of agribusiness.

In January 2004, IICA launched the *Inter-American Program for the Promotion of Trade, Agribusiness and Food Safety*, with offices in Miami, Florida, United States of America. Its mandate is to increase technical cooperation to small- and medium-sized agribusinesses in IICA's member countries with a view to upgrading their business capabilities, helping them identify trade opportunities, and providing information that will facilitate decision-making to promote trade.

To date, the program's activities have helped identify a set of needs shared by small- and medium-sized agribusinesses throughout the Americas, which have been defined as "priority issues." They are analyzed in a group of IICA publications in the Agribusiness Series that aim specifically to upgrade the competitiveness of small- and medium-sized agribusiness operators in the hemisphere. One of the subgroups of this series, *Export Handbooks*, disseminates concepts and ideas to facilitate decision-making for those interested in successfully integrating their agribusinesses into international markets.

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Sincerely,

Miguel García Winder
Director of Agribusiness Competitiveness
Inter-American Program for the Promotion of Trade,
Agribusiness and Food Safety
IICA Office in Miami

CONTENTS

INTRODUCTION	7
I. HOW TO USE THIS GUIDE	10
II. GOOD AGRICULTURAL PRACTICES (GAP)	10
CONCEPTUAL APPROACH:	10
GOOD AGRICULTURAL PRACTICES FOR FRESH FRUITS AND VEGETABLES	11
MAIN INITIATIVES DEALING WITH GOOD AGRICULTURAL PRACTICES (GAP)	11
GENERAL GUIDELINES:	
1. <i>Traceability</i>	12
2. <i>Propagation and planting material</i>	14
3. <i>Farm history and farm management</i>	16
4. <i>Soil and substrate management</i>	17
5. <i>Fertilizer use</i>	19
6. <i>Irrigation</i>	21
7. <i>Crop protection</i>	23
8. <i>Harvesting and transportation</i>	31
9. <i>Workers' health, safety, and welfare</i>	36
10. <i>Waste and pollution management</i>	39
11. <i>Environmental protection</i>	40
12. <i>Complaint management</i>	41
ANNEX. SAMPLE RECORDS	43
1. <i>Record of activities on the property</i>	43
2. <i>Record of fertilizer application</i>	44
3. <i>Record of fertilizer application</i>	45
4. <i>Equipment calibration record</i>	46
5. <i>Equipment maintenance record</i>	47
6. <i>Pesticide application record</i>	48

7. <i>Staff training record</i>	49
8. <i>Pesticide card file</i>	50
9. <i>Fertilizer card file</i>	51
10. <i>Client complaint and claim record</i>	52

 REFERENCES	53
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New trends in global food consumption are being driven by the demand for products that meet increasingly stringent health, safety and quality standards. This stems from a trade environment that is becoming increasingly challenging and competitive with each passing day, due to the globalization of markets and economic interdependence.

Various food crises occurred in the past decade including bacterial contamination of fresh fruits and vegetables, bovine spongiform encephalopathy (“mad cow disease”) and avian influenza, among others. Combined with concerns over pesticide residues and genetically modified foods, this has heightened consumers’ concern about the conditions under which food is produced and marketed. Consumers are now demanding the highest possible guarantees to ensure that the food they consume does not entail any health hazards.

In response, many countries have established guidelines, standards, regulations and systems to guarantee a food supply that is safe, suitable for human consumption, and based on a production chain approach. Special attention has been placed on primary production (agriculture) in order to minimize the risk of physical, chemical and biological contamination, starting from the very first stages of the food chain.

In addition to complying with official regulations governing market access, agribusiness operators must also deal with many private regulations and standards that are generally much more stringent and that often exceed the bounds of food safety per se. Although private standards are not compulsory in a formal sense, they tend to be so in practice. For small agribusiness operators in particular, this has made compliance –in terms of implementation, certification, maintenance costs and other issues– especially difficult.

The Committee on Sanitary and Phytosanitary Measures (SPS) of the World Trade Organization (WTO) is currently addressing the concern raised by several countries with respect to commercial and private standards, the proliferation of which, they argue, is causing confusion and lack of transparency. According to some studies, these standards may even be going so far as to exclude small producers and aggravate rural poverty.

In relation to good agricultural practices (GAP), the most important initiatives worldwide are the United States Food and Agriculture Safety Initiative, which provides general guidelines for the fresh fruits and vegetables industry, and the EurepGAP Standard, a private initiative of several food distribution chains in Europe. There also various guidelines and international codex on good practices for primary production.

Given this situation, IICA decided to produce this manual for small- and medium-sized agribusiness operators in the Americas, in order to provide general guidelines on good agricultural practices, share information on the most common risk factors in different agricultural activities, and highlight the care that producers must take, regardless of whether their production is aimed for domestic or export markets. The information included herein is based on the latest national and international initiatives and regulations, both public and private.

Small and medium sized agribusiness operators are encouraged to begin by implementing official regulations and basic guidelines, recommendations and standards, in order to ensure the safety and quality of their food products, with an eye to subsequently moving on to applying progressively more complex systems. Private certification may later be sought to improve market access and strengthen competitiveness in trade development strategies that encourage higher-quality products through seals that convey added value.

This document has been organized in a way that seeks to facilitate readers' understanding of the objectives of good agricultural practices. Recommendations are followed by indicators that are typically used to check compliance with good agricultural practices.

This guide also contains examples for record keeping, which has been identified as one of the main weaknesses in food safety and quality management systems. The idea is to provide a frame of reference for a task that must be undertaken by every business.

The Asparagus Standards Technical Committee –Fresh Asparagus Subcommittee of Peru¹–reviewed and validated this document.

1 The Asparagus Standards Technical Committee –Fresh Asparagus Subcommittee– was established in 1998 by Peru’s National Standardization Agency. Its mission is to develop international-referenced quality specifications for asparagus and to disseminate those specifications to producers in order to ensure the quality and competitiveness of Peruvian asparagus at home and abroad. It has also drawn up technical standards and good agricultural practices for asparagus. Its members are public and private sector organizations involved in setting standards for asparagus, including: the Peruvian Asparagus and Vegetables Institute (IPEH), Frío Aéreo Civil Association, Agrícola Athos S.A., Agroparacas S.A., Proagro S.A., Complejo Agroindustrial Beta S.A., Camposol S.A., Danper Trujillo S.A.C., Agroinversiones Chavin S.A.C., the National Agricultural Health Service (SENASA) of the Ministry of Agriculture, the General Directorate of Environmental Health (DIGESA) of the Ministry of Health, the Ministry of Production (PRODUCE), the Crop Protection Committee (PROTEC), Sociedad de Asesoramiento Técnico S.A., SGS of Peru, the Inter–American Institute for Cooperation on Agriculture (IICA), and the Entomological Society of Peru.

I. HOW TO USE THIS GUIDE

This guide was prepared for small- and medium-sized agribusiness operators with the intention of helping them effectively implement food safety standards and management systems, regardless of the enterprise's size or the type of food produced.

Each section defines the objectives of the recommended practices, which should be interpreted and applied with a good measure of flexibility. How these recommendations will be implemented will depend primarily on the nature of the crop and the production system. Producers should supplement their reading of this booklet with specific guidelines for their particular products, and assess the pertinence of implementing the recommendations based on a hazard analysis.

The record-keeping samples included in this document are offered as a guide or a point of reference, and were provided by the Peruvian Asparagus and Vegetables Institute (IPEH), solely for the purpose of sharing experiences in a field that is new to most small and medium sized agribusiness operators.

II. GOOD AGRICULTURAL PRACTICES (GAP)

■ CONCEPTUAL APPROACH:

Good agricultural practices (GAPs) consist of a set of principles, standards, and technical recommendations that can be applied at different stages of agricultural production in order to guarantee an output of wholesome and safe foods. According to international standards, the primary aim of good agricultural practices is to control biological, chemical and physical hazards that may occur at any stage of the primary production process.

In addition to strictly food safety issues, private regulations for good agricultural practices cover other topics such as environmental protection; workers' health, safety and welfare; and animal welfare.

This guide addresses good agricultural practices for fresh fruits and vegetables, particularly as relates to food safety. In order to bring

small and medium sized agribusiness operators up to date on the latest requirements, it also refers to environmental protection and worker welfare, which are usually covered by environmental protection and occupational health regulations.

Food safety standards are combined with environmental protection and worker health, safety, and welfare requirements in order to encourage agribusiness operators to produce quality products and also to contribute to sustainable development in agriculture.

■ GOOD AGRICULTURAL PRACTICES FOR FRESH FRUITS AND VEGETABLES

The rediscovery of the nutritional value of fresh fruits and vegetables and their greater year-round availability due to international trade have stimulated not only growth in the consumption of these products but also major opportunities for agribusiness operators of the Americas.

The beneficial effects of consuming fresh fruits and vegetables have been countered, however, by the impact of food borne diseases. This has resulted in economic losses, the closing of markets, and a tarnished image for the businesses and countries that supplied the products.

Accordingly, in order to take advantage of current opportunities, agribusiness operators must upgrade their production and marketing capacities, both in terms of quantity and quality, as well as their ability to satisfy official and private sanitary and phytosanitary requirements of international markets.

■ MAIN INITIATIVES DEALING WITH GOOD AGRICULTURAL PRACTICES (GAP)

- “Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables” This document was produced by the United States Food Safety Initiative and contains guidelines for the fresh fruits and vegetables industry.

Its guidelines are general, not mandatory, and provide a frame of reference for identifying and applying appropriate measures for minimizing the risk of microbial contamination on farms, in packing facilities, and during transportation.

The main focus of these guidelines is to: i) reduce microbial hazards in fresh fruits and vegetables, although it does not address other environmental areas of concern related to food supply (pesticide residues, chemical contaminants); ii) reduce the risk, not eliminate it; and iii) disseminate general science-based principles.

– **EurepGAP.** This initiative was launched in 1997 by retailers of the EUREP Group (Euro-Retailer Produce Working Group). The EurepGAP standard includes guiding principles on food safety, environmental protection, and worker health and welfare. Since then, it has evolved into a private-sector standard with very wide coverage, involving both producers and their retail clients.

To some extent, changes have been made that reflect greater transparency in the standard-setting process; nonetheless, developing countries still find it hard to participate effectively in this process.

On September 7, 2007, at its Eighth Annual Conference (Bangkok), EUREPGAP announced its decision to change its name and logo to GlobalGAP. This move reflects its role in expanding the use of good agricultural practices and adopting uniform criteria in places as distant as Central America, South America, Africa, Australia, Japan, and Thailand. Several countries have developed equivalent arrangements of their own: ChileGAP, ChinaGAP, KenyaGAP, MexicoGAP, JGAP (Japan) and, more recently, ThaiGAP.

GlobalGAP is a single standard that covers, in modular form, different groups of products, from plants, livestock, and aquaculture to plant propagation material and manufactured feed concentrates.

■ GENERAL GUIDELINES:

1. *Traceability*

According to the Codex Alimentarius, traceability is the ability to follow the movement of food through specified stage(s) of production, processing and distribution.

Traceability is increasingly required not only as an essential component of standards for managing food safety and food quality, but also as a tool that

can be used, as necessary, in food inspection and certification systems to protect consumers from food-borne diseases and deceitful business practices, and to facilitate trade through proper product identification.

Objective

Identify the product's origin and all the activities involved in producing it, through delivery of the product

General recommendations:

- Clearly identify the parcels or subdivisions of the production site (this facilitates traceability).
- Record all activities undertaken, as well as the agricultural conditions on each parcel or subdivision of the field site. These records will provide a history of each plot or site and will be used for duly identifying it.

It is recommended that all producers keep a "Field Record Book." This is an essential tool for tracking and monitoring the conditions of production. The record book should be kept in good order and up to date, and a trained person should be given responsibility for this task. The person's name, along with those of his/her assistants, should be noted in the book.

Important: "If it hasn't been written down, it doesn't exist."

- If several parcels are managed in a similar way, they may be considered a single unit for record-keeping purposes.
- Create a code system for the product: numbers, letters or some other code may be used for identifying each parcel or subdivision of the production site.
- Maintain a "production and delivery record" that includes, at the least: the product code, the quantity produced, the harvest date, the name of the carrier, and the name of the buyer or the processing plant that received the product.
- Establish a clear, step-by-step procedure to be followed in the event of having to recall a product.

Compliance indicators:

- An identification system or visual reference for each parcel or production unit: this can be a number-, letter-, or code-based system, and is used when documenting all agricultural activities.
- A written traceability system for tracking products that includes: field record book, identification system of the farm's parcels or subdivisions, identification of the boxes or batches of harvested produce (including date and parcel code), delivery date, name of buyer or packing plant that received the product. These elements, systematically organized and recorded, constitute a basic traceability plan.
- A field record book.
- A product-recall procedure that identifies the cause of withdrawal, the persons responsible for the decision, and the disclosure process.

2. Propagation and planting material

The following criteria should be considered when selecting propagation material: varieties should be pest-resistant, and seed should be certified, come from authorized nurseries or seed beds, and have the backing of a recognized certificate. This will help ensure favorable results and make it unnecessary to apply plant protection products or fertilizers.

If producers propagate material for their own use, they should implement quality controls to ensure that the material is of good quality and free of pests and diseases.

Objective

Minimize the use of pesticides and fertilizers on crops

General recommendations:

- Use duly certified seeds and seedlings in order to be assured of their health, the purity of the variety, and their general condition. It is important to keep a record of the origin of the planting material.

- Producers should make sure to obtain documentation certifying the quality and characteristics of material they purchase.
- Producers operating their own nurseries should design and implement a quality control procedure for guaranteeing the quality of the propagation material and appropriately managing any plant protection treatments that may be necessary.
- Quality control should include checking for visible signs of pests and diseases, keeping records of findings, and keeping records of all applications of plant protection products.
- Any treatment applied to the propagation material should be recorded and the record should cover the following: name of the product applied, dose, quantity of seed treated, justification, and treatment date.
- If genetically modified varieties are used, all relevant national regulations should be observed. A written plan should exist describing how GM materials are handled and stored. Producers should keep their customers duly informed.
- Sowing or transplanting should be done at a density that is appropriate to the environment, the species, the variety, and the management system being used. This will help reduce the need to use plant protection products to fertilize crops or protect them from pests and diseases.

Compliance indicators:

- Technical information on the purchased propagation material's resistance to pests and diseases.
- Documents guaranteeing the propagation material's quality. Quality certificates or letters of guarantee from the vendor of the material.
- Record of the application of plant protection products, when appropriate.
- Record of methods applied, density, and planting dates.

3. Farm history and farm management

Producers should ensure that the land they are cultivating is suitable for agriculture and be able to show that a risk assessment was conducted to identify potential hazards and sources of contamination.

If the assessment reveals a non-controllable hazard or indicates that the probability of contamination is high, the site may not be used for agricultural purposes.

Objective

Ensure that the cultivation site is suitable for agricultural activity

General recommendations:

- Find out what the potential agricultural site was used for in the past.
- Conduct a prior risk assessment, with a primary focus on safety issues, to determine whether the site is suitable for agriculture.
- Identify and assess possible sources of contamination from surrounding areas, for example: from mines, agricultural or livestock activity, wildlife, factories, nearby homes, etc.
- Consider for the risk assessment, among other things, the site's previous use, soil type, erosion, water quality and availability, as well as environmental impact on neighboring areas.
- Design a management plan that includes strategies for minimizing all risks identified, based on the information obtained from the site assessment. When necessary, perform the relevant tests for the purpose of taking corrective measures.
- If hazards are detected on neighboring farms, implement a monitoring and control plan.
- If the assessment identifies a non-controllable hazard that is critical to health or to the environment, the site should not be used for agriculture.

- In the case of annual crops or fallow periods, it is recommended to rotate crops and use species that have different nutritional requirements (and preferable, species that do not share plant health problems).

Compliance indicators:

- Property title or some other legal document that proves that the site was not used for non-agricultural purposes.
- Risk assessment report.
- Findings of analyses confirming that the selected site is suitable for the proposed activities.
- Management plan that includes strategies for minimizing all risks identified.
- Record of all agricultural activities carried out on the farm.
- Signs on agricultural parcels or subdivisions, indicating name or other type of identification.
- Documents showing that crops are being rotated; if they are not being rotated, provide written justification for that decision.

4. Soil and substrate management

Producers should use soil management and conservation techniques that help reduce contamination and erosion.

Objective

Use suitable soil management and conservation techniques to prevent contamination and erosion

General recommendations:

- Prepare a soil map of the farm, identifying soil type(s) based on a soil profile study, physical and chemical analyses, or a local soil map.
- Use cultivation and irrigation techniques that reduce soil erosion, for example, drainage systems, contour farming, appropriate use of fertilizers, plant cover, trees and bushes along field borders, etc.
- Choose cultivation techniques that help maintain or improve the soil's natural fertility.
- If the soil is fumigated, justify this in writing, keeping appropriate records. Cover at least the following information: purpose and date of fumigation, identification of the sector fumigated, product used, and names of the operators responsible for the fumigation.
- If inert substrates are used, have the documentation that shows their suitability for agriculture. In the case of non-inert substrates, the technical specifications of the substratum provided by the vendor are sufficient.
If inert substrates are used, participation in substrate recycling programs is recommended.
- If chemicals are used to sterilize substrates, keep records of these operations. If disinfection is performed by third parties, keep a record of the company's name and address.

Compliance indicators:

- Visible evidence of the absence of erosion and that appropriate methods are being used to prevent it.
- Written justification for soil fumigation, covering at least the following: location, date of fumigation, active ingredients, doses, application method, equipment and machinery used, name of operator.
- Soil fumigation records.
- Documents and technical specifications of the substrates used, provided by the vendor.

- Records on inert-substrate recycling activities.
- Records on substrate sterilization.

5. Fertilizer use

Producers should make sure that fertilization conforms to the crop's real needs for nutrients; in other words, when applying fertilizers, factor in the quantity of nutrients available in the soil and the quantity of nutrients taken up by the crop.

Providing crops with the required nutrients ranges from ensuring proper storage conditions for fertilizers in storerooms to properly calibrating the fertilizer application equipment.

Objective

Avoid using more fertilizer than required by the crop to prevent soil and water contamination

General recommendations:

- Design and implement a fertilization plan that takes into account the results of foliar and soil analyses, nutrient dosage, and includes application dates. The quantity applied should be based on the crop's nutrient requirements, the characteristics of the soils, and the application system used.
- Special attention should be given to nitrogen applications. The quantity of nitrogen applied should not exceed the levels stipulated in national regulations. For farmers who produce for the European market, the limit is 170 nitrogen units per hectare per year. If the soil type makes it necessary to use larger amounts, this must be duly justified.
- The fertilization plan should be the responsibility of trained employees or approved by a competent technical adviser.

- Fertilizer application equipment should be properly calibrated and kept in good condition to avoid leaks and waste and to ensure uniform application.
- All fertilizer applications should be recorded, which should include: identification of the field or subdivision treated, application date, crop variety or species, formula, dose, equipment used, application method, justification for the application, technical authorization for the application, trade name of the fertilizer, and name of the operator who applied the fertilizer.
- Have a list of fertilizer suppliers. When purchasing fertilizers, insist that the vendor provide documents or quality guarantees confirming that they are safe for use on crops for human consumption.
- Regarding fertilizer storage, keep in mind that:
 - Fertilizers must be kept in a weather-proof storeroom or building.
 - Storerooms must be kept clean and tidy, and be well ventilated.
 - Storerooms must not be located near water courses so as to prevent contamination in the event of spillage or leakage. Spilled fertilizers should be cleaned up immediately.
 - Fertilizers should be stored off the floor, on platforms, to prevent moisture damage.
 - Storerooms containing fertilizers must not be used to keep harvested produce, seeds or propagation material.
 - Fertilizers must be stored separately from plant protection products. If only one storeroom is available, these two products may be stored on the same site but in separate, clearly identified areas.
 - An inventory of fertilizer products and quantities in storage should be kept by the producer or the storeroom manager. Whenever a product is removed from the storeroom, this should be recorded along with the relevant details, including the name of the person who took it.

- Sewage sludge must not be used to fertilize crops unless it has been treated strictly in accordance with national regulations.
- When guano is used to fertilize crops, it must have been properly treated and composted since it is a source of microbial contamination.
- Guano must be stored separately from harvested produce, agricultural materials or harvesting equipment. To prevent seepage, it must be stored in covered containers.

Compliance indicators:

- Fertilizer application schedule.
- Foliar and soil analysis reports.
- Training certificates or other document attesting to the competence of the technicians responsible for the fertilizer program.
- Equipment calibration and maintenance records, including information on spare parts purchased, repairs, and the corresponding invoices.
- Field record book.
- Quality certificates from fertilizer vendors.
- Fertilizer storeroom inventories.
- Fertilizer storage facility.

6. Irrigation

Poor quality water can be a direct source of contamination and a vehicle that spreads contamination located in the field. It is therefore important to use good agricultural practices to reduce, as much as possible, the risks of contaminating agricultural products.

Objective

Prevent the physical, chemical and microbiological contamination of agricultural products due to the use of poor quality water

General recommendations:

- Assess potential risks from water sources and from the irrigation water distribution system.
- Place filters or barriers at the irrigation ditch's place of entry into the property in order to prevent contamination of the water supply.
- Protect and periodically clean all channels, wells, irrigation ditches, pumping areas and equipment to prevent contamination.
- Use systematic methods of prediction to calculate the water requirement of crops in order to avoid providing too much or too little water, which could affect the crop.
- Select irrigation techniques that minimize water loss and soil erosion.
- Irrigation water should be analyzed by a competent laboratory, and testing frequency should be based on a risk assessment. It is recommended that samples be taken during high-use irrigation periods since the results will be more representative.
- If the results of the water analyses are adverse, take measures to correct the situation.
- Keep a record of the irrigation water used; at the very least, record dates and volumes.
- Optimize irrigation water usage and reduce waste by using different techniques, including water recycling, night irrigation, and properly maintaining irrigation equipment.
- Do not dispose of leftover pesticides or pesticide containers in irrigation channels.

- Wastewater should not be used for irrigation unless it has been treated according to established regulations.

Compliance indicators:

- Report of calculations made to determine crops' water requirements, plus supporting data.
- Water-use records.
- Records of activities to clean channels, ditches and wells.
- Reports on irrigation water analysis by laboratory of recognized competence.
- Records of measures taken to correct adverse findings of water analysis.
- Document certifying that producer has water-use rights.
- Up-to-date irrigation water-use permits.

7. Crop protection

While plant protection products are of special importance for ensuring crop health and quality, they must be used in a way that does not contaminate produce or the environment, or endanger workers' health.

Objective

*Prevent the contamination of product and the environment,
and protect workers' health*

General recommendations:

- Producers should prioritize integrated pest management for plant protection purposes.

- All applications of plant protection products should be duly justified and every effort should be made to use the smallest quantities possible. The choice of plant protection products should be made by competent, qualified advisers (which should be demonstrated) or by the producers themselves, provided they can demonstrate technical competence.
- To back up plant health product applications, periodic field assessments of pests should be performed and records of the findings kept. This task should be carried out by a person who has received training, particularly in the identification of pests, diseases, and beneficial organisms.
- Only use products allowed under national regulations and recommended for the target crop; it is important to check this information on the labels.
- For export products, it is important to be familiar with the legislation of the destination market. This information can be obtained from the buyer or the company that packs the produce for export.
- Keep an up-to-date list of all plant protection products used on the farm. This should include the products' trade name, the manufacturer's name, as well as any changes in legislation relating to these products.
- Plant protection products should be obtained from authorized vendors whose licenses are up-to-date, not from any store or unauthorized vendor.
- In preparing the mixture or solution, use accurate calculations that take into account application speed, the size of the area to be treated, and the pressure of the equipment. Follow the instructions on the label.
- In order to ensure the effectiveness of the plant protection product and prevent it from becoming a source of contamination for the crop, it is important to use good quality water in preparing the mixture.
- Storage of plant protection products:
 - Ideally, a dedicated storeroom should be used for this purpose. In any event, a specific and separate area should be set aside for storing plant protection products. If the farm has a central storeroom or distribution facility and plant protection products

need to be stored near the treatment area, a small transit storeroom should be set up that meets all the requirements of the main storage facility.

- The storeroom should always be located at a good distance from residential and food storage areas, in a place where there is no risk of flooding.
- The structure should be sound, fire-resistant, and with a waterproof floor that is in good condition; the storeroom should be kept clean and tidy, and be clearly identified with signs indicating "Plant protection products storeroom" and "Authorized personnel only."
- Ventilation is essential to avoid dangerous vapor build-up. It is also important to ensure that animals cannot enter the storeroom, and that the storeroom be protected from rain. Storerooms should be well lit to facilitate the reading of product labels.
- Storerooms should be able to retain spillage, for example with gutters or protective edging.
- The storeroom should be equipped with a fire extinguisher and workers should be trained to use it.
- No other materials should be stored in it (veterinary products, fertilizers, application equipment, etc.), not even temporarily.
- The storeroom should always be locked, and access to it limited. The key should be kept by authorized personnel.
- To ensure users' safety, signs such as the following should be clearly displayed inside the storeroom: "No eating," "No drinking," "No smoking," "Use protective gear."
- All products should be kept on shelves, clearly organized and labeled. Products in sacks or boxes should be stored on raised platforms or shelves, never on the ground. Liquid products should always be placed on the lowest shelves.
- Shelving should be made of non-flammable and non-absorbent material; try not to use wooden shelves.

- Plant protection products should always be stored in their original containers with their labels preserved, since labels contain complete instructions on storage conditions and on what to do in the event of poisoning.
 - Obsolete or unidentified products should be stored separately, under lock and key, and be clearly labeled “obsolete.”
 - The producer or storeroom supervisor should maintain an inventory of the products that indicates the quantity of each product stored. Whenever a product is removed from the storeroom, this should be noted down along with the name of the person who took it.
- Product preparation area:
- A special area should be set aside for weighing, measuring and mixing plant protection products; this area should meet the same requirements as the plant protection product storeroom.
 - The preparation area may be located inside the plant health product storeroom, in an area specially set up for that purpose.
 - All equipment needed for measuring, weighing and mixing the products (scales, measuring vessels, etc.) should be on hand and designated exclusively for those purposes.
 - If measured products are stored, they should be clearly labeled.
- The plant protection product storeroom and preparation area must be equipped to handle any emergency related to accidental operator contamination. This should include: access to clean water, an emergency or first aid kit, eye-washing equipment, a step-by-step procedure to be followed for handling accidents, and a list of emergency telephone numbers or other means of emergency communication.
- The emergency procedure should include clear instructions on what to do in the event of spillage or fire, or if a product should come into contact with a person’s skin or eyes, etc. Emergency telephone numbers to be called in case of fire, spillage, or poisoning should be clearly displayed. If the farm is located at a great distance from an

urban center, the instructions should include a clear procedure to follow for making the necessary emergency contact or communication.

Important

Emergency telephone numbers should be checked and updated regularly.

- The plant protection product storeroom and measuring areas should be equipped with materials for containing spillages, such as buckets of sand or dirt, which should be identified and placed in a visible location.
- Application equipment should be in good condition and duly calibrated to prevent waste and leakage of the plant protection product, and to ensure uniform distribution. If there are various pieces of equipment, they should be duly identified.
- Operators who handle plant protection products, from storage through application, should be equipped with the necessary protective gear and equipment, which should be used as per instructions.
- Protective gear should be washed on the farm after each application and kept separate from the plant protection products, preferably hanging in a ventilated area. These articles should never be taken home by the workers.
- Showers with soap and water should be available for employees' use measuring and applying plant protection products.
- When plant protection products are being applied, make sure that there are no people in the area being treated.
- It is important to respect the interval period for reentering treated fields or plots. The product label has information on this matter. In the case of using mixtures of products, the longest period should be observed. A record should be kept of these activities.
- Treated fields or parcels should be clearly identified; this information should be clearly visible to all workers.

- "Leftovers" of plant protection products
 - Surplus application mix, or tank or machinery washings should be carefully disposed of in compliance with national regulations. If there are no national guidelines on the matter, "leftovers" may be applied to a portion of untreated crop, provided the dosage does not exceed the recommended amount; alternately, it may be applied to uncultivated fields. Remember to always keep a record of these practices.

- Records of application
 - Keep a record of all applications of plant protection products, growth regulators, and macro- and microelements.
 - This information should be recorded on a lot-by-lot or field-by-field basis, with a clear identification of each.
 - For each application, record the name of the crop and variety treated, the date and time of the application, the purpose, trade name and active ingredient of the product used, its formula, concentration and dosage, the type of equipment used, the phenology of the crop, the date of the last application, fulfillment of the re-entry period, name of all operators who participated in mixing and measuring the product and applying it, and name of the person who made the technical recommendation.
 - For each application, estimate and duly record the possible harvest date.

- Handling of empty plant protection product containers:
 - Empty containers should immediately be washed three times. This will eliminate 99% of the container's product.
 - Triple washing consists of rinsing the container three times, which means filling the container to $\frac{1}{4}$ of its capacity and shaking it for 60 seconds, each time. The rinsate should be returned to the application equipment tank or sprayer.

- Containers should never be washed in ditches, channels or watercourses in order not to contaminate these water sources.
- Once washed, the containers should be perforated (if made of plastic) or spoiled (if made of glass or paper), and stored temporarily on the farm until they can be disposed of in accordance with national legislation.
- Plant protection product containers may never be used for other purposes.

Pesticide residue analysis:

- It is important to analyze pesticide residues in agricultural products. Samples should be representative and be collected at harvest time. Record the sampling procedure and the method of analysis.
- Pesticide residue analysis should be performed by a recognized and duly accredited laboratory.
- If the analysis is performed by the packing company, the export company or a producers' association, the producer should keep a copy of the report.
- Pesticide residues should not exceed the thresholds established in national, regional or international regulations.

For agricultural exports, it is important to have an up-to-date list of the target market's maximum pesticide residue levels.

Some countries may not have maximum pesticide residue levels for the product being exported; in this case it is recommended that consideration be given to zero tolerance. If this information is not taken into account when the product is being grown or shipped, serious setbacks may arise during the export process. This is especially important for some native products from the countries of the hemisphere.

Compliance indicators:

- Field record notebook.
- Applications recommended by competent personnel.
- Field assessment reports.
- Certificates of competence or documents attesting to the competence of the technical advisers who recommended the applications system and performed the field assessments.
- Up-to-date list of plant protection products used on the farm.
- Invoices showing that the plant protection products were acquired from authorized vendors.
- Records of the calculations made to prepare the solutions or mixtures.
- Application equipment calibration and maintenance records, including information on parts that had to be replaced, repairs, and invoices.
- Inventory of plant protection products kept in the storeroom.
- Procedures to be followed in case of emergency and of plant protection product spillage.
- Procedure for washing and disposing of empty containers.
- Procedure for managing surplus plant protection products, and records.
- Procedure or instructions to ensure observance of reentry times for treated plots.
- Sampling procedures (when this activity it is performed farm employees).
- Records of application.
- Visual identification and signs in plant protection product storeroom, the measuring and mixing area, and treated fields.
- Suitable infrastructure for the fertilizer storeroom and for the preparation and mixing area.

- Protective gear for operators who apply plant protection products, properly maintained and in good condition.
- In the case of exports, up-to-date list of the maximum residue levels permitted in the destination country and markets.
- Pesticide analysis reports.

8. Harvesting and transportation

Produce may become contaminated during harvest, especially if workers do not observe hygiene procedures or if harvesting equipment is dirty or in poor condition. As contamination can also occur during the storage and transport of harvested produce, it is important to adopt good practices to minimize these risks.

Objective

Prevent the contamination of harvested produce by adopting good hygiene practices both for workers and for harvesting equipment and materials, as well as for produce storage and transportation

General recommendations:

- Design and apply a hygiene procedure for harvest and transport activities, based on a risk analysis.
- At the least, this procedure should cover workers, harvesting equipment and materials, produce handling, storage, transportation, and field toilets.
- A written training program should be in operation, with records kept of these activities.
- Harvest workers should be in good health, with no injuries or open wounds that could affect the safety of harvested produce.

- Clearly defined hygiene instructions should be posted in view of workers and visitors.
- There should be evidence that hygiene procedures and instructions are being followed by workers.

Worker hygiene

- Harvest workers (including supervisors), whether temporary or permanent, part time or full time, should be familiar with the basic principles of hygiene, personal hygiene, the use of protective or appropriate clothing (i.e., hand washing, wearing jewelry, nail cutting, general cleanliness, etc.), and with appropriate personal conduct (i.e., no smoking or spitting, etc.).
- Workers should wear clothing that is appropriate for the tasks they carry out; clothing should be clean and provide protection against contaminants.
- Activities such as eating, drinking, and smoking should be restricted to specific areas, away from plant protection products and far from planting, harvesting, handling, storage, and transportation areas.

Bathroom facilities

- Workers should have access to toilets and to hand-washing equipment, with all the items necessary for correct washing (unscented soap, paper towels, etc.).
- Post clear messages (such as pictograms) in visible places instructing workers to wash their hands correctly before handling products, especially after using the bathroom.
- Workers should have proper dressing rooms where they can change their clothes.

Hygiene of equipment and materials used in harvesting

- Harvesting equipment and materials (knives, containers, tables, baskets, packing materials, scissors, brushes, etc.) should always be used appropriately and be kept clean in order to prevent indirect contamination of harvested produce.
- Harvesting equipment and materials should be washed with potable water, not canal or river water.
- Containers used to transport fresh produce should be cleaned before use and be clearly identified to prevent their use for other purposes.
- Damaged containers that cannot be cleaned should be discarded in order to reduce the possibility of microbial contamination.
- Equipment and materials used to remove garbage, manure, and other waste should not be used to load or transport harvested produce.
- Containers used often during harvest should be cleaned repeatedly, before they are reused. If they are stored out in the open, they should be cleaned and disinfected before use.
- It is recommended that one person be responsible for supervising the use of harvesting equipment and materials. This person should ensure that everything is working properly and take the actions necessary to clean, and if necessary, disinfect them.

Produce packed at point of harvest

- If fruits and vegetables are processed directly in the field (i.e., washed, cooled, packed), steps should be taken to ensure that they are not contaminated in the process.
- Contact with manure, poor quality water, unclean workers, and unclean packing crates or materials increase the risk of contamination by pathogenic microorganisms.
- Produce-handling facilities and equipment should be kept clean and in good condition to prevent contamination.

- When water or ice are used for processing produce in the harvesting area, the water, including the water used to make ice, should be potable water and be handled under sanitary conditions to prevent contamination of the produce.
- Cleaning products should be stored in a designated area, away from produce handling, packing and transport areas.
- Chemical products (cleaning products, waxes, etc.) that enter into contact with the produce should be authorized for such use by the food industry.
- The hygiene procedure should cover the harvesting and handling of produce directly in the field.
- Packing material used for in-field packing should be stored in a place that is protected from contamination.
- In-field harvested and packed produce should be protected from contamination.

Storage and transportation of harvested produce

- Harvested produce should always be duly protected and kept in the shade. Every effort should be made for trucks to be loaded in shaded areas.
- Installations where fresh produce is stored should be cleaned and, if necessary disinfected, before harvest. Storerooms and outside areas should be inspected regularly for signs of any type of pest (rodents, birds or insects). If such presence is noted, traps, bait and barriers should be set out, and a map should be made available indicating where each one is. To avoid cross-contamination, do not use toxic baits in storerooms.
- Before loading transport vehicles, they should be checked for overall cleanliness and strange odors.
- Have written instructions on how to clean and inspect vehicles.

- Transportation vehicles should only be used for harvested produce, at least during harvest time. They should not have been used to transport pesticides, animals, animal feed, or anything other than fruits, vegetables and harvest materials.
- It is recommended that produce be protected during transportation. If trucks are not closed, they can be covered with mesh to protect the produce.

Compliance indicators:

- Risk assessment report.
- Written hygiene procedures.
- Written instructions or signs for the prevention of physical, chemical and microbiological contamination of harvested produce.
- Clean-up and disinfection plan for facilities, equipment, tools, etc., plus the corresponding records.
- Equipment maintenance plan, plus the corresponding records.
- Hygiene verification records.
- Record of the state of cleanliness of worker toilets and washbasins.
- Procedure describing what to do in case of bleeding injuries, including what to do if the harvested produce or harvest tools become contaminated.
- Worker hygiene and health records.
- Training program, plus corresponding records.
- Control records of water used to wash harvesting materials.
- Documentation (labels, technical data sheets, specifications, etc.) authorizing the use of chemical products, such as cleaning agents, etc., on harvested produce.

- Control records of water or ice if used in processing produce.
- Written instructions on the cleaning and checking of produce transport vehicles.
- Records of the cleaning and checking of transport vehicles.

9. Workers' health, safety, and welfare

Workers, be they temporary or permanent, part-time or full-time, play a key role in ensuring food safety and good quality produce. They should receive training that will provide them with the skills they need to perform their tasks; in addition, they should be provided with suitable equipment for carrying out their jobs safely. Both of these practices aim at achieving greater sustainability in the field.

Objective

Obtain safe and good-quality produce through responsible production that provide safe conditions and practices in the workplace

General recommendations:

- Working conditions should be safe, in keeping with the agribusiness activity and labor laws currently in force.
- The farm should have set procedures for dealing with accidents and emergencies, hygiene procedures, and procedures for dealing with the risks identified.
- All the employees, including supervisors, temporary personnel, and part-time and full-time workers, should receive training, either in written form or verbally, related to the subjects of health, hygiene, and safety. The training should be provided by skilled personnel.

- Training intensity (degree of know-how) will depend on the type of operation, the task to be performed, and the responsibilities assigned.
- Workers who show symptoms of disease or who have open injuries that cannot be properly covered should be removed from any activity that involves direct or indirect contact with produce.
- Workers should be instructed to inform their supervisors of any symptom of disease or illness.
- Supervisors should be familiar with the symptoms of infectious diseases so they can take the necessary action.
- When gloves are used, workers should be instructed in their correct use so the gloves do not become a means for disseminating pathogens.

Important

Using gloves does not reduce the need to wash hands or to practice good hygiene habits.

- It is recommended that at least one person have first aid training to ensure timely response in the case of accidents.
- Hygiene instructions should be clear to ensure that they are understood by all workers.
- Visitors should be informed of the farm's hygiene and safety procedures.
- Workers who handle or apply chemicals, disinfectants, pesticides, or other hazardous substances, as well as operators of complex or dangerous equipment, should have certificates or other documents that attest to their competence in performing said activities.
- All potential risks and hazards should be clearly identified with warning signs placed in the corresponding areas (waste disposal areas, oil tanks, pesticide storeroom, treated fields, etc.).
- Well-stocked emergency first aid kits should be accessible to workers (near the harvesting area and in places where dangerous substances or machinery are handled).

- Workers, including subcontractors, should wear suitable protective clothing in accordance with label instructions or as required by the competent authority.
- Protective clothing and equipment should be complete and in good condition, in line with label instructions of the products and pesticides applied. They should be cleaned after use and stored in a ventilated area, away from the pesticides and other chemical products that could contaminate them.
- A member of management should be given responsibility for worker health, safety, and welfare. All workers should be aware of who that person is.
- Workers should have access to clean food storage areas, designated dining areas, hand washing facilities, and drinking water.
- Workers should have access to toilets.
- On-site living facilities should be equipped with water, toilets or a watertight septic tank.

Compliance indicators:

- Set procedures for dealing with accidents or emergencies, set hygiene procedures, and set procedures for dealing with the identified risks.
- Staff training program, plus the corresponding records.
- Instructions on hygiene, safety, and on the procedure to be followed in the event of accidents and emergencies.
- Visible notices (signs, pictograms, etc.) informing workers and visitors of hygiene, health, and safety requirements on the site.
- Records of meetings between workers and the person in management responsible for worker health, safety, and welfare that show that workers' concerns are being addressed.
- Protective equipment is complete, in good condition, and given proper maintenance.

- Infrastructure and facilities required for worker welfare (dining area, bathrooms, etc.).
- Complete records for workers, regardless of whether they are permanent or temporary, full-time or part-time.
- Records for checking protective clothing and equipment.
- Worker hygiene records.
- Worker health and attendance records.

10. Waste and pollution management

This covers activities to prevent, reduce, reuse, and recycle waste produced by farm activities.

Objective

Effectively manage waste and polluting agents produced by farm activities

General recommendations:

- Identify all possible waste and sources of pollution on the farm (paper, containers, harvest waste, effluents, etc.).
- Taking that into account, design and implement a waste and pollution management plan to reduce wastage and to recycle waste, when possible, avoiding landfills and burning.
- The farm and all premises should be kept clean of litter and waste to avoid becoming a breeding ground for pests and diseases.
- Specific areas should be identified for garbage and waste generated during the working day; this should be removed periodically.
- Waste should be identified (organic, glass, plastic) and stored separately.

Compliance indicators:

- List of potential waste and pollution sources identified.
- Written waste and pollution management plan.
- Visible actions that show that the plan is being implemented.
- Visible evidence that fields are litter and waste free.
- Signs posted in garbage and waste collection areas.
- Duly labeled and separate containers for disposing of garbage and waste (organic, glass, plastic).

11. Environmental protection

Producers should be aware of agriculture's impact on the environment and strive to enhance and conserve the environment where they carry out their agricultural activities.

Objective

*Minimize the impact of agriculture on the environment
and on natural flora and fauna*

General recommendations:

- Prepare and implement an environmental conservation management plan, taking into account the impact of agricultural activities.
- Convert unproductive sites (wetlands, woodlands, or strips of impoverished soil) into conservation areas to encourage the development of natural flora and fauna.

- Monitor energy use on the farm to improve energy efficiency (i.e., select and maintain machinery to obtain optimal energy consumption).

Compliance indicators:

- An environmental management plan exists for conserving flora and fauna (the plan can include integrated pest management practices, and cover priority conservation areas, actions to recover habitat damaged or affected by agricultural activity, etc.).
- Energy use records.
- Farm equipment and machinery receive regular maintenance and are kept in good condition to ensure optimal energy consumption.
- Alternative energy sources other than nonrenewable sources are used.

12. Complaint management

Management of complaints is important for improving the food safety management system and for ensuring that requirements are met.

Objective

Promote ongoing improvement of food safety management in the field

General recommendations:

- Establish a procedure for dealing with complaints related to product safety and to the fulfillment of good agricultural practices.

- Investigate the origin of complaints and take corrective actions to avoid reoccurrence.
- Follow up on actions taken to respond to complaints.

Compliance indicators:

- Procedure established for dealing with complaints.
- Records of actions taken in response to complaints.

Sample Records

1. Record of activities of the property

<i>Business name/logo</i>	Record of daily activities	Code/version:
		Date: dd/mm/yy
	Reviewed:	Approved:

<i>Lot name/code:</i>	<i>Area/density</i>
<i>Crop:</i>	<i>Planting date</i>
<i>Variety/cultivar:</i>	<i>Likely harvest date</i>

<i>Date</i>	<i>Record No.</i>	<i>Activity</i>	<i>No. worker/ days</i>	<i>No. hours/ machine</i>	<i>Total area worked</i>	<i>Name and signature of person responsible for the activity</i>

Field supervisor

2. Record of fertilizer application

<i>Business name/logo</i>	Record of fertilizer application (gravity irrigation)	Code/version:
		Date: dd/mm/yy
	Reviewed:	Approved:

Lot code:	Area/density
Crop:	Planting date
Variety/cultivar:	Likely harvest date

	Nitrogen (N)	Phosphorus (P ₂ O ₅)	Potassium (K ₂ O)	Calcium (Ca)	Magnesium (Mg)	Sulfur (S)	Micronutrients (specify)
<i>Total dosage</i>							

Date	Days after planting	Source (trade name)	Input by nutrient							Quantity (kg/ha)	Application method	Equipment	Operator name and signature
			(N)	(P ₂ O ₅)	(K ₂ O)	(Ca)	(Mg)	S	Micron				

Observations _____

Fertilizer program supervisor

Field supervisor

3. Record of fertilizer application

Business name/logo	Daily record of fertilizer application (fertigation)	Code/version:
		Date: dd/mm/yy
	Reviewed:	Approved:

Lot code:	Planting date
Cultivar/variety:	Crop
Plant density:	Harvest date (estimated)

	Nitrogen (N)	Phosphorus (P ₂ O ₅)	Potassium (K ₂ O)	Calcium (Ca)	Magnesium (Mg)	Sulfur (S)	Micronutrients (specify)
Total dosage							

Date and time	Sources (Liters per Ha)								Time/irrigation/shift	Time/inject/shift	Cubic meters/lot	Cubic meters/ha	Person responsible
	Fertilizer 1		Fertilizer 2		Fertilizer 3		Fertilizer 4						
	Daily	Accum	Daily	Accum	Daily	Accum	Daily	Accum					

Observations _____

Fertilizer program supervisor

Field supervisor

4. Equipment calibration record

<i>Business name/logo</i>	Application equipment calibration record Manual sprayer (backpack)	Code/version:
		Date: dd/mm/yy
	Reviewed:	Approved:

<i>Inventory N°</i>	<i>Working pressure</i>
<i>Trade name /model</i>	<i>Discharge</i>
<i>Type of nozzle:</i>	<i>Date of purchas</i>

Registered use: () herbicides () insecticides () fungicides () fertilizer () Other: _____

<i>N° Repetitions</i>	<i>Initial volume (IV) liters</i>	<i>Final volume (FV) liters</i>	<i>Consumption by equipment (IV-FV) liters</i>	<i>Area covered (hectares)</i>	<i>Consumption in liters per ha. (IV-FV) x l ha/ area covered</i>
1					
2					
3					
4					
5					
6					
Average					

Observations _____

Maintenance and calibration supervisor

Field supervisor

5. Equipment maintenance record

<i>Business name/logo</i>	Daily equipment maintenance record	Code/version:
		Date: dd/mm/yy
	Reviewed:	Approved:

<i>Inventory N°</i>	<i>Equipment</i>
<i>Trade name /model</i>	<i>Date of purchase</i>

Registered use: () herbicides () insecticides () fungicides () fertilizer () Other:_____

Date	Condition/ damages	Type of maintenance given	Parts replaced		Maintenance person (name and signature)	Observations
			Part	Voucher N°		

Maintenance and calibration supervisor

Field supervisor

6. Pesticide application record

Business name/logo	Pesticide application record		Code/Version:
			Date: dd/mm/yy
Reviewed:			Approved:

Lot code:	Area density:
Crop	Planting date:
Variety/cultivar:	Estimated harvest date:

Date	Days after planting	Information on pesticide		Control objective	Dose		Reentry date to treated area	Safety period	MRL (ppm)	Application Equipment	Operator	Observations	Approved application supervisor
		Trade name	I/A		Unit of measure	L or kg/cylinder							

Observations _____

Crop protection supervisor _____

Farm manager _____

7. Staff training record

<i>Business name/logo</i>	Pesticide application record	Code/version:
		Date: dd/mm/yy
	Reviewed:	Approved:

Training subject _____ *Date* _____
Speaker _____ *Total hours* _____

Nº	Last name	Surname	Given names	ID number	Work area	Observations	Signature

Training supervisor

8. Pesticide card file

<i>Business name/logo</i>	Pesticide card file (one per commercial product)	Code/version:
		Date: dd/mm/yy
	Reviewed:	Approved:

Product Trade name: _____
Active ingredient: _____
Safety period: _____
Reentry period to treated area: _____
MRL/country: _____

Date	Unit	Received	Used	Lot to be treated	Balance	Justification

Observations _____

Farm or storeroom supervisor

9. Fertilizer card file

<i>Business name/logo</i>	Fertilizer card file (one per commercial product)	Code/version:
		Date: dd/mm/yy
	Reviewed:	Approved:

Fertilizer Trade name: _____

Nutrients: _____

Date	Unit	Quantity		Balance	Justification
		Received	Used		

Observations: _____

Farm or storeroom supervisor

10. Client complaint and claim record

<i>Business name/logo</i>	Complaint and claim record	Code/version: _____
		Date: dd/mm/yy
	Reviewed: _____	Approved: _____

TO BE COMPLETED BY CLIENT

1. *Product information:*

Product: _____
Product lot code: _____
Date received: _____
Origin: _____

2. *Reason for complaint/claim/problem:*

Client signature

TO BE COMPLETED BY PRODUCER

1. *Product information:*

3. *Date complaint is received:* _____
4. *Date complaint is addressed:* _____
5. *Causes that gave rise to the problem:* _____
6. *Corrective action taken:* _____
7. *Observations:* _____

Farm Manager

Source: *Peruvian Asparagus and Vegetables Institute. Local GAP standard for Capsicum. Lima, Peru. 2007*

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GLOBALGAP: <http://www.globalgap.org/>



**Inter-American Institute for Cooperation on Agriculture
Agribusiness Competitiveness Directorate**

**Inter-American Program for the Promotion of Trade
Agribusiness and Food Safety**

5757 Blue Lagoon Drive, Suite 200 Miami, FL, 33126, USA
Telephone: + (305) 260-9010 • Fax: + (305) 260-9020
E-mail: desarrollo.agronegocios@iica.int
Website: www.iica.int / www.infoagro.net/agronegocios