

# INTEGRATED FARM ASSURANCE

## All Farm Base – Crops Base – Plant Propagation Material – Best Practices for Nurseries

CONTROL POINTS AND COMPLIANCE CRITERIA

ENGLISH VERSION 5.2

VALID FROM: 1 FEBRUARY 2019

OBLIGATORY FROM: 1 AUGUST 2019



GLOBALG.A.P.

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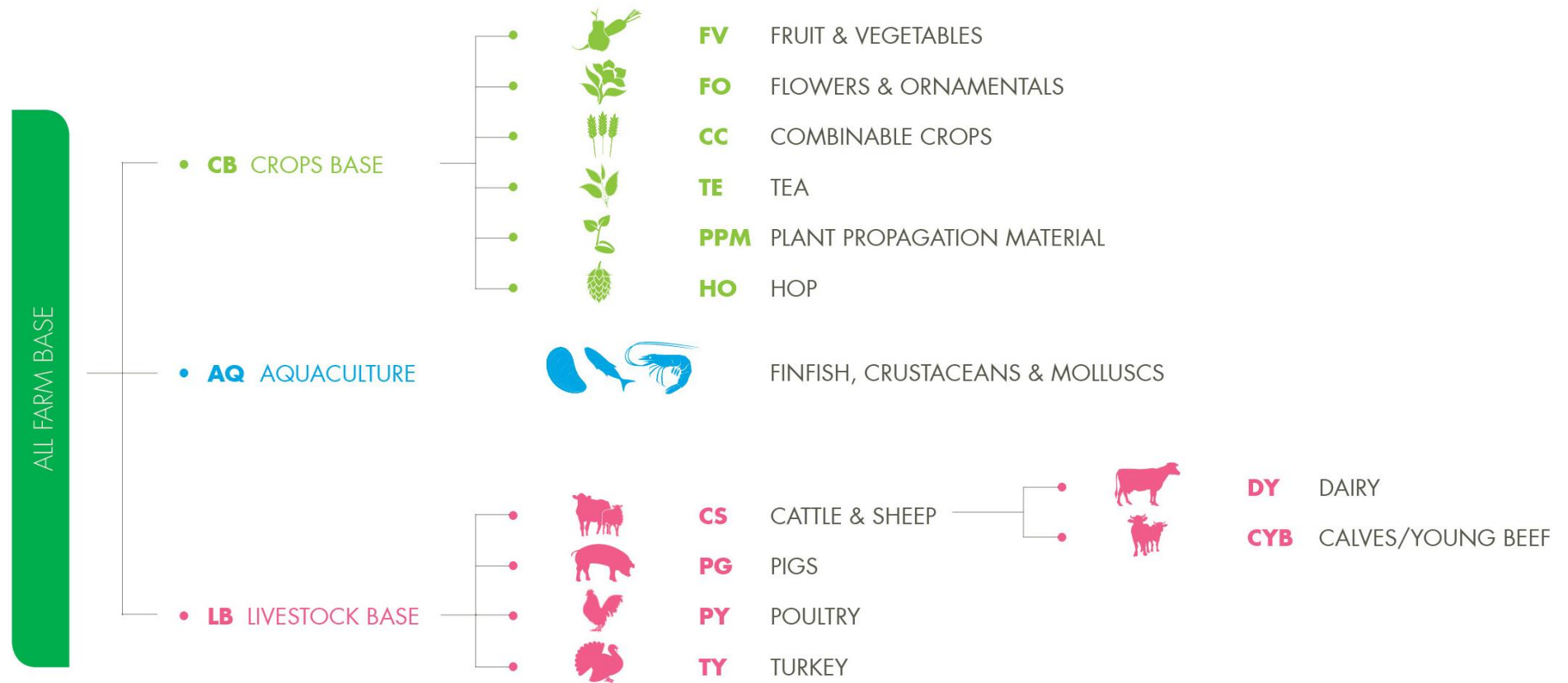
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## INTRODUCTION

- a) The GLOBALG.A.P. Integrated Farm Assurance (IFA) Standard covers the certification of the whole agricultural production process of the product from before the plant is in the ground (origin and propagation material control points) or from when the animal enters the production process to non-processed product (no processing, manufacturing, or slaughtering is covered, except for the first level in Aquaculture).
- b) GLOBALG.A.P. provides the standard and framework for independent, recognized third party certification of primary production processes based on ISO/IEC 17065. Certification of the production process – cropping, growing, rearing, or producing – of products ensures that only those that reach a certain level of compliance with established Good Agricultural Practices (G.A.P.) set out in the GLOBALG.A.P. normative documents are certified.
- c) The IFA Standard offers several benefits to producers:
  - (i) Reducing food safety risks in primary production by encouraging the development and adoption of national and regional farm assurance schemes and with a clear risk assessed HACCP based reference standard serving the consumer and food chain. It also serves as technical communication platform for continuous improvement and transparency through consultation across the entire food chain.
  - (ii) Reducing the cost of compliance by avoiding multiple product audits on mixed farming enterprises by a single “one-stop-shop”, avoiding excess regulators burden by proactive adoption by industry and by achieving global harmonization, leading to a more level playing field.
  - (iii) Increase in the integrity of farm assurance schemes worldwide, by defining and enforcing a common level of auditor competence, verification status, reporting and harmonizing interpretation of compliance criteria.
- d) The IFA Control Points and Compliance Criteria (CPCC) documents are separated into different modules, each one covering different areas or levels of activity on a production site.  
These sections are grouped into:
  - (i) “Scopes” – covering more generic production issues, classified more broadly. These are:  
All Farm Base (AF),  
Crops Base (CB),  
Livestock Base (LB) and  
Aquaculture (AQ).
  - (ii) “Modules” (or “sub-scopes”) – covering more specific production details, classified per product type.

# A MODULAR APPROACH TO INTEGRATED FARM ASSURANCE (IFA)



- e) Legislation relevant to a control points and compliance criterion more demanding than GLOBALG.A.P. overrides the GLOBALG.A.P. requirement. Where there is no legislation (or legislation is not so strict), GLOBALG.A.P. provides a minimum acceptable level of compliance. Legal compliance of all applicable legislation per se is not a condition for certification. The audit carried out by the GLOBALG.A.P. approved certification body (CB) is not replacing the responsibilities of public compliance agencies to enforce legislation. Existence of legislation relevant to a specific CPCC does not change the level of that control point to Major Must. The CPCC levels have to be kept as defined in the CPCC documents and checklists approved and published on the GLOBALG.A.P. website.
- f) Definitions of terminology used in the GLOBALG.A.P. General Regulations and Control Points and Compliance Criteria are available in the 'General Regulations Part I Annex I.4 - [GLOBALG.A.P. Definitions](#)'.
- g) Annexes referenced in the CPCC are guidelines, unless a CPCC states that the annex or part of the annex is mandatory. In the title of those annexes it is stated that they are mandatory. Guidelines referenced in the CPCC document to guide producers to comply with the requirements are *not* normative documents.
- h) Only products included in the GLOBALG.A.P. product list, published on the GLOBALG.A.P. website, can be registered for certification. The GLOBALG.A.P. product list is not limited and can be extended based on demand. Requests to add new products to the product list shall be sent to the e-mail address: [standard\\_support@globalgap.org](mailto:standard_support@globalgap.org) with the following information:
  - (i) Product
  - (ii) Scientific name
  - (iii) Any additional information e.g. cultivation, use, alternative names, pictures, etc. This can be supplied via a website link as well.
- i) The term "shall" is used throughout the GLOBALG.A.P. IFA Standard documents to indicate those provisions which, reflecting the requirements of GLOBALG.A.P., are mandatory.
- j) FoodPLUS GmbH and GLOBALG.A.P. approved certification bodies are not legally liable for the safety of the product certified under this standard and not liable for the data accuracy and completeness in the GLOBALG.A.P. Database entered by the GLOBALG.A.P. approved certification body. Under no circumstances shall FoodPLUS GmbH, its employees, or agents be liable for any losses, damage, charges, costs, or expenses of whatever nature (including consequential loss) which any producer may suffer or incur by reason of, or arising directly or indirectly from the administration by FoodPLUS GmbH, its employees, or agents or the performance of their respective obligations in connection with the scheme save to the extent that such loss, damage, charges, costs, and/or expenses arise as a result of the finally and judicially determined gross negligence or willful default of such person.

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N°	Control Points	Compliance Criteria	Level
AF	<b>ALL FARM BASE</b>		
	<i>Control points in this module are applicable to all producers seeking certification, as it covers issues relevant to all farming businesses.</i>		
AF 1	<b>SITE HISTORY AND SITE MANAGEMENT</b>		
	<i>One of the key features of sustainable farming is the continuous integration of site-specific knowledge and practical experience into future management planning and practices. This section is intended to ensure that the land, buildings, and other facilities which constitute the fabric of the farm, are properly managed to ensure the safe production of food and protection of the environment.</i>		
AF 1.1	<b>Site History</b>		
AF 1.1.1	Is there a reference system for each field, orchard, greenhouse, yard, plot, livestock building/pen, and/or other area/location used in production?	Compliance shall include visual identification in the form of: <ul style="list-style-type: none"> <li>• A physical sign at each field/orchard, greenhouse/yard/plot/livestock building/pen, or other farm area/location</li> </ul> or <ul style="list-style-type: none"> <li>• A farm map, which also identifies the location of water sources, storage/handling facilities, ponds, stables, etc., and that could be cross-referenced to the identification system</li> </ul> No N/A.	Major Must
AF 1.1.2	Is a recording system established for each unit of production or other area/location to provide a record of the livestock/aquaculture production and/or agronomic activities undertaken at those locations?	Current records shall provide a history of GLOBALG.A.P. production of all production areas. No N/A.	Major Must

N°	Control Points	Compliance Criteria	Level
<b>AF 1.2</b>	<b>Site Management</b>		
AF 1.2.1	Is there a risk assessment available for all sites registered for certification (this includes rented land, structures, and equipment) and does this risk assessment show that the site in question is suitable for production, with regards to food safety, the environment, and health and welfare of animals in the scope of the livestock and aquaculture certification where applicable?	<p>A written risk assessment to determine whether the sites are appropriate for production shall be available for all sites. It shall be ready for the initial inspection and maintained updated and reviewed when new sites enter in production and when risks for existing ones have changed, or at least annually, whichever is shorter. The risk assessment may be based on a generic one but shall be customized to the farm situation.</p> <p>Risk assessments shall take into account:</p> <ul style="list-style-type: none"> <li>• Potential physical, chemical (including allergens), and biological hazards</li> <li>• Site history (for sites that are new to agricultural production, history of 5 years is advised and a minimum of one year shall be known)</li> <li>• Impact of proposed enterprises on adjacent stock/crops/environment, and the health and safety of animals in the scope of the livestock and aquaculture certification</li> </ul> <p>(See Annex AF 1 and Annex AF 2 for guidance on risk assessments. Annex FV 1 includes guidance regarding flooding.)</p>	Major Must
AF 1.2.2	Has a management plan that establishes strategies to minimize the risks identified in the risk assessment (AF 1.2.1) been developed and implemented?	<p>A management plan addresses the risks identified in AF 1.2.1 and describes the hazard control procedures that justify that the site in question is suitable for production. This plan shall be appropriate to the farm operations, and there shall be evidence of its implementation and effectiveness.</p> <p>NOTE: Environmental risks do not need to be part of this plan and are covered under AF 7.1.1.</p>	Major Must



N°	Control Points	Compliance Criteria	Level
<b>AF 2</b>	<b>RECORD KEEPING AND INTERNAL SELF-ASSESSMENT/INTERNAL INSPECTION</b>		
	<i>Important details of farming practices shall be recorded and records kept.</i>		
AF 2.1	Are all records requested during the external inspection accessible and kept for a minimum period of 2 years, unless a longer requirement is stated in specific control points?	Producers shall keep up-to-date records for a minimum of 2 years. Electronic records are valid and when they are used, producers are responsible for maintaining back-ups of the information. For the initial inspections, producers shall keep records from at least 3 months prior to the date of the external inspection or from the day of registration, whichever is longer. New applicants shall have full records that reference each area covered by the registration with all of the agronomic activities related to GLOBALG.A.P. documentation required for this area. For livestock, these records shall be available for the current livestock cycle before the initial inspection. This refers to the principle of record keeping. When an individual record is missing, the respective control point dealing with those records is not compliant. No N/A.	Major Must
AF 2.2	Does the producer take responsibility to conduct a minimum of one internal self-assessment per year against the GLOBALG.A.P. Standard?	There is documented evidence that in Option 1 an internal self-assessment has been completed under the responsibility of the producer (this may be carried out by a person different from the producer). Self-assessments shall include all applicable control points, even when a subcontracted company carries them out. The self-assessment checklist shall contain comments of the evidence observed for all non-applicable and non-compliant control points. This has to be done before the CB inspection (see GLOBALG.A.P. General Regulations Part I, section 5.). No N/A, except for multisite operations with QMS and producer groups, for which the QMS checklist covers internal inspections.	Major Must
AF 2.3	Have effective corrective actions been taken as a result of non-conformances detected during the internal self-assessment or internal producer group inspections?	Necessary corrective actions are documented and have been implemented. N/A only in the case no non-conformances are detected during internal self-assessments or internal producer group inspections.	Major Must

N°	Control Points	Compliance Criteria	Level
<b>AF 3</b>	<b>HYGIENE</b>		
	<p><i>People are key to the prevention of product contamination. Farm staff and contractors as well as producers themselves stand for the quality and safety of the product. Education and training will support progress toward safe production. This section is intended to ensure good practices to diminish hygiene risks to the product and that all workers understand the requirements and are competent to perform their duties. Further hygiene requirements, specific to certain activities such as harvest and product handling, are defined in the applicable Standard module.</i></p>		
AF 3.1	Does the farm have a written risk assessment for hygiene?	The written risk assessment for hygiene issues covers the production environment. The risks depend on the products produced and/or supplied. The risk assessment can be a generic one, but it shall be appropriate for conditions on the farm and shall be reviewed annually and updated when changes (e.g. other activities) occur. No N/A.	Minor Must
AF 3.2	Does the farm have a documented hygiene procedure and visibly displayed hygiene instructions for all workers and visitors to the site whose activities might pose a risk to food safety?	<p>The farm shall have a hygiene procedure addressing the risks identified in the risk assessment in AF 3.1. The farm shall also have hygiene instructions visibly displayed for workers (including subcontractors) and visitors provided by way of clear signs (pictures) and/or in the predominant language(s) of the workforce. The instructions must also be based on the results of the hygiene risk assessment in AF 3.1 and include at a minimum:</p> <ul style="list-style-type: none"> <li>• The need to wash hands</li> <li>• The need to cover skin cuts</li> <li>• Limitation on smoking, eating, and drinking to designated areas</li> <li>• Notification of any relevant infections or conditions. This includes any signs of illness (e.g. vomiting, jaundice, diarrhea), whereby these workers shall be restricted from direct contact with the product and food-contact surfaces</li> <li>• Notification of product contamination with bodily fluids</li> </ul> <p>The use of suitable protective clothing, where the individuals' activities might pose a risk of contamination to the product.</p>	Minor Must
AF 3.3	Have all persons working on the farm received annual hygiene training appropriate to their activities and according to the hygiene instructions in AF 3.2?	An introductory training course for hygiene shall be given in both written and verbal form. All new workers shall receive this training and confirm their participation. This training shall cover all instructions defined in AF 3.2. All workers, including the owners and managers, shall annually participate in the farm's basic hygiene training.	Minor Must

N°	Control Points	Compliance Criteria	Level
AF 3.4	Are the farm's hygiene procedures implemented?	Workers with tasks identified in the hygiene procedures shall demonstrate competence during the inspection and there is visual evidence that the hygiene procedures are being implemented. No N/A.	Major Must
<b>AF 4</b>	<b>WORKERS' HEALTH, SAFETY, AND WELFARE</b>		
	<i>People are key to the safe and efficient operation of any farm. Farm staff and contractors as well as producers themselves stand for the quality of the produce and for environmental protection. Education and training will help progress towards sustainability and build on social capital. This section is intended to ensure safe practices in the work place and that all workers both understand and are competent to perform their duties; are provided with proper equipment to allow them to work safely; and that, in the event of accidents, can obtain proper and timely assistance.</i>		
<b>AF 4.1</b>	<b>Health and Safety</b>		
AF 4.1.1	Does the producer have a written risk assessment for hazards to workers' health and safety?	The written risk assessment can be a generic one but it shall be appropriate to conditions on the farm, including the entire production process in the scope of certification. The risk assessment shall be reviewed and updated annually and when changes that could impact workers' health and safety (e.g. new machinery, new buildings, new plant protection products, modified cultivation practices, etc.) occur. Examples of hazards include but are not limited to: Moving machine parts, power take-off (PTO), electricity, farm machinery and vehicle traffic, fires in farm buildings, applications of organic fertilizer, excessive noise, dust, vibrations, extreme temperatures, ladders, fuel storage, slurry tanks, etc. No N/A.	Minor Must
AF 4.1.2	Does the farm have written health and safety procedures addressing issues identified in the risk assessment of AF 4.1.1?	<p>The health and safety procedures shall address the points identified in the risk assessment (AF 4.1.1) and shall be appropriate for the farming operations. They shall also include accident and emergency procedures as well as contingency plans that deal with any identified risks in the working situation, etc. The procedures shall be reviewed annually and updated when the risk assessment changes.</p> <p>The farm infrastructure, facilities, and equipment shall be constructed and maintained in such a way as to minimize health and safety hazards for the workers to the extent practical.</p>	Minor Must

N°	Control Points	Compliance Criteria	Level
AF 4.1.3	Have all people working on the farm received health and safety training according to the risk assessment in AF 4.1.1?	All workers, including subcontractors, can demonstrate competency in responsibilities and tasks through visual observation (if possible, on the day of the inspection). There shall be evidence of instructions in the appropriate language and training records. Producers may conduct the health and safety training themselves if training instructions or other training materials are available (i.e. it need not be an outside individual who conducts the training). No N/A.	Minor Must
<b>AF 4.2</b>	<b>Training</b>		
AF 4.2.1	Is there a record kept for training activities and attendees?	A record is kept for training activities, including the topic covered, the trainer, the date, and a list of the attendees. Evidence of attendance is required.	Minor Must
AF 4.2.2	Do all workers handling and/or administering veterinary medicines, chemicals, disinfectants, plant protection products, biocides, and/or other hazardous substances and all workers operating dangerous or complex equipment as defined in the risk analysis in AF 4.1.1 have evidence of competence or details of other such qualifications?	Records shall identify workers who carry out such tasks and can demonstrate competence (e.g. certificate of training and/or records of training with proof of attendance). This shall include compliance with applicable legislation. No N/A.  For aquaculture, cross-reference with Aquaculture module AQ 4.1.1.  In livestock, for workers administering medicines, proof of adequate experience is also required.	Major Must

N°	Control Points	Compliance Criteria	Level
<b>AF 4.3</b>	<b>Hazards and First Aid</b>		
AF 4.3.1	Do accident and emergency procedures exist? Are they visually displayed, and are they communicated to all persons associated with the farm activities, including subcontractors and visitors?	<p>Permanent accident procedures shall be clearly displayed in accessible and visible location(s) for workers, visitors, and subcontractors. These instructions are available in the predominant language(s) of the workforce and/or pictograms.</p> <p>The procedures shall identify the following:</p> <ul style="list-style-type: none"> <li>• The farm's map reference or farm address</li> <li>• The contact person(s)</li> <li>• An up-to-date list of relevant phone numbers (police, ambulance, hospital, fire-brigade, access to emergency health care on site or by means of transport, supplier of electricity, water, and gas)</li> </ul> <p>Examples of other procedures that can be included:</p> <ul style="list-style-type: none"> <li>• The location of the nearest means of communication (telephone, radio)</li> <li>• How and where to contact the local medical services, hospital, and other emergency services. (<i>Where</i> did it happen? <i>What</i> happened? <i>How</i> many injured people? <i>What</i> kind of injuries? <i>Who</i> is calling?)</li> <li>• The location of fire extinguisher(s)</li> <li>• The emergency exits</li> <li>• Emergency cut-offs for electricity, gas, and water supplies</li> <li>• How to report accidents and dangerous incidents</li> </ul> <p>For aquaculture, cross-reference with Aquaculture module AQ 3.1.4.</p>	Minor Must
AF 4.3.2	Are potential hazards clearly identified by warning signs?	Permanent and legible signs shall indicate potential hazards. This shall include, where applicable: Waste pits, fuel tanks, workshops, and access doors of the storage facilities for plant protection products/fertilizers/any other chemicals. Warning signs shall be present and in the predominant language(s) of the workforce and/or in pictograms. No N/A.	Minor Must
AF 4.3.3	Is safety advice for substances hazardous to workers' health available/accessible?	<p>When required to ensure appropriate action, information (e.g. website, telephone number, material safety data sheets, etc.) is accessible.</p> <p>For aquaculture, cross-reference with Aquaculture module AQ 3.1.2.</p>	Minor Must

N°	Control Points	Compliance Criteria	Level
AF 4.3.4	Are first aid kits available at all permanent sites and in the vicinity of fieldwork?	Complete and maintained first aid kits (i.e. according to local recommendations and appropriate to the activities being carried out on the farm) shall be available and accessible at all permanent sites and readily available for transport (tractor, car, etc.) where required by the risk assessment in AF 4.1.1.	Minor Must
AF 4.3.5	Are there always an appropriate number of persons (at least one person) trained in first aid present on each farm whenever on-farm activities are being carried out?	There is always at least one person trained in first aid (i.e. within the last 5 years) present on the farm whenever on-farm activities are being carried out. As a guideline: One trained person per 50 workers. On-farm activities include all activities mentioned in the relevant modules of this standard.	Minor Must
<b>AF 4.4</b>	<b>Protective Clothing/Equipment</b>		
AF 4.4.1	Are workers, visitors, and subcontractors equipped with suitable protective clothing in accordance with legal requirements and/or label instructions and/or as authorized by a competent authority?	Complete sets of protective clothing, which enable label instructions and/or legal requirements and/or requirements as authorized by a competent authority to be complied which are available on the farm, utilized, and in a good state of repair. To comply with label requirements and/or on-farm operations, this may include some of the following: Rubber boots or other appropriate footwear, waterproof clothing, protective overalls, rubber gloves, face masks, appropriate respiratory equipment (including replacement filters), ear and eye protection devices, life-jackets, etc. as required by label or on-farm operations.	Major Must
AF 4.4.2	Is protective clothing cleaned after use and stored in such a way as to prevent contamination of personal clothing?	Protective clothing is kept clean according to the type of use and degree of potential contamination and in a ventilated place. Cleaning protective clothing and equipment includes separate washing from private clothing. Wash-reusable gloves before removal. Dirty and damaged protective clothing and equipment and expired filter cartridges shall be disposed of appropriately. Single-use items (e.g. gloves, overalls) shall be disposed of after one use. All protective clothing and equipment including replacements filters, etc. shall be stored outside of the plant protection products/storage facility and physically separated from any other chemicals that might cause contamination of the clothing or equipment. No N/A.	Major Must

N°	Control Points	Compliance Criteria	Level
<b>AF 4.5</b>	<b>Worker Welfare</b>		
AF 4.5.1	Is a member of management clearly identifiable as responsible for the workers' health, safety, and welfare?	Documentation is available that clearly identifies and names the member of management who is responsible for ensuring compliance with and implementation of existing, current and relevant national and local regulations on workers' health, safety, and welfare.	Major Must
AF 4.5.2	Does regular two-way communication take place between management and workers on issues related to workers' health, safety, and welfare? Is there evidence of actions taken from such communication?	Records show that communication between management and workers about health, safety, and welfare concerns can take place openly (i.e. without fear of intimidation or retribution) and at least once a year. The auditor is not required to make judgments about the content, accuracy, or outcome of such communications. There is evidence that the concerns of the workers about health, safety, and welfare are being addressed.	Minor Must
AF 4.5.3	Do workers have access to clean food storage areas, designated rest areas, handwashing facilities, and drinking water?	A place to store food and a place to eat shall be provided to the workers if they eat on the farm. Handwashing equipment and drinking water shall always be provided.	Major Must
AF 4.5.4	Are on-site living quarters habitable and have the basic services and facilities?	The on-farm living quarters for the workers are habitable and have a sound roof, windows and doors, and the basic services of drinking water, toilets, and drains. In the case of no drains, septic pits can be accepted if compliant with local regulations.	Major Must
AF 4.5.5	Is transport for workers (on-farm, to and from fields/orchard) as provided by the producer safe and compliant with national regulations when used to transport workers on public roads?	Vehicles or vessels shall be safe for workers and, when used to transport workers on public roads, shall comply with national safety regulations.	Minor Must

N°	Control Points	Compliance Criteria	Level
<b>AF 5</b>	<b>SUBCONTRACTORS</b>		
	<i>A subcontractor is the entity furnishing labor, equipment and/or materials to perform specific farm operation(s) under contract with the producer (e.g. custom grain harvesting, fruit spraying and picking).</i>		
AF 5.1	When the producer makes use of subcontractors, do they oversee their activities in order to ensure that those activities relevant to GLOBALG.A.P. CPCC comply with the corresponding requirements?	<p>The producer is responsible for observing the control points applicable to the tasks performed by the subcontractors who carry out activities covered in the GLOBALG.A.P. Standard, by checking and signing the assessment of the subcontractor for each task and season contracted.</p> <p>Evidence of compliance with the applicable control points shall be available on the farm during the external inspection.</p> <p>i) The producer can perform the assessment and shall keep the evidence of compliance of the control points assessed. The subcontractor shall agree that GLOBALG.A.P. approved certifiers are allowed to verify the assessments through a physical inspection or</p> <p>ii) A third-party certification body, which is GLOBALG.A.P. approved, can inspect the subcontractor. The subcontractor shall receive a letter of conformance from the certification body with the following info:</p> <ol style="list-style-type: none"> <li>1) Date of assessment</li> <li>2) Name of the certification body</li> <li>3) Inspector name</li> <li>4) Details of the subcontractor</li> <li>5) List of the inspected control points and compliance criteria. Certificates issued to subcontractors against standards that are not officially approved by GLOBALG.A.P. are not valid evidence of compliance with GLOBALG.A.P.</li> </ol>	Major Must



N°	Control Points	Compliance Criteria	Level
<b>AF 6</b>	<b>WASTE AND POLLUTION MANAGEMENT, RECYCLING, AND RE-USE</b>		
	<i>Waste minimization shall include review of current practices, avoidance of waste, reduction of waste, re-use of waste, and recycling of waste.</i>		
<b>AF 6.1</b>	<b>Identification of Waste and Pollutants</b>		
AF 6.1.1	Have possible waste products and sources of pollution been identified in all areas of the farm?	Possible waste products (e.g. paper, cardboard, plastic, oil) and sources of pollution (e.g. fertilizer excess, exhaust smoke, oil, fuel, noise, effluent, chemicals, sheep-dip, feed waste, algae produced during net cleaning) produced by the farm processes have been listed.  For crops, producers shall also take into consideration surplus application mix and tank washings.	Minor Must
<b>AF 6.2</b>	<b>Waste and Pollution Action Plan</b>		
AF 6.2.1	Is there a documented farm waste management plan to avoid and/or minimize wastage and pollution to the extent possible, and does the waste management plan include adequate provisions for waste disposal?	A comprehensive, current, and documented plan that covers wastage reduction, pollution, and waste recycling is available. Air, soil, and water contamination shall be considered where relevant along with all products and sources identified in the plan. For aquaculture, cross-reference with Aquaculture module AQ 9.1.1.	Minor Must
AF 6.2.2	Is the site kept in a tidy and orderly condition?	Visual assessment shall show that there is no evidence of waste/litter in the immediate vicinity of the production site(s) or storage buildings. Incidental and insignificant litter and waste on the designated areas are acceptable as well as the waste from the current day's work. All other litter and waste shall be cleared up, including fuel spills.	Major Must
AF 6.2.3	Are holding areas for diesel and other fuel oil tanks environmentally safe?	All fuel storage tanks shall conform to the local requirements. When there are no local requirements to contain spillage, the minimum is bunded areas, which shall be impervious and be able to contain at least 110 % of the largest tank stored within it, unless it is in an environmentally sensitive area where the capacity shall then be 165 % of the content of the largest tank. There shall be no-smoking signs displayed and appropriate fire emergency provisions made nearby.	Minor Must

N°	Control Points	Compliance Criteria	Level
AF 6.2.4	Provided there is no risk of pest, disease, and weed carry-over, are organic wastes composted on the farm and recycled?	Organic waste material is composted and used for soil conditioning. The composting method ensures that there is no risk of pest, disease, or weed carry-over. For aquaculture, cross-reference with Aquaculture module AQ 10.2.2.	Recom.
AF 6.2.5	Is the water used for washing and cleaning purposes disposed of in a manner that ensures the minimum health and safety risks and environmental impact?	Waste water resulting from washing of contaminated machinery, e.g. spray equipment, personal protective equipment, hydro-coolers, or buildings with animals, should be collected and disposed of in a way that ensures the minimum impact on the environment and the health and safety of farm staff, visitors and nearby communities as well as legal compliance. For tank washings see CB 7.5.1.	Recom
<b>AF 7</b>	<b>CONSERVATION</b>		
	<i>Farming and the environment are inseparably linked. Managing wildlife and landscape is of great importance. The abundance and diversity of flora and fauna benefits the enhancement of species and the structural diversity of land and landscape features.</i>		
<b>AF 7.1</b>	<b>Impact of Farming on the Environment and Biodiversity</b> (Cross-Reference with AQ 9 of the Aquaculture Module)		
AF 7.1.1	Does each producer have a wildlife management and conservation plan for the farm business that acknowledges the impact of farming activities on the environment?	There shall be a written action plan that aims to enhance habitats and maintain biodiversity on the farm. This can be either an individual plan or a regional activity that the farm is participating in or is covered by. It shall pay special attention to areas of environmental interest being protected and make reference to legal requirements where applicable. The action plan shall include knowledge of integrated pest management practices, nutrient use of crops, conservation sites, water supplies, the impact on other users, etc.	Minor Must
AF 7.1.2	Has the producer considered how to enhance the environment for the benefit of the local community and flora and fauna? Is this policy compatible with sustainable commercial agricultural production and does it strive to minimize environmental impact of the agricultural activity?	There should be tangible actions and initiatives that can be demonstrated 1) by the producer either on the production site or at the local scale or at the regional scale 2) by participation in a group that is active in environmental support schemes concerned with habitat quality and habitat elements. There is a commitment within the conservation plan to undertake a baseline audit of the current levels, location, condition, etc. of the fauna and flora on the farm, so as to enable actions to be planned. Within the conservation plan, there is a clear list of priorities and actions to enhance habitats for fauna and flora, where viable, and to increase bio-diversity on the farm.	Recom.

N°	Control Points	Compliance Criteria	Level
<b>AF 7.2</b>	<b>Ecological Upgrading of Unproductive Sites</b>		
AF 7.2.1	Has consideration been given to the conversion of unproductive sites (e.g. low-lying wet areas, woodlands, headland strips, or areas of impoverished soil, etc.) to ecological focus areas for the encouragement of natural flora and fauna?	There should be a plan to convert unproductive sites and identified areas that give priority to ecology into conservation areas, where viable.	Recom.
<b>AF 7.3</b>	<b>Energy Efficiency</b>		
<i>Farming equipment shall be selected and maintained for optimum energy efficiency. The use of renewable energy sources should be encouraged.</i>			
AF 7.3.1	Can the producer show monitoring of on-farm energy use?	Energy use records exist (e.g. invoices where energy consumption is detailed). The producer/producer group is aware of where and how energy is consumed on the farm and through farming practices. Farming equipment shall be selected and maintained for optimum energy consumption.	Minor Must
AF 7.3.2	Based on the result of the monitoring, is there a plan to improve energy efficiency on the farm?	A written plan identifying opportunities to improve energy efficiency is available.	Recom.
AF 7.3.3	Does the plan to improve energy efficiency consider minimizing the use of non-renewable energy?	Producers consider reducing the use of non-renewable energies to a minimum possible and use renewable ones.	Recom.
<b>AF 7.4</b>	<b>Water Collection/Recycling</b>		
AF 7.4.1	Where feasible, have measures been implemented to collect water and, where appropriate, to recycle taking into consideration all food safety aspects?	Water collection is recommended where it is commercially and practically feasible, e.g. from building roofs, glasshouses, etc. Collection from watercourses within the farm perimeters may need legal permits from the authorities.	Recom.

N°	Control Points	Compliance Criteria	Level
<b>AF 8</b>	<b>COMPLAINTS</b>		
	<i>Management of complaints will lead to an overall better production system.</i>		
AF 8.1	Is there a complaint procedure available relating to both internal and external issues covered by the GLOBALG.A.P. Standard and does this procedure ensure that complaints are adequately recorded, studied, and followed up, including a record of actions taken?	A documented complaint procedure is available to facilitate the recording and follow-up of all received complaints relating to issues covered by GLOBALG.A.P. actions taken with respect to such complaints. In the case of producer groups, the members do not need the complete complaint procedure, but only the parts that are relevant to them. The complaint procedure shall include the notification of GLOBALG.A.P. Secretariat via the certification body in the case that the producer is informed by a competent or local authority that they are under investigation and/or has received a sanction in the scope of the certificate. No N/A.	Major Must
<b>AF 9</b>	<b>RECALL/WITHDRAWAL PROCEDURE</b>		
AF 9.1	Does the producer have documented procedures on how to manage/initiate the withdrawal/recall of certified products from the marketplace and are these procedures tested annually?	<p>The producer shall have a documented procedure that identifies the type of event that may result in a withdrawal/recall, the persons responsible for making decisions on the possible product withdrawal/recall, the mechanism for notifying the next step in the supply chain and the GLOBALG.A.P. approved certification body, and the methods of reconciling stock.</p> <p>The procedures shall be tested annually to ensure that they are effective. This test shall be recorded (e.g. by picking a recently sold batch, identifying the quantity and whereabouts of the product, and verifying whether the next step involved with this batch and the CB can be contacted. Actual communications of the mock recall to the clients are not necessary. A list of phone numbers and e-mails is sufficient). No N/A.</p>	Major Must
<b>AF 10</b>	<b>FOOD DEFENSE (N/A FOR FLOWERS AND ORNAMENTALS AND PLANT PROPAGATION MATERIAL)</b>		
AF 10.1	Is there a risk assessment for food defense and are procedures in place to address identified food defense risks?	Potential intentional threats to food safety in all phases of the operation shall be identified and assessed. Food defense risk identification shall assure that all input is from safe and secured sources. Information of all employees and subcontractors shall be available. Procedures for corrective action shall be in place in case of intentional threat.	Major Must

N°	Control Points	Compliance Criteria	Level
<b>AF 11</b>	<b>GLOBALG.A.P. STATUS</b>		
AF 11.1	Does all transaction documentation include reference to the GLOBALG.A.P. status and the GGN?	<p>Sales invoices and, where appropriate, other documentation related to sales of certified material/products shall include the GGN of the certificate holder <i>and</i> a reference to the GLOBALG.A.P. certified status. This is not obligatory in internal documentation.</p> <p>Where producers own a GLN, this shall replace the GGN issued by GLOBALG.A.P. during the registration process.</p> <p>Positive identification of the certified status is enough on transaction documentation (e.g. "GLOBALG.A.P. certified &lt;product name&gt;"). Non-certified products do not need to be identified as "non-certified".</p> <p>Indication of the certified status is obligatory regardless of whether the certified product was sold as certified or not. This cannot be checked during the initial (first ever) inspection, because the producer is not certified yet and the producer cannot reference to the GLOBALG.A.P. certified status before the first positive certification decision.</p> <p>N/A only when there is a written agreement available between the producer and the client not to identify the GLOBALG.A.P. status of the product and/or the GGN on the transaction documents.</p>	Major Must

N°	Control Points	Compliance Criteria	Level
<b>AF 12</b>	<b>LOGO USE</b>		
AF 12.1	Is the GLOBALG.A.P. word, trademark, GLOBALG.A.P. QR code or logo and the GGN (GLOBALG.A.P. Number) used according to the GLOBALG.A.P. General Regulations and according to the 'Sublicense and Certification Agreement'?	<p>The producer/producer group shall use the GLOBALG.A.P. word, trademark, GLOBALG.A.P. QR code or logo and the GGN, GLN or sub-GLN according to the General Regulations Part I, Annex 1 and according to the 'Sublicense and Certification Agreement'. The GLOBALG.A.P. word, trademark, or logo shall never appear on the final product, on the consumer packaging, or at the point of sale. However, the certificate holder can use any and/or all in business-to-business communications.</p> <p>The GLOBALG.A.P. word, trademark, or logo cannot be in use during the initial (first ever) inspection because the producer is not certified yet and the producer cannot reference to the GLOBALG.A.P. certified status before the first positive certification decision.</p> <p>N/A for CFM, PPM, GLOBALG.A.P. Aquaculture ova or seedlings, and Livestock, when the certified products are input products, not intended for sale to final consumers and will definitely not appear at the point of sale to final consumers.</p>	Major Must
<b>AF 13</b>	<b>TRACEABILITY AND SEGREGATION</b>		
	<i>Section 13 is applicable to all producers who need to register for parallel production/ownership and to those who buy from other producers (certified or not), the same products they also certify. It is not applicable to producers who certify 100 % of the product in their GLOBALG.A.P. scope and do not buy of those products from other producers (certified or not).</i>		
AF 13.1	Is there an effective system in place to identify and segregate all GLOBALG.A.P. certified and non-certified products?	A system shall be in place to avoid mixing of certified and non-certified products. This can be done via physical identification or product handling procedures, including the relevant records.	Major Must

N°	Control Points	Compliance Criteria	Level
AF 13.2	In the case of producers registered for parallel production/ownership (where certified and non-certified products are produced and/or owned by one legal entity), is there a system to ensure that all final products originating from a certified production process are correctly identified?	<p>In the case the producer is registered for parallel production/ownership (where certified and non-certified products are produced and/or owned by one legal entity), all product packed in final consumer packaging (either from farm level or after product handling) shall be identified with a GGN where the product originates from a certified process.</p> <p>It can be the GGN of the (Option 2) group, the GGN of the group member, both GGNs, or the GGN of the individual (Option 1) producer. The GGN shall not be used to label non-certified products.</p> <p>N/A only when the producer only owns GLOBALG.A.P. products (no PP/PO), or when there is a written agreement available between the producer and the client not to use the GGN, GLN, or sub-GLN on the ready to be sold product. This can also be the client's own label specifications where the GGN is not included.</p>	Major Must
AF 13.3	Is there a final check to ensure the correct product dispatch of certified and non-certified products?	The check shall be documented to show that the certified and non-certified products are dispatched correctly.	Major Must
AF 13.4	Are appropriate identification procedures in place and records for identifying products purchased from different sources available for all registered products?	<p>Procedures shall be established, documented and maintained, appropriately to the scale of the operation, for identifying certified and, when applicable, non-certified quantities purchased from different sources (i.e. other producers or traders) for all registered products.</p> <p>Records shall include:</p> <ul style="list-style-type: none"> <li>• Product description</li> <li>• GLOBALG.A.P. certified status</li> <li>• Quantities of product(s) purchased</li> <li>• Supplier details</li> <li>• Copy of the GLOBALG.A.P. certificates where applicable</li> <li>• Traceability data/codes related to the purchased products</li> <li>• Purchase orders/invoices received by the organization being assessed</li> <li>• List of approved suppliers</li> </ul>	Major Must

N°	Control Points	Compliance Criteria	Level
<b>AF 14</b>	<b>MASS BALANCE</b>		
	<i>Section 14 is applicable to all GLOBALG.A.P. producers. In the case of producer group members, this information may sometimes be covered under the QMS of the group.</i>		
AF 14.1	Are sales records available for all quantities sold and all registered products?	Sales details of certified and, when applicable, non-certified quantities shall be recorded for all registered products, with particular attention to quantities sold and descriptions provided. The documents shall demonstrate the consistent balance between the certified and non-certified input and the output. No N/A.	Major Must
AF 14.2	Are quantities (produced, stored, and/or purchased) recorded and summarized for all products?	<p>Quantities (including information on volumes or weight) of certified, and when applicable non-certified, incoming (including purchased products), outgoing and stored products shall be recorded, and a summary maintained for all registered products, so as to facilitate the mass balance verification process.</p> <p>The frequency of the mass balance verification shall be defined and be appropriate to the scale of the operation, but It shall be done at least annually per product. Documents to demonstrate mass balance shall be clearly identified. This control point applies to all GLOBALG.A.P. producers.</p> <p>No N/A.</p>	Major Must
AF 14.3	Are conversion ratios and/or loss (input-output calculations of a given production process) during handling calculated and controlled?	Conversion ratios shall be calculated and available for each relevant handling process. All generated product waste quantities shall be estimated and/or recorded. No N/A.	Major Must



N°	Control Points	Compliance Criteria	Level
<b>AF 15</b>	<b>FOOD SAFETY POLICY DECLARATION (N/A FOR FLOWERS AND ORNAMENTALS)</b>		
	<i>The 'Food Safety Policy Declaration' reflects in an unambiguous manner the commitment of the producer to ensure that food safety is implemented and maintained throughout the production processes.</i>		
AF 15.1	Has the producer completed and signed the 'Food Safety Policy Declaration' included in the IFA checklist?	<p>Completion and signature of the 'Food Safety Policy Declaration' is a commitment to be renewed annually for each new certification cycle.</p> <p>For a producer under Option 1 without QMS, the self-assessment checklist will only be complete when the 'Food Safety Policy Declaration' is completed and signed.</p> <p>In the case of producer groups (Option 2) and producers under Option 1 Multisite with QMS, it is possible that the central management assumes this commitment for the organization and for all its members by completing and signing one declaration at QMS level. In that case, the members of the producer groups and the individual production sites are not required to complete and sign the declaration individually. No N/A, unless Flowers and Ornamentals or Plant Propagation Material certification.</p>	Major Must
<b>AF 16</b>	<b>FOOD FRAUD MITIGATION (N/A FOR FLOWERS AND ORNAMENTALS)</b>		
	<i>Food fraud may occur on primary production when suppliers provide input products/materials that do not match the specifications (e.g. counterfeit plant protection products (PPP) or propagation material, non-food grade packaging material). This may cause public health crises, and therefore producers should take measures to mitigate these risks.</i>		
AF 16.1	Does the producer have a food fraud vulnerability risk assessment?	A documented risk assessment to identify potential vulnerability to food fraud (e.g. counterfeit PPP or propagation material, non-food grade packaging material) is available, current, and implemented. This procedure may be based on a generic one but shall be customized to the scope of the production.	Minor Must
AF 16.2	Does the producer have a food fraud mitigation plan and has it been implemented?	A documented food fraud mitigation plan, specifying the measures the producer has implemented to address the food fraud threats identified, is available and implemented.	Minor Must

N°	Control Points	Compliance Criteria	Level
<b>AF 17</b>	<b>NON-CONFORMING PRODUCTS</b>		
AF 17.1	Does the producer have a documented procedure for non-conforming products and has it been implemented?	A documented procedure is in place specifying that all non-conforming products shall be clearly identified and quarantined as appropriate. These products shall be handled or disposed of according to the nature of the problem and/or specific customer requirements.	Major Must

## ANNEX AF 1 GLOBALG.A.P. GUIDELINE: RISK ASSESSMENT – GENERAL

### Introduction to Risk Assessment

In the GLOBALG.A.P. IFA Standard, a number of risk assessments are required in order to facilitate food safety, workers' health and safety, and environmental protection. This guidance document provides assistance to producers.

### Five Steps to Risk Assessment

A risk assessment is an important step in protecting the products, workers, and business, as well as complying with GLOBALG.A.P. requirements and the law. A risk assessment helps you to focus on those risks that really matter in the workplace—the ones with the potential to cause real and serious harm. In many instances, straightforward, simple, effective, and inexpensive measures can readily control risks (e.g. ensuring spillages are cleaned up promptly so that the product cannot be contaminated).

It is not expected that you eliminate all risks, but you are expected and required to protect your products and workers as far as it is reasonably practicable.

This is not the only way to perform a risk assessment. There are other methods that work well, particularly for more complex risks and/or circumstances. However, we believe this method provides a straightforward approach for most producers. Workers and others have a right to be protected from harm caused by a failure to take reasonable control measures. Accidents and ill health can ruin lives and affect the business as well, if output is lost or you have to go to court. Producers are legally required to assess the risks in their workplace so that a plan to control the risks can be put in place.

### What is Risk Assessment?

A risk assessment is simply a careful examination of what in your work could cause harm to the product, environment, and/or workers, so that you can evaluate whether you have taken sufficient precautions or should do more to prevent harm.

*Don't overcomplicate* the process. In many enterprises, the risks are well-known and the necessary control measures are easy to apply. Check that you have taken reasonable precautions to avoid contamination and/or injury.

When thinking about your risk assessment, remember:

- A *hazard* is anything that may cause harm, such as chemicals, electricity, working from ladders, etc.
- The *risk* is the chance, high or low, that these and other hazards, together with an indication of how serious the harm could be, could harm somebody.

### How to Assess the Risks in Your Enterprise

Step 1: Identify the hazards.

Step 2: Decide who/what might be harmed and how.

Step 3: Evaluate the risks and decide on precautions.

Step 4: Record the work plan/findings and implement them.

Step 5: Review the assessment and update if necessary.

### Step 1: Identify the Hazards

First, you need to identify how the product, environment, and/or workers could be harmed. Here are some tips to help identify the ones that matter:

- Walk around the workplace and look at what could reasonably be expected to cause harm (e.g. situations, equipment, products, practices, etc.).
- Ask the workers (if applicable) or their representatives what they think. They may have noticed things that are not immediately obvious to you.
- Check manufacturers' instructions or data sheets for chemicals and equipment, as these can be very helpful in identifying the hazards and putting them in their true perspective.
- Review prior incidence and accident records, as these often help to identify less obvious hazards. Remember to think about long-term hazards to health (e.g. high levels of noise or exposure to harmful substances) as well as (food) safety hazards.

### Step 2: Decide Who/What Might be Harmed and How

For each hazard, you need to be clear about who or what might be harmed. This will help you identify the best way of managing the risk.

Remember:

- Some activities have particular requirements, (e.g. harvesting).
- Some hazards will require extra thought, especially in situations where individuals (e.g. cleaners, visitors, contractors, maintenance workers, etc.) may not be in the workplace all the time.

### Step 3: Evaluate the Risks and Decide on Precautions

Having spotted the hazards, you then have to decide what to do about them. The law requires you to do everything reasonably practicable to protect people from harm. You can work this out for yourself, but the easiest way is to compare what is being done against what are already defined as good practices.

So first, look at what you are already doing, and think about what controls you have in place and how the work is organized. Then compare that with the good practices and see if there's more you should be doing to bring yourself up to standard. During your evaluation process, consider the following:

- Can I get rid of the hazard altogether?
- If not, how can I manage the risks so that harm is unlikely?

When managing risks, if possible, apply the principles below and, if possible, in the following order:

- Try a less risky option (e.g. switch to using a less hazardous chemical).
- Prevent access to the hazard (e.g. by guarding).
- Organize the work/tasks to reduce exposure to the hazard.
- Issue personal protective equipment (e.g. clothing, footwear, goggles, etc.).
- Provide welfare facilities (e.g. first aid and washing facilities for removal of contamination).

Improving health and safety need not cost a lot. For instance, placing a mirror on a dangerous blind corner to help prevent vehicle accidents is a low-cost precaution considering the risks. Failure to take simple precautions can cost you a lot more if an accident does happen.

Involve staff (if applicable), so that you can be sure that what you propose to do will work in practice and won't introduce any new hazards.

#### **Step 4: Record the Work Plan/Findings and Implement Them**

Putting the results of the risk assessment into practice will make a difference when looking after food safety, workers' health and safety, and your business.

Writing down the results of the risk assessment and sharing them with your staff encourages you to complete the implementation.

When writing down the results, keep it simple (e.g. contamination at harvest: handwashing facilities at the field).

The risk assessment is not expected to be perfect, but it shall be suitable and sufficient. You need to be able to show that:

- A proper check was made.
- You asked who or what might be affected.
- You dealt with all the significant hazards.
- The precautions are reasonable and the remaining risk is low.
- You involved your staff or their representatives (where applicable) in the process.

A good plan of action often includes a mixture of different responses such as:

- Temporary solution until more reliable controls can be put in place
- Long-term solutions to those risks most likely to cause accidents or ill health
- Long-term solutions to those risks with the worst potential consequences
- Arrangements for training employees on the primary risks that remain and how these risks are to be controlled
- Regular checks to make sure that the control measures stay in place
- Clearly defined responsibilities. Who will lead on what action and by when?

Remember, prioritize and tackle the most important things first. As you complete each action, tick it off your work plan.

### Step 5: Review the Risk Assessment and Update if Necessary

Few enterprises stay the same. Sooner or later, you will bring in new equipment, substances, and/or procedures that could lead to new hazards. It makes sense, therefore, to review what you are doing on an ongoing basis. Every year, formally review where you are with respect to recognized good practices to make sure you are still improving, or at least not sliding back.

Look at your risk assessment again:

- Have there been any changes?
- Are there improvements you still need to make?
- Have your workers spotted problems?
- Have you learned anything from incidences or near misses?
- *Make sure your risk assessment stays up-to-date.*

When you are running a business, it's all too easy to forget about reviewing your risk assessment—until something has gone wrong and it's too late. Why not set a review date for this risk assessment now? Write it down and note it in your diary as an annual event.

During the year, if there is a significant change, don't wait. Check the risk assessment and, where necessary, amend it. If possible, it is best to think about the risk assessment when you're planning a change—that way there is more flexibility.

Source: 'Five Steps to Risk Assessment, Health and Safety Executive' ([www.hse.gov.uk/pubns/indg163.pdf](http://www.hse.gov.uk/pubns/indg163.pdf))

## ANNEX AF 2 GLOBALG.A.P. GUIDELINE: RISK ASSESSMENT – SITE MANAGEMENT

Control points AF 1.2.1 (M) and AF 1.2.2 (M) require producers to carry out a risk assessment of their production site and to take appropriate action to mitigate any risks identified.

### Control Point AF 1.2.1

Is there a risk assessment available for all sites registered for certification (this includes rented land, structures, and equipment) and does this risk assessment show that the site in question is suitable for production, with regards to food safety, the environment, and the health and welfare of animals in the scope of the livestock certification, where applicable?

### Compliance Criterion AF 1.2.1

A written risk assessment to determine whether the sites are appropriate for production shall be available for all sites. It shall be ready for the initial inspection and maintained, updated, and reviewed when new sites enter in production, and when risks for existing ones have changed, or at least annually, whichever is shorter. The risk assessment may be based on a generic one but shall be customized to the farm situation.

Risk assessments shall take into account:

- Potential physical, chemical (including allergens), and biological hazards
- Site history (for sites that are new to agricultural production, history of 5 years is advised and a minimum of one year shall be known)
- Impact of proposed enterprises on adjacent stock/crops/environment, and the health and safety of animals in the scope of the livestock certification

(See Annex AF 1 and AF 2 for guidance on risk assessments. Annex FV 1 includes guidance regarding flooding)

### Control Point AF 1.2.2

Has a management plan that establishes strategies to minimize the risks identified in the risk assessment (AF 1.2.1) been developed and implemented?

### Compliance Criterion AF 1.2.2

A management plan addresses the risks identified in AF 1.2.1 and describes the hazard control procedures that justify that the site in question is suitable for production. This plan shall be appropriate to the products being produced, and there shall be evidence of its implementation and effectiveness.

NOTE: Environmental risks do not need to be part of this plan and are covered under AF 7.1.1.

The risk assessment should consider relevant physical, chemical, and microbiological hazards and take into account the type of farm operation and the way in which farm output will, eventually, be used. The next table helps to identify the most common factors and hazards to consider when carrying out a site risk assessment. This is *not an exhaustive list of factors*. Growers shall consider it as guidance designed to help trigger their analysis of farm conditions in order to prepare the risk assessment for the site. They shall not consider these examples as a comprehensive list.

**1. Legislation:**

Legislation (national or local) may restrict the farm operations. Local regulations should be checked first to verify legal compliance.

**2. Prior Use of Land:**

Example of Factors to Consider	Example of Risks that can be Involved
Previous crops	Some crops (e.g. cotton production) typically involve heavy use of residual herbicides that can have long-term effects on cereal and other vegetable crops.
Former use	Industrial or military use can cause contamination to land through residues, petroleum contamination, garbage storage, etc. Landfill or mining sites may have unacceptable waste in their subsoil that can contaminate subsequent crops or harm livestock. They may be subject to sudden subsidence endangering persons working on the land. Husbandry may create zones of high microbial content (manure deposit, etc.).

**3. Soil:**

Example of Factors to Consider	Example of Risks that can be Involved
Soil structure	Structural suitability for intended use (including susceptibility to erosion) and chemical/microbiological integrity
Erosion	Conditions that cause losses of topsoil by water/wind that may affect crop yields and/or affect land and water downstream
Susceptibility to flooding	Susceptibility to flooding and probable contamination of soil through the flood
Wind exposure	Excessive wind speeds can cause crop losses



**4. Water:**

Example of Factors to Consider	Example of Risks that can be Involved
Water availability	Adequacy throughout the year, or at least the proposed growing season. The amount of water supply shall at least match the consumption of the intended crops. Water shall be available in a sustainable condition.
Water quality	The risk assessment should establish whether water quality is 'fit for purpose'. In some instances, 'fit for purpose' may be defined by a local authority. Evaluate probabilities of upstream contamination (sewage, animal farms, etc.) that may need costly treatments. For certain applications, the grower shall be aware of a minimum microbiological water quality specified by the authority or GLOBALG.A.P. Where this is the case, the requirements are specified in the relevant GLOBALG.A.P. module (WHO Guidelines for Drinking-Water Quality, 2008: <i>E. coli</i> or thermo-tolerant coliform bacteria shall not be detectable in any 100 ml sample). See also FV 1.1.1 under FV 1.1 'Risk Assessment'.
Authorization to use water	Rights or license of use of water: local laws or customs may recognize other users whose needs may pre-empt agricultural use at times. Environmental impact: While legal, some extraction rates could adversely affect flora and fauna associated with or dependent on the water source.

## 5. Allergens:

Food allergies have received much attention over the past few years with an estimated 2 % of adults and 5 % of children now suffering from some type of food allergy.

All foods have the potential to cause a food allergy, however there are groups of foods that are responsible for causing the majority of food allergies. In the EU, for example, 14 main allergens which are subject to labeling legislation have been identified: Celery, cereals containing gluten, eggs, fish, lupin (a kind of legume of the Fabaceae family), milk, molluscs, mustard, peanuts, sesame seeds, shellfish, soya, sulfur dioxide (used as an antioxidant and preservative, e.g. in dried fruits), and tree nuts.

Whilst the control of allergens is crucial for food processors and caterers, it is also a relevant issue to be considered by primary producers.

Allergens in fruits and vegetables are not as complicated as other foods. Cooking destroys many of them, and thus cooked fruits are often safe for fruit allergic people to eat. Peanut allergy can be so severe that only very tiny amounts of peanut can cause a reaction. Tree nuts such as Brazil nut, hazelnut, walnut, and pecan can cause symptoms as severe.

Lists of food allergens and information on labeling can be found on national or EU websites (see AF 1.2.1, AF 1.2.2, and FV 5.9.1).

Example of Factors to Consider	Example of Risks that can be Involved
Previous crops	Mechanical harvest of crops in rotation with peanuts (legume grown underground) might introduce rests of peanuts. Transportation of produce in vehicles that have transported products in the group of main allergens may introduce cross-contamination if vehicles are not adequately cleaned.
Product handling	Cross-contamination when packing and/or storing of products in the same facilities with those considered amongst main food allergens

## 6. Other impacts:

Example of Factors to Consider	Example of Risks that can be Involved
Impacts on the neighborhood	Dust, smoke, and noise problems caused by the operation of agricultural machinery. Contamination of downstream sites by silt-laden or chemical-laden runoff. Spray drift.
Impacts on the farm	Type of adjacent farming activities. Smoke, fumes, and/or dust from nearby industrial or transport installations, including roads with heavy traffic. Insects attracted by crops, waste products, and/or operations using manure. Depredations by pests from nearby natural or conservation areas.

## VERSION/EDITION UPDATE REGISTER

New Document	Replaced Document	Date of Publication	Description of Modifications
160201_GG_IFA_CPCC_AF_V5_0-1_en	150630_GG_IFA_CPCC_AF_V5-0_en	1 February 2016	AF 4 – Chapter description deleted as it belongs to AF 3; AF 4.4.1 CC – typing error corrected; AF 16.1 CC – small change of wording; AF 16.2 CC – corrected wording of Compliance Criteria; Annex AF 1 – change of wording of second bullet point under “What is Risk Assessment”
160630_GG_IFA_CPCC_AF_V5_0-2_en	160201_GG_IFA_CPCC_AF_V5_0-1_en	1 July 2016	AF 10, AF 15 and AF 16 amendment in titles of chapters; AF 15.1 CC – text added to third paragraph.
170630_GG_IFA_CPCC_AF_V5_1_en	160630_GG_IFA_CPCC_AF_V5_0-2_en	1 July 2017	Update of IFA structure graphic to include Hops module AF 16.1 – change in level AF 16.2 – change in level
190201_GG_IFA_CPCC_AF_V5_2_en	170630_GG_IFA_CPCC_AF_V5_1_en	1 February 2019	Included new control point and compliance criterion AF 17.1 Annex AF 2, 5. – text added

If you want to receive more information on the modifications in this document, see details in the [document version with traceable changes](#) or contact the GLOBALG.A.P. Secretariat at [translation\\_support@globalgap.org](mailto:translation_support@globalgap.org).

When the changes do not introduce new requirements to the standard, the version will remain “5.0” and an edition update shall be indicated with “5.0-x”. When the changes do affect compliance with the standard, the version name will change to “5.x”. A new version, e.g. V6.0, V7., etc., will always affect the accreditation of the standard.



GLOBALG.A.P.

# INTEGRATED FARM ASSURANCE

## Crops Base

CONTROL POINTS AND COMPLIANCE CRITERIA

ENGLISH VERSION 5.2

VALID FROM: 1 FEBRUARY 2019

OBLIGATORY FROM: 1 AUGUST 2019

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N°	Control Points	Compliance Criteria	Level
<b>CB</b>	<b>CROPS BASE</b>		
<b>CB 1</b>	<b>TRACEABILITY</b>		
	<i>Traceability facilitates the recall/withdrawal of foods and flowers and ornamentals and enables customers to be provided with targeted and accurate information concerning implicated products.</i>		
CB 1.1	Is a GLOBALG.A.P. registered product traceable back to and trackable from the registered farm (and other relevant registered areas) where it has been produced and, if applicable, handled?	There is a documented identification and traceability system that allows GLOBALG.A.P. registered products to be traced back to the registered farm or, in a producer group, to the registered farms of the group, and tracked forward to the immediate customer (one step up, one step down). Harvest information shall link a batch to the production records or the farms of specific producers (refer to General Regulations Part II for information on segregation in Option 2). Produce handling shall also be covered, if applicable. No N/A.	Major Must
<b>CB 2</b>	<b>PROPAGATION MATERIAL</b>		
	<i>The choice of propagation material plays an important role in the production process and, by using the appropriate varieties, can help to reduce the number of fertilizer and plant protection product applications. The choice of propagation material is a precondition of good plant growth and product quality.</i>		
<b>CB 2.1</b>	<b>Quality and Health</b>		
	<i>The purpose of variety registration is to provide growers, processors, retailers, and governments a means of oversight to ensure that health and safety requirements are met, and that information related to the identity of the variety is available to regulators to prevent fraud. Variety registration aims at protecting the buyer of the seed/young plants/harvested material by providing the basic assurance that the starting material used conforms to the official variety description.</i>		
CB 2.1.1	When seeds or propagation material have been purchased in the past 24 months, is there evidence that guarantees they have been obtained in compliance with variety registration laws (in the case mandatory variety registration exists in the respective country)?	A document (e.g. empty seed package, plant passport, packing list, or invoice) that states as a minimum variety name, batch number, propagation material vendor, and, where available, additional information on seed quality (germination, genetic purity, physical purity, seed health, etc.) shall be available.  Material coming from nurseries that have GLOBALG.A.P. Plant Propagation Material, equivalent or GLOBALG.A.P. recognized certification is considered compliant.	Minor Must

N°	Control Points	Compliance Criteria	Level
CB 2.1.2	Has the propagation material used been obtained in accordance to applicable intellectual property laws?	<p>When producers use registered varieties or rootstock, there are written documents available on request that prove that the propagation material used has been obtained in accordance to applicable local intellectual property right laws. These documents may be the license contract (for starting material that does not originate from seed, but from vegetative origin), the plant passport if applicable or, if a plant passport is not required, a document or empty seed package that states, as a minimum, variety name, batch number, propagation material vendor, and packing list/delivery note or invoice to demonstrate size and identity of all propagation material used in the last 24 months. No N/A.</p> <p>Note: The PLUTO Database of UPOV (<a href="http://www.upov.int/pluto/en">http://www.upov.int/pluto/en</a>) and the Variety Finder Tool on the website of CPVO (<a href="http://cpvo.europa.eu">cpvo.europa.eu</a>) list all varieties in the world, providing their registration details and the intellectual property protection details per variety and country.</p>	Minor Must
CB 2.1.3	Are plant health quality control systems operational for in-house nursery propagation?	A quality control system that contains a monitoring system for visible signs of pest and diseases is in place and current records of the monitoring system shall be available. Nursery means anywhere propagation material is produced, (including in-house grafting material selection). The monitoring system shall include the recording and identification of the mother plant or field of origin crop, as applicable. Recording shall be at regular established intervals. If the cultivated trees or plants are intended for own use only (i.e. not sold), this will suffice. When rootstocks are used, special attention shall be paid to the origin of the rootstocks through documentation.	Minor Must
<b>CB 2.2</b>	<b>Chemical Treatments and Dressings</b>		
CB 2.2.1	Is the purchased propagation material (seed, rootstocks, seedlings, plantlets, cuttings) accompanied by information of chemical treatments done by the supplier?	<p>Records with the name(s) of the chemical product(s) used by the supplier on the propagation material (e.g. maintaining records/ seed packages, list with the names of the plant protection product (PPP) used, etc.) are available on request.</p> <p>Suppliers who hold a GLOBALG.A.P. Plant Propagation Material, equivalent or GLOBALG.A.P. recognized certificate are considered compliant with the control point. N/A for perennial crops.</p>	Minor Must

N°	Control Points	Compliance Criteria	Level
CB 2.2.2	Are PPP treatments recorded for in-house nursery propagation materials applied during the plant propagation period?	Records of all PPP treatments applied during the plant propagation period for in-house plant nursery propagation are available and include location, date, trade name and active ingredient, operator, authorized by, justification, quantity, and machinery used.	Minor Must
<b>CB 2.3</b>	<b>Genetically Modified Organisms (N/A if no Genetically Modified Varieties are Used)</b>		
CB 2.3.1	Does the planting of or trials with genetically modified organisms (GMOs) comply with all applicable legislation in the country of production?	The registered farm or group of registered farms have a copy of the legislation applicable in the country of production and comply accordingly. Records shall be kept of the specific modification and/or the unique identifier. Specific husbandry and management advice shall be obtained.	Major Must
CB 2.3.2	Is there documentation available of when the producer grows GMOs?	If GMO cultivars and/or products derived from genetic modification are used, records of planting, use or production of GMO cultivars and/or products derived from genetic modification are maintained.	Minor Must
CB 2.3.3	Have the producer's direct clients been informed of the GMO status of the product?	Documented evidence of communication shall be provided and shall allow verification that all material supplied to direct clients is according to customer requirements.	Major Must
CB 2.3.4	Is there a plan for handling genetically modified (GM) material (i.e. crops and trials) identifying strategies to minimize contamination risks (e.g. such as accidental mixing of adjacent non-GM crops) and maintaining product integrity?	A written plan that explains how GM materials (e.g. crops and trials) are handled and stored to minimize risk of contamination with conventional material and to maintain product integrity is available.	Minor Must
CB 2.3.5	Are GM crops stored separately from other crops to avoid adventitious mixing?	A visual assessment of the integrity and identification of GM crops storage shall be made.	Major Must



N°	Control Points	Compliance Criteria	Level
<b>CB 3</b>	<b>SOIL MANAGEMENT AND CONSERVATION</b>		
	<i>Good soil husbandry ensures the long-term fertility of the soil, aids yield, and contributes to profitability. Not applicable in the case of crops that are not grown directly on the soil (e.g. hydroponic or potted plants).</i>		
CB 3.1	Does the producer have a soil management plan?	<p>The producer shall demonstrate that consideration has been given to the nutritional needs of the crop and to maintaining soil fertility. Records of analyses and/or crop-specific literature shall be available as evidence.</p> <p>Flowers and ornamentals producers shall perform calculations at least once for every single crop harvested and on a justified regular basis (e.g. every 2 weeks in closed systems) for continuously harvested crops. (Analysis may be conducted with on-farm equipment or mobile kits). No N/A.</p>	Minor Must
CB 3.2	Have soil maps been prepared for the farm?	The types of soil are identified for each site, based on a soil profile or soil analysis or local (regional) cartographic soil-type map.	Recom.
CB 3.3	Is there, where feasible, crop rotation for annual crops?	When rotations of annual crops to improve soil structure and minimize soil borne pests and diseases are done, this can be verified from planting date and/or PPP application records. Records shall exist for the previous 2-year rotation.	Minor Must
CB 3.4	Have techniques been used to improve or maintain soil structure and avoid soil compaction?	There is evidence of techniques applied (e.g. use of deep-rooting green crops, drainage, subsoiling, use of low-pressure tires, tramlines, permanent row marking, avoiding in-row plowing, smearing, poaching,) that are suitable for use on the land and, where possible, minimize, isolate, or eliminate soil compaction, etc.	Minor Must
CB 3.5	Does the producer use techniques to reduce the possibility of soil erosion?	There is evidence of control practices and remedial measures (e.g. mulching, cross line techniques on slopes, drains, sowing grass or green fertilizers, trees and bushes on borders of sites, etc.) to minimize soil erosion (e.g. water, wind).	Minor Must
CB 3.6	Has the producer taken into account the nutrient contribution of organic fertilizer applications?	An analysis from the supply is carried out or recognized standard values are used, which take into account the contents of NPK nutrients (nitrogen ( <b>N</b> ), phosphorus ( <b>P</b> ), potassium ( <b>K</b> )) in organic fertilizer applied in order to avoid soil contamination.	Minor Must

N°	Control Points	Compliance Criteria	Level
CB 3.7	Does the producer keep records on seed/planting rate, sowing/planting date?	Records of sowing/planting, rate/density, and date shall be kept and be available.	Minor Must
<b>CB 4</b>	<b>FERTILIZER APPLICATION</b>		
	<i>The fertilization decision-making process involves consideration of crop demands. Nutrients shall be available for crops in the growing substrate or soil and fertilization is often necessary. Correct application to optimize use and storage procedures to avoid loss and contamination shall be followed.</i>		
<b>CB 4.1</b>	<b>Advice on Quantity and Type of Fertilizer</b>		
CB 4.1.1	Are recommendations for the application of fertilizers (organic or inorganic) provided by competent and qualified persons?	<p>Where the fertilizer records show that the technically responsible person determining quantity and type of the fertilizer (organic or inorganic) is an external adviser, training and technical competence shall be demonstrated via official qualifications, specific training courses, etc., unless employed for that purpose by a competent organization (e.g. official advisory services).</p> <p>Where the fertilizer records show that the technically responsible person determining quantity and type of fertilizer (organic or inorganic) is the producer or designated employee, experience shall be complemented by technical knowledge (e.g. access to product technical literature, specific training course attendance, etc.) and/or the use of tools (software, on farm detection methods, etc.).</p>	Minor Must
<b>CB 4.2</b>	<b>Records of Application</b>		
	<b>4.2.1 to 4.2.6:</b> Do records of all applications of soil and foliar fertilizers, both organic and inorganic, include the following criteria:		
CB 4.2.1	Field, orchard or greenhouse reference and crop?	Records shall be kept of all fertilizer applications, detailing the geographical area and the name or reference of the field, orchard, or greenhouse where the registered product crop is located. Records shall also be kept for hydroponic situations and where fertigation is used. No N/A.	Minor Must
CB 4.2.2	Application dates?	The exact dates (day, month and year) of the application are detailed in the records of all fertilizer applications. No N/A.	Minor Must
CB 4.2.3	Applied fertilizer types?	The trade name, type of fertilizer (e.g. NPK), and concentrations (e.g. 17-17-17) are detailed in the records of all fertilizer applications. No N/A.	Minor Must

N°	Control Points	Compliance Criteria	Level
CB 4.2.4	Applied quantities?	The amount of product to be applied in weight or volume relative to a unit of area or number of plants or unit of time per volume of fertigation is detailed in the records of all fertilizer applications. The actual quantity applied shall be recorded, as this is not necessarily the same as the recommendation. No N/A.	Minor Must
CB 4.2.5	Method of application?	The method and/or equipment used are detailed in the records of all fertilizer applications. In the case the method/equipment is always the same, it is acceptable to record these details only once. If there are various equipment units, these are identified individually. Methods may be e.g. via irrigation or mechanical distribution. Equipment may be e.g. manual or mechanical. No N/A.	Minor Must
CB 4.2.6	Operator details?	The name of the operator who has applied the fertilizer is detailed in the records of all fertilizer applications.  If a single individual makes all of the applications, it is acceptable to record the operator details only once. If there is a team of workers performing the fertilization, all of them need to be listed in the records. No N/A.	Minor Must
<b>CB 4.3</b>	<b>Fertilizer Storage</b>		
	<b>4.3.1 to 4.3.7:</b> Are all fertilizers stored:		
CB 4.3.1	Separately from PPPs?	The minimum requirement is to prevent physical cross-contamination between fertilizers (organic and inorganic) and PPPs by using a physical barrier (wall, sheeting, etc.). If fertilizers that are applied together with PPPs (i.e. micronutrients or foliar fertilizers) are packed in a closed container, they can be stored with PPPs.	Minor Must
CB 4.3.2	In a covered area?	The covered area is suitable to protect all inorganic fertilizers (e.g. powders, granules, or liquids) from atmospheric influences (e.g. sunlight, frost and rain, high temperature). Based on a risk assessment (fertilizer type, weather conditions, storage duration and location), plastic coverage could be acceptable. It is permitted to store lime and gypsum in the field. As long as the storage requirements on the material safety data sheet are complied with, bulk liquid fertilizers can be stored outside in containers.	Minor Must

N°	Control Points	Compliance Criteria	Level
CB 4.3.3	In a clean area?	Inorganic fertilizers (e.g. powders, granules, or liquids) are stored in an area that is free from waste, does not constitute a breeding place for rodents, and where spillage and leakage may be cleared away.	Minor Must
CB 4.3.4	In a dry area?	The storage area for all inorganic fertilizers (e.g. powders, granules, or liquids) is well ventilated and free from rainwater or heavy condensation. Storage cannot be directly on the soil except for lime/gypsum.	Minor Must
CB 4.3.5	In an appropriate manner that reduces the risk of contamination of water sources?	All fertilizers are stored in a manner that poses minimum risk of contamination to water sources. Liquid fertilizer stores/tanks shall be surrounded by an impermeable barrier to contain a capacity to 110 % of the volume of the largest container, if there is no applicable legislation.	Minor Must
CB 4.3.6	Not together with harvested products?	Fertilizers shall not be stored with harvested products.	Major Must
CB 4.3.7	Is there an up-to-date fertilizer stock inventory or stock calculation listing incoming fertilizer and records of use available?	The stock inventory (type and amount of fertilizers stored) shall be updated within a month after there is a movement of the stock (in and out). A stock update can be calculated by registration of supply (invoices or other records of incoming fertilizers) and use (treatments/applications), but there shall be regular checks of the actual content so as to avoid deviations with calculations.	Minor Must
<b>CB 4.4</b>	<b>Organic Fertilizer</b>		
CB 4.4.1	Does the producer prevent the use of human sewage sludge on the farm?	No treated or untreated human sewage sludge is used on the farm for the production of GLOBALG.A.P. registered crops. No N/A.	Major Must
CB 4.4.2	Has a risk assessment been carried out for organic fertilizer, which, prior to application, considers its source, characteristics and intended use?	Documented evidence is available to demonstrate that a food safety and environmental risk assessment for the use of organic fertilizer has been done, and that at least the following have been considered: <ul style="list-style-type: none"> <li>• Type of organic fertilizer</li> <li>• Method of treatment to obtain the organic fertilizer</li> <li>• Microbial contamination (plant and human pathogens)</li> <li>• Weed/seed content</li> <li>• Heavy metal content</li> <li>• Timing of application, and placement of organic fertilizer (e.g. direct contact to edible part of crop, ground between crops, etc.).</li> </ul> This also applies to substrates from biogas plants.	Minor Must

N°	Control Points	Compliance Criteria	Level
CB 4.4.3	Is organic fertilizer stored in an appropriate manner that reduces the risk of contamination of the environment?	Organic fertilizers shall be stored in a designated area. Appropriate measures, adequate according to the risk assessment in AF 1.2.1, have been taken to prevent the contamination of water sources (e.g. concrete foundation and walls, specially built leak-proof container, etc.) or shall be stored at least 25 meters from water sources.	Minor Must
<b>CB 4.5</b>	<b>Nutrient Content of Inorganic Fertilizers</b>		
CB 4.5.1	Is the content of major nutrients (NPK) of applied fertilizers known?	Documented evidence/labels detailing major nutrient content (or recognized standard values) is available for all fertilizers used on crops grown under GLOBALG.A.P. within the last 24-month period.	Minor Must
CB 4.5.2	Are purchased inorganic fertilizers accompanied by documented evidence of chemical content, which includes heavy metals?	Documented evidence detailing chemical content, including heavy metals, is available for all inorganic fertilizers used on crops grown under GLOBALG.A.P. within the last 12-month period.	Recom.
<b>CB 5</b>	<b>WATER MANAGEMENT</b>		
	<i>Water is a scarce natural resource and irrigation should be designed and planned by appropriate forecasting and/or by technical equipment allowing for the efficient use of irrigation water. For information about responsible water use, see Annex CB 1.</i>		
<b>CB 5.1</b>	<b>Predicting Irrigation Requirements</b>		
CB 5.1.1	Are tools used routinely to calculate and optimize the crop irrigation requirements?	The producer can demonstrate that crop irrigation requirements are calculated based on data (e.g. local agricultural institute data, farm rain gauges, drainage trays for substrate growing, evaporation meters, water tension meters for the percentage of soil moisture content). Where on-farm tools are in place, these should be maintained to ensure that they are effective and in a good state of repair. N/A only for rain-fed crops.	Minor Must
<b>CB 5.1</b>	<b>Predicting Irrigation Requirements</b>		
CB 5.1.1	Are tools used routinely to calculate and optimize the crop irrigation requirements?	The producer can demonstrate that crop irrigation requirements are calculated based on data (e.g. local agricultural institute data, farm rain gauges, drainage trays for substrate growing, evaporation meters, water tension meters for the percentage of soil moisture content). Where on-farm tools are in place, these should be maintained to ensure that they are effective and in a good state of repair. N/A only for rain-fed crops.	Minor Must

N°	Control Points	Compliance Criteria	Level
<b>CB 5.2</b>	<b>Efficient Water Use on Farm</b>		
CB 5.2.1	Has a risk assessment been undertaken that evaluates environmental issues for water management on the farm and has it been reviewed by the management within the previous 12 months?	There is a documented risk assessment that identifies environmental impacts of the water sources, distribution system and irrigation and crop washing usages. In addition, the risk assessment shall take into consideration the impact of own farming activities on off-farm environments, where information is known to be available. The risk assessment shall be completed, fully implemented and it shall be reviewed and approved annually by the management. See 'Annex AF 1 GLOBALG.A.P. Guideline: Risk Assessment - General' and 'Annex CB 1 GLOBALG.A.P. Guideline: Responsible On-Farm Water Management for Crops' for further guidance. No N/A.	Major Must (obligatory as Major Must from 1 July 2017)
CB 5.2.2	Is there a water management plan available that identifies water sources and measures to ensure the efficiency of application and which management has approved within the previous 12 months?	<p>There is a written and implemented action plan, approved by the management within the previous 12 months, which identifies water sources and measures to ensure efficient use and application.</p> <p>The plan shall include one or more of the following: Maps (see AF 1.1.1), photographs, drawings (hand drawings are acceptable), or other means to identify the location of water source(s), permanent fixtures and the flow of the water system (including holding systems, reservoirs or any water captured for re-use).</p> <p>Permanent fixtures, including wells, gates, reservoirs, valves, returns, and other above-ground features that make up a complete irrigation system, shall be documented in such a manner as to enable location in the field. The plan shall also assess the need for the maintenance of irrigation equipment.</p> <p>Training and/or retraining of personnel responsible for the oversight or performance duties shall be provided. Short and long-term plans for improvement, with timescales where deficiencies exist, shall be included. This can either be an individual plan or a regional activity that the farm may be participating in or is covered by such activities.</p>	Major Must (obligatory as Major Must from 1 July 2017)
CB 5.2.3	Are records for crop irrigation/fertigation water usage and for the previous individual crop cycle(s) with total application volumes maintained?	The producer shall keep records of the usage of crop irrigation/fertigation water that include the date, cycle duration, actual or estimated flow rate, and the volume (per water meter or per irrigation unit) updated on a monthly basis, based on the water management plan and an annual total. This can also be the hours of systems operating on a timed flow basis.	Minor Must

N°	Control Points	Compliance Criteria	Level
<b>CB 5.3</b>	<b>Water Quality</b>		
CB 5.3.1	Is the use of treated sewage water in pre-harvest activities justified according to a risk assessment?	<p>Untreated sewage is not used for irrigation/fertigation or other pre-harvest activities.</p> <p>Where treated sewage water or reclaimed water is used, water quality shall comply with the WHO published 'Guidelines for the Safe Use of Wastewater and Excreta in Agriculture and Aquaculture 2006'. Also, when there is reason to believe that the water may be coming from a possibly polluted source (i.e. because of a village upstream, etc.) the producer shall demonstrate through analysis that the water complies with the WHO guideline requirements or the local legislation for irrigation water. No N/A.</p>	Major Must
CB 5.3.2	Has a risk assessment on physical and chemical pollution of water used on pre-harvest activities (e.g. irrigation/fertigation, washings, spraying) been completed and has it been reviewed by the management within the last 12 months?	<p>A risk assessment that takes into consideration, at a minimum, the following shall be performed and documented:</p> <ul style="list-style-type: none"> <li>• Identification of the water sources and their historical testing results (if applicable)</li> <li>• Method(s) of application (see Annex CB 1 for examples)</li> <li>• Timing of water use (during crop growth stage)</li> <li>• Contact of water with the crop</li> <li>• Characteristics of the crop and the growth stage</li> <li>• Purity of the water used for PPP applications</li> </ul> <p>PPP must be mixed in water whose quality does not compromise the effectiveness of the application. Any dissolved soil, organic matter or minerals in the water can neutralize the chemicals. For guidance, producers must obtain the required water standards from the product label, the literature provided by the chemical manufacturers, or seek advice from a qualified agronomist.</p> <p>The risk assessment shall be reviewed by the management every year and updated any time there is a change made to the system or a situation occurs that could introduce an opportunity to contaminate the system. The risk assessment shall address potential physical (e.g. excessive sediment load, rubbish, plastic bags, bottles) and chemical hazards and hazard control procedures for the water distribution system.</p>	Minor Must

N°	Control Points	Compliance Criteria	Level
CB 5.3.3	Is water used on pre-harvest activities analyzed at a frequency in line with the risk assessment (CB 5.3.2) taking into account current sector specific standards?	Water testing shall be part of the water management plan as directed by the water risk assessment and current sector specific standards or relevant regulations for the crops being grown. There shall be a written procedure for water testing during the production and harvest season, which includes frequency of sampling, who is taking the samples, where the sample is taken, how the sample is collected, the type of test, and the acceptance criteria. N/A for sub-scope Flowers and Ornamentals.	Minor Must
CB 5.3.4	According to the risk assessment in CB 5.3.2 and current sector specific standards, does the laboratory analysis consider chemical and physical contamination, and is the laboratory accredited against ISO 17025 or by competent national/local authorities for testing water?	If according to the risk assessment and current sector specific standards there is a risk of contamination, the laboratory analysis provides a record of the relevant identified chemical and physical contaminants. Analysis results from an appropriate laboratory accredited against ISO 17025 or equivalent standard, or laboratories approved for water testing by the competent national/local authorities are available. N/A for sub-scope Flowers and Ornamentals.	Minor Must
CB 5.3.5	Are corrective actions taken based on adverse results from the risk assessment before the next harvest cycle?	Where required, corrective actions and documentation are available as part of the management plan as identified in the water risk assessment and current sector specific standards. N/A for sub-scope Flowers and Ornamentals.	Minor Must
<b>CB 5.4</b>	<b>Supply of Irrigation/Fertigation Water</b>		
CB 5.4.1	Where legally required, are there valid permits/licenses available for all farm water extraction, water storage infrastructure, on-farm usage and, where appropriate, any subsequent water discharge?	There are valid permits/licenses available issued by the competent authority for all farm water extraction; water storage infrastructure; all on-farm water usage including but not restricted to irrigation, product washing or flotation processes; and where legally required, for water discharge into river courses or other environmentally sensitive areas. These permits/licenses shall be available for inspection and have valid dates.	Minor Must
CB 5.4.2	Where the water permits/licenses indicate specific restrictions, do the water usage and discharge records confirm that the management has complied with these?	It is not unusual for specific conditions to be set in the permits/licenses, such as hourly, daily, weekly, monthly, or yearly extraction volumes or usage rates. Records shall be maintained and available to demonstrate that these conditions are being met.	Major Must



N°	Control Points	Compliance Criteria	Level
<b>CB 5.5</b>	<b>Water Storage Facilities</b>		
CB 5.5.1	Are water storage facilities present and well maintained to take advantage of periods of maximum water availability?	Where the farm is located in areas of seasonal water availability, there are water storage facilities for water use during periods when water availability is low. Where required, they are legally authorized, in a good state of repair, and appropriately fenced/secured to prevent accidents.	Recom.
<b>CB 6</b>	<b>INTEGRATED PEST MANAGEMENT</b>		
	<i>Integrated pest management (IPM) involves the careful consideration of all available pest control techniques and the subsequent integration of appropriate measures that discourage the development of pest populations and keeps plant protection products and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. An IPM toolbox (Annex CB 2) has been developed to provide alternative actions for the application of IPM techniques in the commercial production of agricultural and horticultural crops. Given the natural variation on pest development for the different crops and areas, any IPM system shall be implemented in the context of local physical (climatic, topographical etc.), biological (pest complex, natural enemy complex, etc.), and economic conditions.</i>		
CB 6.1	Has assistance with the implementation of IPM systems been obtained through training or advice?	Where an external adviser has provided assistance, training and technical competence shall be demonstrated via official qualifications, specific training courses, etc., unless this person has been employed for that purpose by a competent organization (e.g. official advisory services).  Where the technically responsible person is the producer, experience shall be complemented by technical knowledge (e.g. access to IPM technical literature, specific training course attendance, etc.) and/or the use of tools (software, on-farm detection methods, etc.).	Minor Must
	<b>CB 6.2 to 6.5:</b> Can the producer show evidence of implementing activities that fall under the category of:		
CB 6.2	Prevention?	The producer shall show evidence of implementing at least 2 activities per registered crop that include the adoption of production practices that could reduce the incidence and intensity of pest attacks, and thereby reducing the need for intervention.	Major Must
CB 6.3	Observation and Monitoring?	The producer shall show evidence of a) implementing at least 2 activities per registered crop that will determine when and to what extent pests and their natural enemies are present, and b) using this information to plan what pest management techniques are required.	Major Must

N°	Control Points	Compliance Criteria	Level
CB 6.4	Intervention?	The producer shall show evidence that in situations where pest attacks adversely affect the economic value of a crop, intervention with specific pest control methods will take place. Where possible, non-chemical approaches shall be considered. N/A when the producer did not need to intervene.	Major Must
CB 6.5	Have anti-resistance recommendations, either on the label or other sources, been followed to maintain the effectiveness of available PPPs?	When the level of a pest, disease or weed requires repeated controls in the crops, there is evidence that anti-resistance recommendations (where available) are followed.	Minor Must
<b>CB 7</b>	<b>PLANT PROTECTION PRODUCTS</b>		
<i>In situations where a pest attack will adversely affect the economic value of a crop, it may be necessary to intervene using specific pest control methods, including PPPs. The correct use, handling and storage of plant protection products are essential.</i>			
<b>CB 7.1</b>	<b>Choice of Plant Protection Products</b>		
CB 7.1.1	Is a current list kept of PPPs that are authorized in the country of production for use on crops being grown?	A list is available for the commercial brand names of PPPs (including their active ingredient composition or beneficial organisms) that are authorized on crops being, or which have been, grown on the farm under GLOBALG.A.P. within the last 12 months.	Minor Must
CB 7.1.2	Does the producer only use PPPs that are currently authorized in the country of use for the target crop (i.e. where such an official registration scheme exists)?	All the PPPs applied are officially and currently authorized or permitted by the appropriate governmental organization in the country of application. Where no official registration scheme exists, refer to the GLOBALG.A.P. guideline on this subject (Annex CB 3) as well as the 'FAO International Code of Conduct on the Distribution and Use of Pesticides'. Refer also to Annex CB 3 for cases where the producer takes part in legal field trials for final approval of PPPs by the local government. No N/A.	Major Must
CB 7.1.3	Is the PPP that has been applied appropriate for the target as recommended on the product label?	All the PPPs applied to the crop are suitable and can be justified (according to label recommendations or official registration body publication) for the pest, disease, weed or target of the PPP intervention. If the producer uses an off-label PPP, there shall be evidence of official approval for use of that PPP on that crop in that country. No N/A.	Major Must
CB 7.1.4	Are invoices of PPPs kept?	Invoices or packing slips of all PPPs used and/or stored shall be kept for record keeping and available at the time of the external inspection. No N/A.	Minor Must

N°	Control Points	Compliance Criteria	Level
<b>CB 7.2</b>	<b>Advice on Quantity and Type of Plant Protection Products</b>		
CB 7.2.1	Are the persons selecting the PPPs competent to make that choice?	<p>Where the PPP records show that the technically responsible person making the choice of the PPPs is an external qualified adviser, technical competence shall be demonstrated via official qualifications or specific training course attendance certificates. Fax and e-mails from advisers, governments, etc. are permissible.</p> <p>Where the PPP records show that the technically responsible person making the choice of PPPs is the producer or designated employee, experience shall be complemented by technical knowledge that can be demonstrated via technical documentation (e.g. product technical literature, specific training course attendance, etc.).</p>	Major Must
<b>CB 7.3</b>	<b>Records of Application</b>		
CB 7.3.1	<p>Are records of all PPP applications kept and do they include the following minimum criteria:</p> <ul style="list-style-type: none"> <li>• Crop name and/or variety</li> <li>• Application location</li> <li>• Date and end time of application</li> <li>• Product trade name and active ingredient</li> <li>• Pre-harvest interval</li> </ul>	<p>All PPP application records shall specify:</p> <ul style="list-style-type: none"> <li>• The crop and/or variety treated. No N/A.</li> <li>• The geographical area, the name or reference of the farm, and the field, orchard or greenhouse where the crop is located. No N/A.</li> <li>• The exact dates (day/month/year) and end time of the application. The actual date (end date, if applied more than one day) of application shall be recorded. Producers need not record end times, but in these cases it shall be considered that application was done at the end of the day recorded. This information shall be used to cross-check compliance with the pre-harvest intervals. No N/A.</li> <li>• The complete trade name (including formulation) and active ingredient or beneficial organism with scientific name. The active ingredient shall be recorded or it shall be possible to connect the trade name information to the active ingredient. No N/A.</li> <li>• The pre-harvest interval has been recorded for all PPP applications where a pre-harvest interval is stated on the product label or, if not on label, as stated by an official source. No N/A unless Flowers and Ornamentals certification.</li> </ul>	Major Must

N°	Control Points	Compliance Criteria	Level
	<b>7.3.2 to 7.3.7:</b> Are records of all plant protection product applications kept and do they also include the following criteria:		
CB 7.3.2	Operator?	Full name and/or signature of the responsible operator(s) applying the PPPs shall be recorded. For electronic software systems, measures shall be in place to ensure authenticity of records. If a single individual makes all the applications, it is acceptable to record the operator details only once. If there is a team of workers doing the application, all of them need to be listed in the records. No N/A.	Minor Must
CB 7.3.3	Justification for application?	The name of the pest(s), disease(s) and/or weed(s) treated is documented in all PPP records. If common names are used, they shall correspond to the names stated on the label. No N/A.	Minor Must
CB 7.3.4	Technical authorization for application?	The technically responsible person making the decision on the use and the doses of the PPP(s) being applied has been identified in the records. If a single individual authorizes all the applications, it is acceptable to record this person's details only once. No N/A.	Minor Must
CB 7.3.5	Product quantity applied?	All PPP application records specify the amount of product to be applied in weight or volume or the total quantity of water (or other carrier medium) and dose in g/l or internationally recognized measures for the PPP. No N/A.	Minor Must
CB 7.3.6	Application machinery used?	The application machinery type (e.g. knapsack, high volume, U.L.V., via the irrigation system, dusting, fogger, aerial, or another method) for all the PPPs applied (if there are various units, these are identified individually) is detailed in all PPP application records. If it is always the same unit of application machinery (e.g. only 1 boom sprayer), it is acceptable to record the details only once. No N/A.	Minor Must
CB 7.3.7	Weather conditions at time of application?	Local weather conditions (e.g. wind, sunny/covered and humidity) affecting effectiveness of treatment or drift to neighboring crops shall be recorded for all PPP applications. This may be in the form of pictograms with tick boxes, text information, or another viable system on the record. N/A for covered crops.	Minor Must
CB 7.3.8	Does the producer take active measures to prevent pesticide drift to neighboring plots?	The producer shall take active measures to avoid the risk of pesticide drift from own plots to neighboring production areas. This may include, but is not limited to, knowledge of what the neighbors are growing, maintenance of spray equipment, etc.	Minor Must

N°	Control Points	Compliance Criteria	Level
CB 7.3.9	Does the producer take active measures to prevent pesticide drift from neighboring plots?	The producer shall take active measures to avoid the risk of pesticide drift from adjacent plots e.g. by making agreements and organizing communication with producers from neighboring plots in order to eliminate the risk for undesired pesticide drift, by planting vegetative buffers at the edges of cropped fields, and by increasing pesticide sampling on such fields. N/A if not identified as risk.	Recom.
<b>CB 7.4</b>	<b>Pre-Harvest Interval</b> (N/A for Flowers and Ornamentals)		
CB 7.4.1	Have the registered pre-harvest intervals been complied with?	The producer shall demonstrate that all pre-harvest intervals have been complied with for PPPs applied to the crops, through the use of clear records such as PPP application records and crop harvest dates. Specifically in continuous harvesting situations, there are systems in place in the field, orchard or greenhouse (e.g. warning signs, time of application, etc.) to ensure compliance with all pre-harvest intervals. Refer to CB 7.6.4. No N/A, unless Flowers and Ornamentals production.	Major Must
<b>CB 7.5</b>	<b>Disposal of Surplus Application Mix</b>		
CB 7.5.1	Is surplus application mix or tank washings disposed of in a way that does not compromise food safety and the environment?	Applying surplus spray and tank washings to the crop is a first priority under the condition that the overall label dose rate is not exceeded. Surplus mix or tank washings shall be disposed of in a manner that does not compromise neither food safety nor the environment. Records are kept. No N/A.	Minor Must
<b>CB 7.6</b>	<b>Plant Protection Product Residue Analysis</b> (N/A for Flowers and Ornamentals or Plant Propagation Material Production)		
CB 7.6.1	Can the producer demonstrate that information regarding the maximum residue levels (MRLs) of the country(ies) of destination (i.e. market(s) in which the producer intends to trade) is available?	The producer or the producer's customer shall have available a list of current applicable MRLs for all market(s) in which produce is intended to be traded (domestic and/or international). The MRLs shall be identified by either demonstrating communication with clients confirming the intended market(s), or by selecting the specific country(ies) (or group of countries) in which produce is intending to be traded, and presenting evidence of compliance with a residue screening system that meets the current applicable MRLs of that country. Where a group of countries is targeted together for trading, the residue screening system shall meet the strictest current applicable MRLs in the group. Refer to 'Annex CB 4 GLOBALG.A.P. Guideline: CB 7.6 Residue Analysis'.	Major Must

N°	Control Points	Compliance Criteria	Level
CB 7.6.2	Has action been taken to meet the MRLs of the market in which the producer is intending to trade the produce?	Where the MRLs of the market in which the producer is intending to trade the produce are stricter than those of the country of production, the producer or the producer's customer shall demonstrate that during the production cycle these MRLs have been taken into account (i.e. modification where necessary of PPP application regime and/or use of produce residue testing results).	Major Must
CB 7.6.3	Has the producer completed a risk assessment covering all registered crops to determine if the products will be compliant with the MRLs in the country of destination?	<p>The risk assessment shall cover all registered crops and evaluate the PPP use and the potential risk of MRL exceedance.</p> <p>Risk assessments normally conclude that there is a need to undertake residue analysis and identify the number of analyses, when and where to take the samples, and the type of analysis according to 'Annex CB 5 GLOBALG.A.P. Guideline: CB 7.6.3 Maximum Residue Limit Exceedance Risk Assessment'. The Annex CB 5 B 'Mandatory Minimum Criteria of a Residue Monitoring System (RMS)' is obligatory.</p> <p>A risk assessment that concludes that there is no need to undertake residue analysis shall have identified that there is:</p> <ul style="list-style-type: none"> <li>• A track history of 4 or more years of analytical verification without detecting incidences (e.g. exceedances, use of non-authorized PPPs, etc.)</li> <li>• No or minimal use of PPPs</li> <li>• No use of PPPs close to harvesting (spraying to harvest interval is much bigger than the PPP pre-harvest interval)</li> <li>• A risk assessment validated by an independent third party (e.g. CB inspector, expert, etc.) or the customer</li> </ul> <p>Exceptions to these conditions could be those crops where there is no use of PPPs and the environment is very controlled, and for these reasons the industry does not normally undertake PPP residue analysis (mushrooms could be an example).</p>	Major Must

N°	Control Points	Compliance Criteria	Level
CB 7.6.4	Is there evidence of residue tests, based on the results of the risk assessment?	Based on the outcome of the risk assessment, current documented evidence or records shall be available of PPP residue analysis results for the GLOBALG.A.P. registered product crops, or of participation in a PPP residue monitoring system that is traceable to the farm and compliant with the minimum requirements set in Annex CB 5. When residue tests are required as a result of the risk assessment, the criteria relating to sampling procedures, accredited labs, etc., shall be followed. Analysis results have to be traceable back to the specific producer and production site where the sample comes from.	Major Must
<b>7.6.5 to 7.6.7:</b> When the risk assessment determines that it is necessary to carry out residue analysis, is there evidence that:			
CB 7.6.5	Correct sampling procedures are followed?	Documented evidence exists demonstrating compliance with applicable sampling procedures. See 'Annex CB 4 GLOBALG.A.P. Guideline: CB 7.6 Residue Analysis'.	Minor Must
CB 7.6.6	The laboratory used for residue testing is accredited by a competent national authority to ISO 17025 or equivalent standard?	There is clearly documented evidence (on letterhead, copies of accreditations, etc.) that the laboratories used for PPP residue analysis have been accredited or are in the process of accreditation to the applicable scope by a competent national authority to ISO 17025 or an equivalent standard. In all cases, the laboratories shall show evidence of participation in proficiency tests (e.g. FAPAS must be available). See 'Annex CB 4 GLOBALG.A.P. Guideline: CB 7.6 Residue Analysis'.	Minor Must
CB 7.6.7	An action plan is in place in the event of an MRL is exceeded?	There is a clearly documented procedure of the remedial steps and actions (this shall include communication to customers, product tracking exercise, etc.) to be taken where a PPP residue analysis indicates an MRL (either of the country of production or the countries in which the harvested product is intended to be traded, if different) is exceeded. See 'Annex CB 4 GLOBALG.A.P. Guideline: CB 7.6 Residue Analysis'. This may be part of the recall/withdrawal procedure required by AF 9.1.	Major Must

N°	Control Points	Compliance Criteria	Level
<b>CB 7.7</b>	<b>Plant Protection Product Storage</b>		
	The PPP store must comply with basic rules to ensure safe storage and use.		
CB 7.7.1	Are PPPs stored in accordance with local regulations in a secure place with sufficient facilities for measuring and mixing them, and are they kept in their original package?	<p>The PPP storage facilities shall:</p> <ul style="list-style-type: none"> <li>• Comply with all the appropriate current national, regional and local legislation and regulations</li> <li>• Be kept secure under lock and key. No N/A.</li> <li>• Have measuring equipment whose graduation for containers and calibration verification for scales been verified annually by the producer to assure accuracy of mixtures, and are equipped with utensils (e.g. buckets, water supply point, etc.), and they are kept clean for the safe and efficient handling of all PPPs that can be applied. This also applies to the filling/mixing area if this is different. No N/A.</li> <li>• Contain the PPPs in their original containers and packs. In the case of breakage only, the new package shall contain all the information of the original label. Refer to CB 7.9.1. No N/A.</li> </ul>	Major Must
	<b>7.7.2 to 7.7.6:</b> Are plant protection products stored in a location that is:		
CB 7.7.2	Sound?	<p>The PPP storage facilities are built in a manner that is structurally sound and robust.</p> <p>Storage capacity shall be appropriate for the highest amount of PPPs that need to be stored during the PPP application season, and the PPPs are stored in a way that is not dangerous for the workers and does not create a risk of cross-contamination between them or with other products. No N/A.</p>	Minor Must
CB 7.7.3	Appropriate to the temperature conditions?	The PPPs are stored according to label storage requirements. No N/A.	Minor Must
CB 7.7.4	Well ventilated (in the case of walk-in storage)?	The PPP storage facilities have sufficient and constant ventilation of fresh air to avoid a build-up of harmful vapors. No N/A.	Minor Must
CB 7.7.5	Well lit?	The PPP storage facilities have or are located in areas with sufficient illumination by natural or artificial lighting to ensure that all product labels can be easily read while on the shelves. No N/A.	Minor Must



N°	Control Points	Compliance Criteria	Level
CB 7.7.6	Located away from other materials?	The minimum requirement is to prevent cross-contamination between PPPs and other surfaces or materials that may enter into contact with the edible part of the crop by the use of a physical barrier (wall, sheeting, etc.). No N/A.	Minor Must
CB 7.7.7	Is all PPP storage shelving made of non-absorbent material?	The PPP storage facilities are equipped with shelving that is not absorbent in case of spillage (e.g. metal, rigid plastic, or covered with impermeable liner, etc.).	Minor Must
CB 7.7.8	Is the PPP storage facility able to retain spillage?	The PPP storage facilities have retaining tanks or products are banded according to 110 % of the volume of the largest container of stored liquid, to ensure that there cannot be any leakage, seepage, or contamination to the exterior of the facility. No N/A.	Minor Must
CB 7.7.9	Are there facilities to deal with spillage?	The PPP storage facilities and all designated fixed filling/mixing areas are equipped with a container of absorbent inert material such as sand, floor brush and dustpan, and plastic bags that must be in a fixed location to be used exclusively in case of spillage of PPPs. No N/A.	Minor Must
CB 7.7.10	Are keys and access to the PPP storage facility limited to workers with formal training in the handling of PPPs?	The PPP storage facilities are kept locked and physical access is only granted in the presence of persons who can demonstrate formal training in the safe handling and use of PPPs. No N/A.	Minor Must
CB 7.7.11	Are PPPs approved for use on the crops registered for GLOBALG.A.P. certification stored separately within the storage facility from PPPs used for other purposes?	PPP's used for purposes other than for registered and/or certified crops (i.e. use in garden etc.) are clearly identified and stored separately in the PPP store.	Minor Must
CB 7.7.12	Are liquids not stored on shelves above powders?	All the PPPs that are liquid formulations are stored on shelving that is never above those products that are powder or granular formulations. No N/A.	Minor Must
CB 7.7.13	Is there an up-to-date PPP stock inventory or calculation of stock with incoming PPPs and records of use available?	The stock inventory (type and amount of PPPs stored, number of units, e.g. bottles, is allowed) shall be updated within a month after there is a movement of the stock (in and out). The stock update can be calculated by registration of supply (invoices or other records of incoming PPPs) and use (treatments/applications), but there shall be regular checks of the actual content to avoid deviations with calculations.	Minor Must

N°	Control Points	Compliance Criteria	Level
CB 7.7.14	Is the accident procedure visible and accessible within 10 meters of the PPP/chemical storage facilities?	An accident procedure containing all information detailed in AF 4.3.1 and including emergency contact telephone numbers shall visually display the basic steps of primary accident care and be accessible by all persons within 10 meters of the PPP/chemical storage facilities and designated mixing areas. No N/A.	Minor Must
CB 7.7.15	Are there facilities to deal with accidental operator contamination?	All PPP/chemical storage facilities and all filling/mixing areas present on the farm have eye washing amenities, a source of clean water at a distance no farther than 10 meters, and a first aid kit containing the relevant aid material (e.g. a pesticide first aid kit might need aid material for corrosive chemicals or alkaline liquid in case of swallowing, and might not need bandages and splints), all of which are clearly and permanently marked via signage. No N/A.	Minor Must
<b>CB 7.8</b>	<b>Plant Protection Product Handling</b> (N/A if no Plant Protection Product Handling)		
CB 7.8.1	Does the producer offer all workers who have contact with PPPs the possibility to be submitted to annual health checks or with a frequency according to a risk assessment that considers their exposure and toxicity of products used?	The producer provides all workers who are in contact with PPPs the option of being voluntarily submitted to health checks annually or according to health and safety risk assessment (see AF 4.1.1). These health checks shall comply with national, regional, or local codes of practice, and use of results shall respect the legality of disclosure of personal data.	Minor Must.
CB 7.8.2	Are there procedures dealing with re-entry times on the farm?	There are clear, documented procedures based on the label instructions that regulate all the re-entry intervals for PPPs applied to the crops. Special attention should be paid to workers at the greatest risk, i.e. pregnant/lactating workers, and the elderly. Where no re-entry information is available on the label, there are no specific minimum intervals, but the spray must have dried on the plants before workers re-enter the growing area.	Major Must
CB 7.8.3	If concentrate PPPs are transported on and between farms, are they transported in a safe and secure manner?	All transport of PPPs shall be in compliance with all applicable legislation. When legislation does not exist, the producer shall in any case guarantee that the PPPs are transported in a way that does not pose a risk to the health of the worker(s) transporting them.	Minor Must
CB 7.8.4	When mixing PPPs, are the correct handling and filling procedures followed as stated on the label?	Facilities, including appropriate measuring equipment, shall be adequate for mixing PPPs, so that the correct handling and filling procedures, as stated on the label, can be followed. No N/A.	Minor Must

N°	Control Points	Compliance Criteria	Level
<b>CB 7.9</b>	<b>Empty Plant Protection Product Containers</b>		
CB 7.9.1	Are empty containers rinsed either via the use of an integrated pressure-rinsing device on the application equipment or at least 3 times with water before storage and disposal, and is the rinsate from empty containers returned to the application equipment tank or disposed of in accordance with CB 7.5.1?	<p>Pressure-rinsing equipment for PPP containers shall be installed on the PPP application machinery or there shall be clear written instructions to rinse each container at least 3 times prior to its disposal.</p> <p>Either via the use of a container-handling device or according to a written procedure for the application equipment operators, the rinsate from the empty PPP containers shall always be put back into the application equipment tank when mixing, or disposed of in a manner that does not compromise neither food safety nor the environment. No N/A.</p>	Major Must
CB 7.9.2	Is re-use of empty PPP containers for purposes other than containing and transporting the identical product being avoided?	There is evidence that empty PPP containers have not been or currently are not being re-used for anything other than containing and transporting identical product as stated on the original label. No N/A.	Minor Must
CB 7.9.3	Are empty containers kept secure until disposal is possible?	There is a designated secure store point for all empty PPP containers prior to disposal that is isolated from the crop and packaging materials (i.e. permanently marked via signage and locked, with physically restricted access for persons and fauna).	Minor Must
CB 7.9.4	Does disposal of empty PPP containers occur in a manner that avoids exposure to humans and contamination of the environment?	Producers shall dispose of empty PPP containers using a secure storage point, a safe handling system prior to the disposal, and a disposal method that complies with applicable legislation and avoids exposure to people and the contamination of the environment (watercourses, flora and fauna). No N/A.	Minor Must
CB 7.9.5	Are official collection and disposal systems used when available, and in that case are the empty containers adequately stored, labeled, and handled according to the rules of a collection system?	Where official collection and disposal systems exist, there are records of participation by the producer. All the empty PPP containers, once emptied, shall be adequately stored, labeled, handled, and disposed of according to the requirements of the official collection and disposal schemes, where applicable.	Minor Must
CB 7.9.6	Are all local regulations regarding disposal or destruction of containers observed?	All the relevant national, regional and local regulations and legislation, if such exist, have been complied with regarding the disposal of empty PPP containers.	Major Must

N°	Control Points	Compliance Criteria	Level
<b>CB 7.10</b>	<b>Obsolete Plant Protection Products</b>		
CB 7.10.1	Are obsolete PPPs securely maintained and identified and disposed of by authorized or approved channels?	There are records that indicate that obsolete PPPs have been disposed of via officially authorized channels. When this is not possible, obsolete PPPs are securely maintained and identifiable.	Minor Must
<b>CB 7.11</b>	<b>Application of Substances other than Fertilizer and Plant Protection Products</b>		
CB7.11.1	Are records available for all other substances, including those that are made on-farm, used on crops, and/or soil that are not covered under the sections on fertilizer and PPPs ?	<p>If preparations, such as plant strengtheners, soil conditioners, or any other such substances are used on certified crops, be they home-made or purchased, records shall be available. These records shall include the name of the substance (e.g. plant from which it derives), the crop, the field, the date, and the amount applied. In case of purchased products, also the trade or commercial name, if applicable, and the active substance or ingredient, or the main source (e.g. plants, algae, mineral, etc.) shall be recorded. If in the country of production, a registration scheme for this substance(s) exists, it has to be approved.</p> <p>Where the substances do not require registration for use in the country of production, the producer shall make sure that the use does not compromise food safety.</p> <p>Records of these materials must contain information about the ingredients where available, and if there is a risk of exceeding MRLs, CB 7.6.2 must be met.</p>	Minor Must

N°	Control Points	Compliance Criteria	Level
<b>CB 8</b>	<b>EQUIPMENT</b>		
CB 8.1	Is equipment sensitive to food safety (e.g. PPP sprayers, irrigation/fertigation equipment, post-harvest product application equipment) maintained in a good state of repair, routinely verified and, where applicable, calibrated at least annually, and are records of measures taken within the previous 12 months available?	<p>The equipment is kept in a good state of repair with documented evidence of up-to-date maintenance sheets for all repairs, oil changes, etc. undertaken.</p> <p>E.g. PPP sprayers: See Annex CB 6 for guidance on compliance with visual inspection and functional tests of application equipment. The calibration of the PPP application machinery (automatic and non-automatic) has been verified for correct operation within the last 12 months and this is certified or documented either by participation in an official scheme (where it exists) or by having been carried out by a person who can demonstrate their competence.</p> <p>If small handheld measures not individually identifiable are used, then their average capacity has been verified and documented, with all such items in use having been compared to a standard measure at least annually.</p> <p>Irrigation/fertigation equipment: As a minimum, annual maintenance records shall be kept for all methods of irrigation/fertigation machinery/techniques used.</p>	Minor Must
CB 8.2	Is equipment sensitive to the environment and other equipment used on the farming activities (e.g. fertilizer spreaders, equipment used for weighing and temperature control) routinely verified and, where applicable, calibrated at least annually?	<p>The equipment used is kept in a good state of repair with documented evidence of up-to-date maintenance sheets for all repairs, oil changes, etc. undertaken.</p> <p>E.g. fertilizer spreader: There shall exist, as a minimum, records stating that the verification of calibration has been carried out by a specialized company, supplier of fertilization equipment or by the technically responsible person of the farm within the last 12 months.</p> <p>If small handheld measures not individually identifiable are used, then their average capacity has been verified and documented, with all such items in use having been compared to a standard measure at least annually.</p>	Minor Must

N°	Control Points	Compliance Criteria	Level
CB 8.3	Is the producer involved in an independent calibration-certification scheme, where available?	The producer's involvement in a calibration scheme is documented. In the case the producer uses an official calibration system cycle longer than one year, the producer still requires internal annual verification of the calibration as per CB 8.1.	Recom.
CB 8.4	Is the PPP equipment stored in such a way as to prevent product contamination?	The equipment used in the application of PPPs (e.g. spray tanks, knapsacks) is stored in a secure way that prevents product contamination or other materials that may enter into contact with the edible part of the harvested products.	Minor Must

## ANNEX CB 1 GLOBALG.A.P. GUIDELINE: RESPONSIBLE ON-FARM WATER MANAGEMENT FOR CROPS

### 1. INTRODUCTION TO THE GUIDANCE DOCUMENT

*This is a GUIDELINE. Where examples are supplied, the lists are not exhaustive, but provide sufficient guidance to producers to design a risk assessment, develop a farm-specific water management plan, and implement good practices.*

Water is one of the main basic raw materials needed to produce food. Fresh water resources have become scarce in more and more regions. Water allocation is becoming a complex issue, especially in certain regions and for certain uses. Managing water requires specific knowledge, skills and improved planning, for example, to react in times of water scarcity. Clean and sufficient water is important for human health, the health of our ecosystems, and for global economic growth and development. To achieve this, good on-farm practices are required, as the agricultural sector is one of the major users of fresh water resources.

This guidance document is designed to support growers seeking certification and to make them aware that the control points and compliance criteria regarding responsible water management have been upgraded. This document helps growers understand the requirements that must be fulfilled in order to receive GLOBALG.A.P. certification.

The document is intended to help growers carry out and comply with some of the new and more complicated tasks or requirements concerning water use, such as performing a risk analysis and drafting a water management plan. This guidance document attempts to identify all the relevant factors that need to be considered and/or the measures that need to be implemented in order to ensure that responsible water management takes place on the farm.

This GLOBALG.A.P. guidance document is not a manual for agronomists or academics—it does not fully illustrate and discusses on-farm water management according to theoretical or applied science. It is designed to be a practical document to help producers, persons responsible for irrigation on farms, auditors, consultants, members of GLOBALG.A.P., and others to develop an integrated understanding of good practices for on-farm water management.

### 2. RESPONSIBLE ON-FARM WATER MANAGEMENT

This section elaborates on good practices to improve on-farm water management. The focus is on reducing direct and indirect contamination of water bodies from agricultural fields by introducing good water management practices on the farm. These practices will also help to improve the efficient and safe use of water resources to grow crops.

The recommended good practices for water management described in this section are at farm level and mainly focus on:

- **The day-to-day management of irrigation and soil** (e.g. avoiding over-irrigation, leaching, excessive drainage, and agricultural runoff, reducing soil erosion, improving soil fertility, etc.)
- **The use of crop protection products** (i.e. the use of insecticides, fungicides, and/or herbicides)
- **The application of crop nutrition** (i.e. the application of fertilizers and organic soil amendments such as manure)
- **Waste management** (e.g. the management of spray tank leftovers, the disposal of empty plant protection product containers, etc.)

## 2.1 Definition of Responsible On-Farm Water Management

The following characterizes sustainable and responsible water management at farm level:

- The farm management has a proper overview of all the water sources surrounding the farm. This includes identifying the sources that are used for extraction, how much water is extracted and when, and having an overview of the farm water distribution system.
- The farm uses water resources in an efficient and planned manner for irrigating crops.
- The irrigation water quality is controlled.
- There is control over the possible return of wastewater from the farm back into water bodies.
- There is proper handling and use of plant protection products, fertilizers and organic soil amendments (correct time, place and amount of application).
- Good soil management practices are in place (to prevent soil erosion, improve the water retaining capacity of the soil and as such prevent water pollution by surface runoff, subsurface runoff and drainage).

## 2.2 Water Quality

The *three* main sources of water contamination in agriculture are chemical (i.e. nutrients, such as nitrates, phosphates, and agrochemicals), physical (e.g. soil, stones, glass) and microbial.

The main potential pollutants from agricultural fields are plant protection products and nutrients.

If organic and inorganic fertilizers end up in surface waters in excessive quantities, this can cause eutrophication of waters bodies.

It is important to handle and use *plant protection products* and *fertilizers* according to their registered uses, while following recommended best practices to prevent them from transferring to other parts of the environment, notably vulnerable areas such as drinking water sourcing areas.

It is important to consider that microbial contamination of irrigation water, for example *with organic manures*, can impact food safety. In this case, the quality of irrigation water is critically important and shall be controlled regularly (see Annex FV 1 for risks associated with microbial contamination of water).

### *Direct and Indirect Contamination*

- Direct (also known as point source) contamination refers to clearly identifiable sources of contamination, for example spills of plant protection products made during mixing and loading of the sprayer or the disposal of tank leftovers fields without properly diluting the mixture and/or without taking into account adjacent water bodies.



By contrast, indirect (also known as diffuse source) contamination is distributed at various locations around the farm and fields. Transfer routes from indirect sources include runoff, drainage, leaching and spray drift. The prevention of indirect source contamination is more complicated than the prevention of direct contamination. Preventing indirect source contamination often involves changing agricultural practices in the field, such as introducing:

- Vegetative buffers at the edges of cropped fields
- Crop rotation with more diverse crops, and other cropping practices that improve soil organic matter and prevent erosion
- Contour cropping
- Minimum tillage
- Better irrigation scheduling and intensities
- Low-drift spray nozzles, careful calibration of spray equipment, etc.

It is important to assess whether direct contamination occurs at the farm and to identify the main areas of risk. This will enable plans to be put in place to ensure that risks are reduced.

These plans include, for example, careful management of plant protection products to avoid contamination of water bodies and sources. Keeping records of plant protection product use is important as well as implementing recommended good practices, which, for example, include proper storage rooms, contained areas for sprayer mixing and loading, the management of spills and tank leftovers, and the collection and safe disposal of contaminated wastewater.

It is more complicated to determine whether there is indirect contamination from agricultural fields and if so to identify the main triggers. This requires an assessment of the fields. For example, visible erosion in the form of tramlines indicates the occurrence of surface runoff. This may be caused by poor infiltration capacity of the soil due to poor soil management practices (e.g. deep plowing, no crop rotation and/or the absence of a proper farm traffic plan). It is more difficult to assess whether the fields are susceptible to leaching of agrochemicals. Local farm advisers or farm service providers can support producers in assessing the risk of agricultural runoff, leaching, drainage and drift from agricultural fields.

According to the type and source of contamination, tailored mitigation measures and best management practices can be implemented. The most important mitigation measure is the correct management of plant protection product applications, i.e. the right time, place and amount. It is important to keep track of the weather forecast. Applying plant protection products before a heavy shower can increase the risk of agricultural runoff and/or leaching and as such contaminate water bodies.

### 2.3 Water Quantity

There are 3 sources of water:

- Groundwater: Water that is captured and stored naturally under the soil. Renewable groundwater is stored in underground aquifers, which are recharged in the short term by rainfall. Fossil groundwater is stored in deeper aquifers, which are not recharged by rainfall.
- Surface water: Fresh water in lakes, rivers, natural and artificial ponds, and ditches.
- Captured water: Water stored by dams or captured in artificial basins.

Unsustainable (over)extraction of water from groundwater aquifers can cause a drop in the groundwater table. Lower groundwater tables impact not only the producers, as they will have to drill deeper to extract groundwater, but also the wider community. It can also cause the intrusion of salt water into freshwater aquifers in regions located close to the sea.

Reducing the consumption of water for irrigation by a more efficient use (and thus less wastefully) is good practice for producers. This can be achieved by better irrigation management through timely applications of the correct amount of water the crops need. It can also be achieved through better soil management, for example, by increasing the soil water retaining capacity by increasing the organic matter content, or investing in mulching. Some crop varieties also use water more optimally. The efficient use of water for irrigation also does not impact crop yields if planned properly, for example by avoiding water stress (e.g. by using soil moisture probes).

## 2.4 Irrigation Methods

Irrigation methods can generally be divided into 3 types:

- 1) Surface irrigation
- 2) Sprinkler irrigation
- 3) Drip irrigation

Each of these methods impacts water quality and quantity in different ways. The choice of using a certain irrigation method depends on the crop, the soil, the producer's ability to invest in irrigation and/or get support from local authorities in irrigation systems, as well as long-standing irrigation practices in the case of traditional irrigation systems.

### Surface Irrigation

There are different types of surface irrigation systems: flood, basin, border or furrow irrigation. There is a greater risk of water contamination in the case of surface irrigation due to the reduced control producers have on the application of water to the crops. For example, flood irrigation brings a larger risk of leaching and drainage. Furrow irrigation also increases the risk of runoff at the tail end of the field, if not managed effectively. Surface irrigation systems are considered to have a low irrigation efficiency (IE) or water use efficiency (WUE) due to high evaporative losses as compared to sprinkler and drip irrigation systems.

### Sprinkler Irrigation

Sprinkler irrigation systems can irrigate large fields and are in most cases replaceable. They are often used when irrigation is not a steady need but required in exceptional circumstances such as dry periods. There are different sprinkler irrigation methods, such as micro-sprinklers, central pivot irrigation systems, laterals, and gun and boom systems. Sprinkler irrigation systems are pressurized irrigation systems and thus need energy to function. The main disadvantage of sprinkler irrigation systems (aside from the high cost) is the evaporative loss of water. This makes the timing of irrigation critical; for example, irrigation at mid-day will increase losses by evaporation.

### Drip Irrigation

Like sprinkler irrigation systems, drip irrigation systems are pressurized and thus make use of energy only when functional (some more than others depending on topographical differences and thus the need to pump water). These systems are popular due to their ease of use and high IE or WUE. Water loss, i.e. evaporative losses or other non-beneficial uses, is minimal. Drip irrigation systems are considered to be the preferred solution in arid and semi-arid regions. However, having drip irrigation in place does not by definition

mean that water is used efficiently, and that water is being saved. Good management practices need to be implemented to ensure that on-farm irrigation does not impact water availability to other users in the catchment or river basin (this includes the need for water for healthy ecosystems).

## 2.5 Water-Related Practices in Rain-Fed Agriculture

Good soil management to improve the infiltration of precipitation in the topsoil and increase the soil's water holding capacity is very important in both irrigated and rain-fed agriculture, as this prevents agricultural runoff or drainage from agricultural fields. Moreover, better retention of available water in the soil allows crops to consume more water, which can improve crop biomass and yields in rain-fed agriculture in arid and semi-arid regions. Increasing soil organic matter content is critical in raising the soil's water-holding capacity.

To improve water quantity management, tools can be put into place to store excess precipitation, which can be used in periods of water stress. Precipitation can be stored by collecting water from roofs or by storing water in reservoirs built in areas that are not cultivated.

## 2.6 Good Practices for Water Management

The following are examples of practices that may be implemented to ensure responsible on-farm water management:

### 2.6.1 Water Quality

- Test the quality of irrigation water and monitor, where possible, the amount of effluent entering water bodies from agricultural fields at accurate intervals.
- Preferably mix and load the sprayer on a concrete/impermeable area at the farm within a safe distance from streams, ditches, wells, food and feed storage rooms, residential areas and roads. Make sure that the area has a small depression that leads possible spills and wastewater from washing the sprayer and the nozzles into an artificial drain for collection and safe disposal. The collected effluent and any remnants, such as tank leftovers, can be sent off for disposal to authorized waste disposal companies or treated at the farm using an effluent management system.
- Areas used for mixing and loading the sprayer must not be located in the vicinity of irrigation storage reservoirs.
- Use the correct irrigation method based on crop, soil, climate and slope to prevent erosion, leaching, evaporative losses and agricultural runoff.
- Improving topsoil permeability can also reduce agricultural runoff. This can be done, for example, by preventing capping or compaction of the soil, introducing controlled farm traffic, and improving soil structure by applying minimum tillage or no till if the soil and other circumstances allow this.
- Agricultural runoff can further be prevented from directly entering surface water bodies by installing buffers next to streams. This will protect surface water bodies from agrochemicals or nutrients that may run off the fields due to precipitation or irrigation.
- Do not irrigate with surface or groundwater if it is contaminated (e.g. microbial, heavy metals, industrial pollutants, etc.).
- If irrigation water is recycled through a drainage system, check that the following crops are not sensitive to herbicides in water even when very low concentrations (this information is normally provided on the label about sensitivities of following crops).
- Do not use plant protection products with a high leaching potential (the label will normally state this), if the groundwater table is very close to the surface and the soil is vulnerable to leaching (high drainage rate, coarse texture (sandy) or heavier textures with extensive cracks/worm channels, and low organic matter levels).
- Ensure that oil from tractors is not disposed of in ditches.

- Adhere to all local laws and bylaws regarding water quality (management).

#### Surface Irrigation Systems

- For crops treated with agrochemicals, ensure that border, basin or furrow irrigation is delayed for a few days after applications. In the case of furrow irrigation or when the borders are relatively small, 'surge irrigation' can be applied to allow for better infiltration of water into the soil avoiding runoff at the tail ends.
- Avoid irrigating with water that contains a high level of industrial effluents or grey water/black water, e.g. water from untreated sewage, or treated sewage high in heavy metals. This can have adverse effects on human health (both operators and consumers of the crops) and soils.

#### Sprinkler and Drip Irrigation Systems

- If crop protection is applied through chemigation, drip irrigation systems should be thoroughly checked because clogging can cause damage to the system and the nozzles, which may lead to leaks.
- If chemigation is applied, use high quality and strong materials for drip lines. Also make sure that the permanent drip irrigation systems (such as in orchards) are equipped with back-flow prevention devices, which stop water from flowing back into reservoirs and thus contaminating larger amounts of water.
- The differences in wetting area and crop root volumes must be kept minimal to prevent leaching.

### 2.6.2 Water Quantity

- Comply with national and international legislation concerning water quantity management and related good practices, if available
- Adhere to all local laws and bylaws regarding water abstraction
- Maintain the correct irrigation rate and intervals depending on crop needs, soil type, and water availability. The latter is important because in the case of serious water shortages or water scarcity, one can choose to apply deficit irrigation, i.e. applying water during the most critical growth stages of the crops, such as flowering, to prevent yield loss.
- Always avoid over-irrigation to prevent leaching, agricultural runoff, and drainage.
- Minimize evaporative losses, for example, from open water surfaces
- When using groundwater for irrigation, use it sustainably. This means not extracting more than the yearly recharge rate to avoid a drop in the groundwater table.
- Maintain a correct irrigation application rate depending on the crop, the growth stage, the availability of water, and the crop water requirements, which also depend on the weather conditions (heat and amount of precipitation).
- Advice on the correct irrigation application rates during the season is available from water user associations, local water management authorities or from private service providers. Growers can also estimate correct irrigation application rates themselves if tools such as soil moisture probes are available.
- Timely maintenance of the irrigation system is important to reduce leaks and improve IE or WUE.

- Increase the soil's water holding capacity, reduce agricultural runoff, leaching, and prevent soil erosion. The soil's water holding capacity can be improved by increasing soil organic matter. Conservation agriculture, which includes minimum tillage or no tillage, helps improve soil organic matter depending on the local circumstances, e.g. soil type, climate, etc.
- Monitor and document water usage

#### Surface Irrigation Systems

- Improve conveyance and application efficiencies where needed and possible. If return flows have clearly proven to be useful for downstream users and if this does not financially impact the producer, allow these return flows to occur and avoid recapturing these flows for re-use in the irrigation system.
- Maintain proper design of the irrigation system, i.e. the size of flood basins, the distribution of gates, the length of furrows, etc.

#### Sprinkler and Drip Irrigation Systems

- Use good quality drip lines to prevent damage and leaks.
- Use water optimally by ensuring the correct wetting pattern, i.e. avoid too much overlap of wetted circles around drippers or sprinklers.
- Drip irrigation: Use correct sized pipes and maintain equal pressure on all plots of a culture, etc.

### 3. GUIDANCE ON THE GLOBALG.A.P. CONTROL POINTS AND COMPLIANCE CRITERIA (CPCC) FOR ON-FARM RESPONSIBLE WATER MANAGEMENT

This section provides guidance on what to consider in order to ensure that a more sustainable and responsible management of water is taking place on the farm, and to fulfill the requirements of GLOBALG.A.P. certification. This is particularly important in regions where water resources are scarce.

Guidance is only supplied for the new or modified Major Musts and Minor Musts of version 5 of the GLOBALG.A.P. Integrated Farm Assurance Standard.

#### CB 5.1.1 Predicting Irrigation Requirements

<b>Control Point</b>	<b>Compliance Criterion</b>	<b>Level</b>
<i>Are tools used routinely to calculate and optimize the crop irrigation requirements?</i>	<i>The producer can demonstrate that crop irrigation requirements are calculated based on data (e.g. local agricultural institute data, farm rain gauges, drainage trays for substrate growing, evaporation meters, water tension meters for the percentage of soil moisture content). Where on-farm tools are in place, these should be maintained to ensure that they are effective and in a good state of repair. N/A only for rain-fed crops.</i>	<i>Minor Must</i>

**Guidance:**

Irrigation should be applied when crops really need it. Growers who own a groundwater well or extract water directly from bordering streams or ditches can use tools, such as weather data and soil moisture probes, to best decide when crops need to be irrigated. Proper planning of an irrigation schedule is strongly recommended. Different tools can be used to do so, and local agronomists and farm advisers can support farm management in training, scheduling, and in properly calculating the crop water requirements. Also, data from the on-farm water management plan can support the producer in estimating how much water would be needed to irrigate the crops and assess whether there are/will be water shortages and water needs to be stored. In the case more water is needed than average, this should be mentioned and explained in the water management plan.

In the case a water users association (WUA) allocates water, growers may receive advice from the WUA on when to and when not to irrigate the crops.

The water management plan should include a reference to which advice has been received, how the crop water requirements have been calculated, and how the irrigation schedule has been agreed.

**CB 5.2.1 Irrigation/Fertigation Management**

<b>Control Point</b>	<b>Compliance Criterion</b>	<b>Level</b>
<i>Has a risk assessment been undertaken that evaluates environmental issues for water management on the farm, and has it been reviewed by the management within the previous 12 months?</i>	<i>There is a documented risk assessment that identifies environmental impacts of the water sources, distribution system and irrigation and crop washing usages. In addition, the risk assessment shall take into consideration the impact of own farming activities on off-farm environments, where information is known to be available. The risk assessment shall be completed, fully implemented and it shall be reviewed and approved annually by the management. See 'Annex AF 1 GLOBALG.A.P. Guideline: 'Risk Assessment - General' and 'Annex CB 1 GLOBALG.A.P. Guideline: Responsible On-Farm Water Management for Crops' for further guidance. No N/A.</i>	<i>Major Must (obligatory as Major Must from 1 July 2017)</i>

**Guidance:**

A documented risk assessment should identify the relevant food safety and environmental impacts of on-farm water use. This includes risks concerning the potential contamination of water (water quality) as well as the over-use of water (water quantity) as explained in the introductory sections of this guidance document.

For this purpose, you should assess the way in which water is used and identify any activities that could result in the inefficient and wasteful use of water, as well as opportunities for more efficient water use. Issues such as over-irrigation or the use of wastewater for irrigation should be addressed.

Farm water sources and distribution systems shall be described to help identify potential sources and opportunities for contamination. The risk assessment will provide guidance on how to best manage possible direct and indirect sources of contamination.

The risk assessment shall be reviewed and approved annually by the farm management.

See Annex AF 1 of the GLOBALG.A.P. Integrated Farm Assurance CPCC document for further guidance on how to perform an on-farm risk assessment.

The risk assessment shall be updated annually and be farm-specific.

Any format can be used, but with strong reference to the guidance provided in Annex AF 1, and taking into consideration the following main elements:

## **1. Food Safety:**

Specific risk analysis on food safety according to CPCC CB 5.3.2.

Please see the annexes on risks associated with on-farm microbiological contamination of water for more detail.

## **2. Environment**

### **Water Source:**

The risk assessment shall address the water sources on and surrounding the farm and the specific use of the water.

- Describe the sources and distribution systems of water used on the farm.
- Describe any natural or man-made water bodies on the farm.
- Does the water source contain debris and/or sediment?
- Is there national legislation that stipulates maximum allowed residue levels of plant protection products and nutrients in groundwater and surface water levels?
- Compile a list of pesticides applied on the fields, including the location on the farm, method of application, the target crop, time of application, dose rate.
- Compile a list of fertilizers and organic amendments applied on the fields, including the location on the farm, method of application, target crop, time of application, and dose rate.
- Maximum allowed residue levels of plant protection products and nutrients in groundwater and surface water levels according to national legislation

### **Permits and Licenses Needed:**

- Are permits or licenses needed in order to extract and store groundwater or surface water (for example from rivers, lakes, streams or ditches on or near the farm)?
- Quantities of water within legal limitations: Are there any restrictions concerning water use from local authorities or irrigation schemes to which the producer belongs?
- Permits for all installations: Are permits needed for wells, pumping stations, storage basins, and distribution systems?

### **Water Use:**

- Identify all uses of water on the farm.
- Identify activities that could result in wastage and over-use of water (e.g. leakage from water distribution systems, poorly maintained irrigation equipment, inefficient irrigation).



**Water Quality**

- Identify activities that could be potential sources of contamination of water bodies (streams, ponds, etc.) and water sources. This includes disposal of wastewater, spray-tank washings and leftovers, use of agrochemicals (pesticides, organic/inorganic fertilizers).
- Identify locations where wastewater and spray-tank leftovers are disposed of, and their proximity to water sources.
- Identify locations where the use of plant protection chemicals could contaminate water bodies and sources through runoff or spray drift.
- Identify locations where the use of organic or inorganic manure could contaminate water bodies and sources through runoff (e.g. where there is close proximity to water, or where land is steep).
- Does or could the use of water by the farm cause agricultural runoff containing plant protection products, nutrients or hazardous contaminants?

**CB 5.2.2 Irrigation/Fertigation Management**

<b>Control Point</b>	<b>Compliance Criterion</b>	<b>Level</b>
<p><i>Is there a water management plan available that identifies water sources and measures to ensure the efficiency of application and which management has approved within the previous 12 months?</i></p>	<p><i>There is a written and implemented action plan that identifies water sources and measures to ensure efficient use and application, which has been approved by the farm management within the previous 12 months.</i></p> <p><i>The plan shall include one or more of the following: maps (see AF 1.1.1.), photographs, drawings (hand drawings are acceptable) or other means to identify the location of water source(s), permanent fixtures and the flow of the water system (including holding systems, reservoirs or any water captured for re-use).</i></p> <p><i>Permanent fixtures, including wells, gates, reservoirs, valves, returns, and other above-ground features that make up a complete irrigation system, shall be documented in such a manner as to enable location in the field. The plan shall also assess the need for the maintenance of irrigation equipment. Training and/or retraining of personnel responsible for the oversight or performance duties shall be provided. Short and long-term plans for improvement, with timescales where deficiencies exist, shall be included. This can either be an individual plan or a regional activity that the farm may participating in or is covered by such activities.</i></p>	<p><i>Major Must (obligatory as Major Must from 1 July 2017)</i></p>

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**Guidance:**

A written on-farm water management plan will help assess current practices on the farm and identify practices that may need to be changed or optimized to improve overall on-farm water use and water quality management. Such a plan needs to be approved by the farm manager and be reviewed each year.

Each on-farm water management plan should provide a description of which measures are in place or will be put into place. These measures should address the efficient use of water resources as well as the prevention of contamination of water bodies. The plan shall be formulated based on the risk assessment. It shall include factors to mitigate the risks identified in the risk assessment, and include training for producers and workers to ensure proper implementation.

Short and long-term plans for improvement, with timescales where appropriate, shall be included. This plan can either be an individual plan or a regional activity that the farm may be participating in or is covered by such activities.

The following are recommended good practices that can help to improve water management on the farm:

**Sustainable Soil and Crop Management Practices**

- Implement practices such as conservation agriculture, mulching, controlled traffic, crop rotation and planting of cover crops. These can reduce agricultural runoff and thus possible contamination of surface water bodies.
- Improve the soil organic matter content.
- Choose crop varieties that use water optimally (perhaps with specific features to optimize water use).

**Losses:**

- Prevent water loss in the irrigation system, for example, that occur through leaks.
- Prevent leaks through effective maintenance of the irrigation system.
- Use well designed basins, pipes, and pumps to avoid losses.

**Evaporative Losses:**

- Prevent substantial evaporative losses in the irrigation.
- Attempt to avoid such losses by measuring or estimating them.

### **Irrigation Interval:**

- Ensure irrigation intervals are well managed to ensure efficiency.
- Take into account precipitation events and the soil moisture content to calculate the required irrigation interval and irrigation application rate.
- Be flexible and reactive in adjusting the irrigation interval according to changing crop water requirements.

### **Pressure Management in Hydrants:**

- In the case of pressurized irrigation systems (i.e. sprinkler and drip irrigation systems), ensure a correct homogeneous pressure is maintained in all hydrants and on all plots to optimize the distribution of irrigation and thus avoid over- and under-irrigation.

### **Downstream shortages:**

- Consider if the use of water by the farm could cause water shortages downstream.

It is recommended to include the following aspects into the on-farm water management plan:

1. Measure water use for all on-farm water extraction and distribution infrastructure such as:
  - All groundwater wells used for irrigation (m<sup>3</sup>/month, m<sup>3</sup>/year)
  - All intakes from streams or ditches (m<sup>3</sup>/month, m<sup>3</sup>/year)
  - All irrigation infrastructures such as water distribution pipes or channels
  - Main, secondary and tertiary irrigation channels and gates in the case of surface irrigation water pumps (capacity m<sup>3</sup>/ha)
  - All hydrants in case of a pressurized irrigation system
  - All reservoirs either used for irrigation or used to capture precipitation
  - All water harvesting constructions
2. Fixed constructions on the farm should be mapped. The map may also include the larger water bodies outside the farm if there are any close to the fields.

3. Mention whether the distribution of water to/on the farm is centrally managed, for example, through a water user association, or whether water is extracted individually by using a private well or pumped from adjacent streams and ditches.
4. Include data on crops and water use: Measure/estimate how much water has been applied on the field (m<sup>3</sup>/ha/month/crop, m<sup>3</sup>/ha/year/crop). Review and explain the methods used to calculate this.
5. If possible and relevant to the irrigation method used (e.g. drip irrigation systems, etc.), include irrigation system efficiency data, such as the conveyance (efficiency of water transport in irrigation canals or through irrigation pipes, which is a function of canal/pipe length, canal characteristics (e.g. earthen or lined canals), soil type and system maintenance. This can be determined using widely available estimation tables (measured in %) and application efficiencies (the volume of water added to the root zone divided by the volume of water applied to the field (measured in %)), which will help in assessing and improving the efficiency of the irrigation infrastructure.
6. Indicate how crop water requirements (CWR) are calculated. Also, include the irrigation intervals and length of irrigation cycles. Optimal intervals and cycle lengths should be maintained. For example, in the case of furrow-irrigated fields, surge flow can significantly improve irrigation uniformity and beneficial uptake of the water by crops. Temperature can also trigger differences in intervals (e.g. larger intervals when lower temperatures and thus a reduced need for crop evapotranspiration).
7. Maintenance: It is important to have a plan in place for the maintenance of the irrigation system and of farm machinery:
  - Indicate how often the fixed water extraction and distribution infrastructure are maintained and/or repaired and who is responsible for it.
  - Address whether there is proper pressure management for optimal design flow through the drip and sprinkler irrigation systems.
  - There should be a plan in place in case emergency maintenance is required.
  - The persons who carry out the maintenance shall be properly trained to do so.
  - Records should be available of when the maintenance was done, by whom and on what, e.g. what has been repaired?
8. Surface irrigation systems: Address whether surface irrigation systems are designed to make optimal use of gravity to minimize the use of pumps and consequently the energy use.
9. Direct and indirect sources of contamination: The plan should outline any measures put in place to mitigate the risks related to direct and indirect sources of water contamination identified in the risk assessment. It needs to address issues such as potential spillage from the crop protection mixing area, and sprayer loading and cleaning area, as well as contamination due to agricultural runoff, leaching and/or drainage.
10. Fertigation and/or chemigation: If fertigation and/or chemigation activities are maintained these need to be outlined, e.g. how much is applied, are drip irrigation systems used for fertigation/chemigation, etc.? Measures to mitigate any risks of contamination of water bodies and/or sources identified in the risk assessment should be outlined (e.g. avoiding applications on or near water, especially on sloping land; use of techniques to reduce runoff such as contour planting).
11. Climate data: Add information concerning the precipitation and temperature and, if possible, the reference evapotranspiration (if this information is available) throughout the year to make informed decisions on irrigated agriculture. Indicate if this information is easily accessible.
12. Training: The plan shall assess who needs training and in which topics. Training may be required to draft/implement a comprehensive water management plan, including logbooks, as well as on record keeping. Growers, technicians and farm workers may also need basic training in on-farm water quality management; the

management, maintenance and operation of irrigation systems; and water quantity management. Growers, technicians, and farm workers should be aware of the management plan and its goals.

Basic training on the following is recommended to assist the farm in implementing good water management practices:

- The control of water quality
  - Safe use of pesticides on the farm and how to handle the sprayer and spray solutions/remnants
  - Management of the soil to maintain soil organic matter, improve infiltration capacity, improve soil water retaining capacity, and prevent erosion
  - Calculating the crop water requirements to make informed decisions about when to irrigate, what the irrigation interval should be, whether deficit irrigation can be applied in times of need, etc.
13. Untreated sewage: The plan should take note of the fact that untreated sewage shall not be used for fertigation or irrigation. This point is covered under CB 4.4.1 and CB 5.3.1.
  14. Record keeping: The guidance on record keeping is provided under AF 3.
  15. Water use permits and licenses: The plan should make reference to all local regulations, by-laws and irrigation scheme rules concerning water extraction and use. The plan should ensure that all necessary licenses and permits have been obtained, are up-to-date, and are complied with. It should include details on all records that need to be kept in order to ensure and demonstrate that all relevant licenses, by-laws, and regulations are complied with.

Permits may be required for putting into place new water storage infrastructure and for the on-farm use of the captured or stored water. For example, local water harvesting and storing of precipitation shall not impact users elsewhere in the catchment area.

The plan must make reference to any local laws or by-laws concerning the correct disposal of wastewater, and indicate how they will be complied with, as well as any relevant records that need to be kept.

This requirement is the object of two control points and is further examined under CB 5.4.1 and 5.4.2.

16. Predicting irrigation water use: This specific requirement is based on CPCC CB 5.1.1.

**CB 5.4.1 Supply of Irrigation/Fertigation Water**

<b>Control Point</b>	<b>Compliance Criterion</b>	<b>Level</b>
<i>Where legally required, are there valid permits/licenses available for all farm water extraction, water storage infrastructure, on-farm usage and where appropriate, any subsequent water discharge?</i>	<i>There are valid permits/licenses available issued by the competent authority for all farm water extraction; water storage infrastructure; all on-farm water usage including but not restricted to irrigation, product washing or flotation processes; and where legally required, for water discharge into river courses or other environmentally sensitive areas. These permits/licenses must be available for inspection and have valid dates.</i>	<i>Minor Must</i>

**Guidance:**

The farm management should be aware of any national legal or local by-laws with which they must comply.

Authorization is frequently needed in order to use water for irrigation of agricultural land. This may specify quantities that can be used, as well as stipulating any restrictions according to the soil, crop or availability of water. Irrigation may not be allowed under certain conditions, or not at all.

Authorities generally issue water use permits to producers. Water use permits may also be issued to water user associations (WUAs) or irrigation schemes, which then distribute water allocations among their members. Growers should then follow the requirements set up by the WUA or any other local water management body that has been recognized by the authority. Farm management should be clear on which legal requirement to follow and be sure they act in accordance with the national legal requirement on the use of water for agricultural purposes, both from a quantitative as well from a qualitative point of view. In the GLOBALG.A.P. assessment of the farms, growers or farm management are advised to explain which legal requirements they are following and why (CPCC CB 5.4.1. Minor Must).

Based on the risk assessment in AF 1, the farm should take note of the following:

- Permits and licenses needed: All permits or licenses needed to extract and store groundwater or flowing water on the farm have been granted and are kept in a file.
- Valid permits and licenses: Permits must be verified regularly to ensure that they are valid and must be renewed before expiration.
- Permits for all installations: Have all permits needed for wells, pumping stations, basins, and distribution systems been obtained? Are groundwater extraction limits adhered to?
- Permits issued by the competent authority: Verify that the competent and entitled authority has granted all necessary documents, permits, and licenses.

**CB 5.4.2 Supply of Irrigation/Fertigation Water**

<b>Control Point</b>	<b>Compliance Criterion</b>	<b>Level</b>
<i>Where the water permits/licenses indicate specific restrictions, do the water usage and discharge records confirm that the farm management has complied with these?</i>	<i>It is not unusual for specific conditions to be set in the permits/licenses, such as hourly, daily, weekly, monthly, or yearly extraction volumes or usage rates. Records shall be maintained and available to demonstrate that these conditions are being met.</i>	<i>Major Must</i>

**Guidance:**

Based on the risk assessment in AF 1, the producer needs to make sure that controls are in place to ensure that the quantities of water extracted comply with all relevant licenses and permits issued by national and local authorities as well as irrigation schemes.

The producer shall have in place a system for measuring and recording water use. Where necessary (for example, because of a lack of access to measuring equipment, especially in the case of small-farmer flood irrigation systems), record keeping can rely on best estimates of water use.

The producer shall have available the valid documents issued by the competent authorities (as requested in CB 5.4.2). In some cases, there are legal requirements in place to keep water use records. Besides providing information to the authorities on the use of water (e.g. the total discharge from wells, the total intake from the irrigation canal in m<sup>3</sup>/year or m<sup>3</sup>/month, etc.), these records can support farm management in planning the water use per season and per crop. The total amount of water allocated to a grower or for that matter to a WUA might differ each year depending on the availability of water in the region. Water use records can be incorporated into the on-farm Water Management Plan.

**Glossary**

**Aquifer:** An aquifer is an underground layer of water-bearing, permeable rock consolidated materials (gravel, sand or silt), from which groundwater can be extracted using a water well.

**Black water:** Water polluted with food, animal, or human waste (source: online dictionary)

**Chemical contamination:** Soils and aquifers can be contaminated by irrigation water containing chemical contaminants, such as plant protection products and heavy metals, in quantities above the legal limits.

**Chemical status of soil:** Chemical characteristics of a soil (affected by mineral composition, organic matter, and environmental factors)

**Chemigation:** Chemigation is the name for the injection of chemicals such as nitrogen, phosphorus or a pesticide into irrigation water that is then applied to the land using the irrigation system.

Contaminants, contamination: This may be microbial contamination (through microorganisms such as bacteria, virus, yeast) or chemical contamination (through chemicals such as heavy metals or agrochemicals).

Control points: Questions in the checklist of GLOBALG.A.P. that have to be answered positively. There are two types of control points: Major and Minor.

Contour cropping: A farming practice of plowing and/or planting across a slope following its elevation contour lines. These lines create a water break, which reduces the formation of rills and gullies during times of heavy water run-off (a major cause of topsoil loss and soil erosion). The water break also allows more time for the water to settle into the soil. In contour plowing, the ruts made by the plough run perpendicular rather than parallel to slopes, generally resulting in furrows that curve around the land and are level. This method is also known for preventing tillage erosion (source: Wikipedia).

Compliance criteria: Normative elements attached to every control point and indicating the criteria to have the control point fulfilled

Crop water requirements (CWR): This is the crop evapotranspiration, which is a function of the crop coefficient (depending on the crop characteristics and evaporation from the soil) and the evapotranspiration.

Diffuse source contamination: In contrast to point source contamination, it describes sources of contamination disseminated among various locations of farms and fields

Downstream shortages: Water shortages downstream caused by the use of water by a farm

Drip irrigation: Drip irrigation is an irrigation method that uses drip lines and emitters (or mini-sprinklers) for the localized delivery of water to the crop. In drip irrigation systems water is distributed from a storage basin through a pressurized distribution system to the fields.

Eutrophication: A process where water bodies receive excess nutrients that stimulate excessive plant growth. (Source: USGS 2014)

Fertigation: Application of fertilizers, soil amendments or other water-soluble products through an irrigation system. (Source: Wikipedia)

Fossil water: Water that has been infiltrated usually millennia ago and often under climatic conditions different to the present, and that has been stored underground since that time. This water has no or minimal contacts with the outer world and no, or only minimal recharge.

Furrow irrigation: Furrow irrigation is a surface irrigation system in which water is delivered in small, long streams to crops that are grown on ridges. Furrow irrigation systems are gravity led

Grey water: Wastewater generated from hand-wash basins, showers and baths, which can be recycled on-site for uses such as toilet flushing, landscape irrigation and constructed wetlands (source: Wikipedia)

Irrigation: Artificial application of water to the land or soil. It is used to assist in the growing of agricultural crops, maintenance of landscapes, and re-vegetation of disturbed soils in dry areas and during periods of inadequate rainfall. Additionally, irrigation also has a few other uses in crop production, which include protecting plants against frost, suppressing weed growth in grain fields, and preventing soil consolidation. By contrast, agriculture that relies only on direct rainfall is referred to as rain-fed or dryland farming.



Irrigation efficiency (IE): Terminology used for engineering irrigation systems and consists of the application efficiency (ea) and conveyance efficiency (ec) of the irrigation system (IE = ea \* ec/100)

Microbial contamination: By water containing microbes in quantities above the legal limits

Major control points: All Major control points must be fulfilled to achieve GLOBALG.A.P. certification.

Minor control points: 95 % of the minor control points must be fulfilled to achieve GLOBALG.A.P. certification.

Minimum tillage: A conservation agriculture technique where the grower works 10 to 15 centimeter of the topsoil using minimum tillage machinery to allow for minimum disturbance of the soil so as to improve soil structure over time

Point source contamination: This refers to clearly identifiable sources of contamination, for example spills of plant protection products made during mixing and loading of the sprayer or the disposal of tank leftovers on the fields without properly diluting the mixture and/or without taking into account adjacent water bodies.

Plant protection products (PPP): Insecticides, fungicides, and herbicides

Pressurized irrigation: Sprinkler and drip irrigation are pressurized irrigation systems requiring energy to distribute the water.

(Agricultural) return flow: The (agricultural) return flow is the amount of water that flows back to water bodies downstream after being used on agricultural fields—thus the amount of water that has not been consumed.

River discharge: The flow of water through the river in m<sup>3</sup>/s

Surface irrigation: Surface irrigation systems comprise open channels in which water is distributed by gravity to field units and controlled by gates which are adjusted by the local irrigation system management authorities.

Sprinkler irrigation: An irrigation method that uses different sprinklers (travelling sprinklers, pivot systems, gun and boom, etc.) for the localized delivery of water to the crop. In sprinkler irrigation systems water is distributed from a storage basin through a pressurized distribution system to the fields.

Surge flow: Irrigation water is applied to furrows in a number of intervals to allow the applied water drain into the topsoil in the first parts of the furrow and reduce infiltration in these parts when applying the second time. This allows for an improved uniformity of irrigation water applied in the furrow-irrigated system.

Surge irrigation: Irrigation is not applied at once, but in surges or cycles that allow water to infiltrate in the soil at the head end of the furrow or border. A second surge of irrigation will allow water to move or advance further to the areas that have not received irrigation yet, reducing the potential for runoff at the tail end of the furrow or border.

Water body: The term most often refers to large accumulations of water, such as oceans, seas, and lakes, but it includes smaller pools of water such as ponds, wetlands, or more rarely, puddles. A body of water does not have to be still or contained—rivers, streams, canals, and other geographical features where water moves from one place to another are also considered bodies of water. (Source: Wikipedia)

Water harvesting: Collecting and storing rainwater and/or runoff for domestic or agricultural use. The stored rainwater and/or runoff should be protected against pollution.

Water user association (WUA): Growers are members of this association and pay this association a price for the use of water in the irrigation systems. The WUA manages the maintenance of the irrigation system and, in the case of supply-based systems, also the distribution of water to its members.

Water use efficiency (WUE): The ratio between crop yield and the total amount of water applied

#### 4. EXAMPLE – RISKS SUMMARY

Risk	Issue		Status	Action
<b>Physical</b>	<b>Water scarcity</b>	Does the river basin or area face water scarcity due to the overexploitation of water resources? Can water scarcity affect the current or planned water usage by the producer? Does the producer contribute significantly to water scarcity in the river basin or area or might the producer do so in future?		
	<b>Drought events</b>	Does the river basin or area face droughts due to irregular rainfall? Can this phenomenon affect the producer's water usage? How flexible is the farm's water usage? Can this phenomenon affect the environmental, social and/or cultural issues?		
	<b>Flood events</b>	Does the river basin or area face floods due to irregular rainfall or water management? Can this phenomenon affect the producer? Can this phenomenon affect the environmental, social and/or cultural issues?		
	<b>Water pollution</b>	Does the river basin or area face water pollution? Are current or potential pollution sources upstream or located in the same groundwater area as the producer? Can the pollution affect the producer? Can this pollution affect the environmental, social and/or cultural issues?		
	<b>Alternative water sources</b>	Do alternative non-overexploited and/or non-polluted water sources exist? Can this water be allocated to the producer on a regular basis? Can this water be allocated to the producer under extreme situations (drought, pollution, etc.)? Are there (new) storage mechanisms in order to address temporary extreme situations? What are the environmental effects of the alternative sources or water storage systems?		
<b>Regulatory</b>	<b>Water allocation and management scheme</b>	Is the river basin or area managed according to a plan or scheme? Has this plan or scheme been consulted to the public and interested parties and approved by the corresponding water authority? Is the plan being implemented and updated on a regular basis? Is the producer's water usage included in the plan or scheme? If not, is the producer's water usage coherent with the plan's allocation and management scheme? Does this plan consider adequately the environmental, social and/or cultural issues?		

Risk	Issue		Status	Action
	<b>Water usage permit</b>	Does a procedure exist to hold a water usage permit? Does the producer hold a water usage permit adequate to its water usage? Does this permit interact with other (water usage) permits?		
	<b>Non-authorized water usage</b>	Does the producer use water (partially) without the correspondent permit? Do other users use water without the corresponding permit? Can this non-authorized water usage affect the producer's water usage permit or the water usage itself? Can this non-authorized water usage affect the environmental, social and/or cultural issues?		
	<b>Priority usage</b>	Is the usage of water prioritized in the river basin or area? What is the ranking of the producer in relation to other water users? Are specific regulations foreseen for extreme situations (drought, pollution, etc.)? Is there a risk for the producer's water usage taking into account the trend scenarios of priority water users and extreme situations? Can the permit be derogated in order to supply water to priority water users?		
<b>Reputational</b>	<b>Water conflict</b>	Does the river basin or groundwater area cross national, regional, local or cultural/ethnic borders? Are there conflicts about water in the river basin or area? What are their reasons? Are these conflicts addressed by conflict-resolution dialogue-processes? Is the producer involved in water conflicts in this particular area or in any other geographical area the producer operates? Are similar water users involved in water conflicts in the river basin or area or adjacent areas?		
	<b>Environmental issues</b>	What is the current situation of the freshwater environment in the river basin or area? What are the environmental and biodiversity trends for the river basin or area? Can these environmental trends affect negatively the farm's operations? Does the farm's water usage impact significantly, in direct or indirect form, the key environmental or biodiversity features? Has the producer developed a (public) environmental statement and/or plan? Does this plan respond to any water-related environmental conflicts or concerns that have arisen? Is this plan implemented, audited and updated on a regular basis? Is this plan publicly accessible?		

Risk	Issue		Status	Action
	<b>Social issues</b>	What is the current social situation regarding water issues (access to drinking water and adequate sanitation, etc.) in the river basin or area? What are the social trends for those aspects? Can social requirements or claims affect negatively the farm's operations? Does the farm's water usage impact significantly, in direct or indirect form, the access to drinking water and sanitation for the inhabitants of the river basin or area? Has the producer developed a (public) statement and/or plan in this regard? Does this plan respond to any conflicts or concerns that have arisen on the water usage? Is this plan implemented, audited and updated on a regular basis? Is this plan publicly accessible?		
	<b>Cultural issues</b>	What are the key cultural issues related to water in the river basin or area? What has been their evolution? Can cultural trends, requirements or claims affect negatively the farm's operations? Does the farm's water usage impact significantly, in direct or indirect form, the cultural heritage of the river basin or area? Has the producer developed a (public) statement and/or plan in this regard? Does this plan respond to any conflicts or concerns that have arisen on the water usage? Is this plan implemented, audited and updated on a regular basis? Is this plan publicly accessible?		
	<b>Farm's water management</b>	Is the water in the farm managed according to a plan? Does this plan include registers for historical, current and future water usage? Does this plan include provisions for the sustainable and efficient water usage? Does this plan respond to any conflicts or concerns that have arisen regarding the farm's water management? Is this plan implemented, audited and updated on a regular basis? Is this plan publicly accessible?		
<b>Financial</b>	<b>Financing</b>	Does the producer require regular or irregular external financing? Do the (current and potential) investors consider water-related criteria in their funding evaluation? Are there any specific aspects (e.g. water management plan, water usage permits) required by the investors? Do the investors establish thresholds for compliance with its water-related criteria?		

Risk	Issue		Status	Action
	<b>Insurance</b>	Does the producer subscribe insurances for its operations? Do the (current and potential) insurance operators consider water-related criteria in their evaluation? Are there any specific aspects (e.g. water management plan, water usage permits) required by the insurance operators? Do they establish risk thresholds for compliance with its water-related criteria?		
	<b>Water pricing</b>	Does the producer pay for the water usage? How is this price/tax/tariff fixed? Does it include operational costs and (environmental) externalities? Is the pricing system stable, foreseeable and transparent? How likely is it that water prices will be increased on a regular or irregular basis?		

## ANNEX CB 2 GLOBALG.A.P. GUIDELINE: INTEGRATED PEST MANAGEMENT TOOLKIT

### 1 INTRODUCTION

This document is a toolbox of alternative actions for the application of IPM techniques in the commercial production of agricultural and horticultural crops. It has been elaborated to provide possible actions for the IPM implementation. Given the natural variation on pest development for the different crops and areas, a specific model for every situation involved in IPM cannot be developed, and therefore the considerations analyzed, and examples given in this document are not all inclusive, but are directed towards the implementation of IPM in the local industry. This is an important consideration because any IPM system must be implemented in the context of local physical (climatic, topographical, etc.), biological (pest complex; natural enemy complex, etc.), and economical (access to subsidies or lack thereof; requirements of all importing countries, etc.) conditions.

#### 1.1 DEFINITION

*Integrated pest management (IPM)* is the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms ('International Code of Conduct on the Distribution and Use of Pesticides', FAO 2002).

#### 1.2 GOAL

The goal of applying IPM into the framework of GLOBALG.A.P. is to ensure sustainable production that includes crop protection. This can be achieved by integrating and applying all available pest control and suppression tactics, including the responsible application of chemicals.

The last word in IPM is management. This is of cardinal importance, because it implies that there must be knowledge of what the problem(s) is/are and the intensity of the problem(s). In the case of pest management this information can only be obtained by applying standardized pest monitoring systems.

#### 1.3 FRAMEWORK

This document lists potential approaches that can be used to implement the three basic pillars of IPM, which are the prevention, monitoring and control of diseases, weeds and arthropod pests in fruit and vegetable crops. This toolbox is designed to supply examples of the different approaches that producers can consider for developing their own IPM programs. It is not intended as an exhaustive and final text on IPM tools and will be updated regularly.

Different crops in different areas of the world require different combinations of IPM methods. However, the overall IPM philosophy is generic and universal. IPM must be considered as a flexible system that must be suited to the local conditions (physical, biological, and economical) under which a particular crop is produced in a particular area. Therefore, a generic IPM model that could be used for every situation cannot be developed, and so the list of examples given here is a guideline. It is not and cannot be complete but is sufficient as a guide for local producers to design and implement an IPM program.

Producers should critically evaluate, at least every year, their current crop protection practices and systematically evaluate the potential of different IPM practices for their crop. Local or regional technical specialists will be able to analyze the IPM plans by area-crop-pest, disease, or weed and to verify which IPM practices or their combinations are successful. Such information will be very useful to help producers in the same area as well as in other similar areas of the world to improve their IPM practices.

## 1.4 THE THREE PILLARS OF IPM

GLOBALG.A.P. has identified three chronological steps in the IPM technique, which are in accordance with the IOBC principles:

### (1) PREVENTION

Maximum efforts should be made to prevent problems with pests, diseases, and weeds to avoid the need for intervention. This includes the adoption of cultivation techniques and management actions at farm level to prevent or reduce the incidence and intensity of pests, diseases, and weed. In the case of some chronic pests, (Stern *et al.* 1959; Pringle 2006) this may include preventative pest management options, including spraying.

### (2) MONITORING AND EVALUATION

Monitoring is the systematic inspection of the crop and its surroundings for the presence, stage (eggs, larvae, etc.), and intensity (population level; infestation level) of development, and location of pests, diseases, and weeds. It is one of the most critical activities of IPM, as it will alert the grower about the presence and level of pests, diseases, and weeds in his crop. This will allow the grower to make a decision on the most appropriate intervention, highlighting how essential the part of monitoring and record keeping is to an IPM program.

### (3) INTERVENTION

Different IPM techniques can be used when monitoring indicates that an action threshold has been reached and that intervention is required to prevent economic impacts on the crops value or the disease/pest will spread in other crops. Within an IPM program, priority is given to non-chemical methods that reduce the risk to people and the environment as long as these effectively control pest, disease or weed. However, most of these at present are preventative, such as placing mating disruption dispensers, conserving natural enemy populations, etc. If further monitoring indicates that control is insufficient, then the use of chemical plant protection products can be considered. In such cases selective pesticides that are compatible with an IPM approach should be selected and the products should be applied in a selective way.

In order to implement IPM on a farm, producers must acquire basic knowledge on the IPM aspects related to their crop and location. This basic knowledge is described in section 2.

## 2 DEVELOPMENT OF BASIC KNOWLEDGE

In order to be successful with IPM, it is important to have a basic knowledge of:

- The key pests, diseases, and weeds that can affect a crop
- The potential strategies, methods, and products to control them

For this purpose, producers should gather information on:

### 2.1 PESTS, DISEASES, AND WEEDS

Producers should have the following basic information:

**2.1.1** List of relevant pests, diseases, and weeds in the target crop for that specific area, region, or country

**2.1.2** Basic information (fact sheets) about the biology of the relevant pests, diseases, and weeds and about their natural enemies, such as:

- Information about their life cycle:
  - Different life stages and their approximate dates of appearance



- Development requirements (minimum temperature threshold for development, number of flights per season, season of the year when they attack or develop, etc.)
- Over-wintering places (in case of pests)
- Photo guides of relevant pests (different stages), diseases, and weeds and of their typical damage
- Photo guides of relevant natural enemies (different stages)
- Economic injury levels (EILs) and action thresholds
- Knowledge about organisms that have a quarantine status in target, export markets

## 2.2 PLANT PROTECTION PRODUCTS

Producers should have the following basic information:

**2.2.1** List of pesticides that can be legally applied against the relevant pests, diseases, and weeds in the target crop

**2.2.2** Basic information (fact sheets) about their

- Chemical family
- Contact route (systemic, translaminar, vapor activity, contact, stomach)
- Dose rates
- Maximum residue levels (in own country and in target export countries)
- Persistence:
  - Re-entry interval
  - Harvest interval
- Optimal application technique
- Optimal timing of application
- Maximum number of applications per season
- Selectivity for natural enemies and for pollinators
- Mode of action

## 2.3 OTHER PROTECTION METHODS

- Similar information should be available for other protection methods

## 2.4 TRAINING

Training of relevant personnel (own personnel or specialized consultant) in the following topics:

- Recognition of pest, diseases, weeds, and relevant natural enemies
- Scouting and monitoring techniques, including record keeping

- IPM principles, techniques, methods, and strategies
- Knowledge about crop protection products and application techniques

### **3 POTENTIAL IPM MEASURES BEFORE PLANTING**

Preventive and hygienic measures are an essential part of an IPM approach. Many preventive measures can be taken before planting the crop, in order to prevent or reduce future problems with pests, diseases, and weeds during the cropping period.

#### **3.1 RISK ASSESSMENT**

Make a risk assessment of the plot:

##### **3.1.1 History of the Plot**

- Which crops have been previously grown on this plot for the last three years?
- What were the main problems with pests, diseases, and weeds on this plot during the past?
- Although it is not always possible, it could be advisable to gather information on previous usage of plant protection products:
  - Which plant protection products have been used on this plot in the past?
- Could the pesticide usage on this plot in the past:
  - Create problems with residues on your crop? (E.g. because of pesticide accumulation in the soil).
  - Cause pest or disease outbreaks during the next cropping season? (E.g. because all natural enemies have been exterminated in perennial crops such as trees and vines).

##### **3.1.2 Surrounding Crops and Vegetation**

Evaluate the potential influence of the surrounding crops and vegetation on your crop:

- What are the IPM practices on neighboring crops?
- What is the pesticide usage on neighboring crops and what is the risk for pesticide drift?
- What is the potential of pest or disease problems created by surrounding crops and vegetation?

##### **3.1.3 Soil and Water Samples**

Take and analyze soil and water samples in order to check for:

- The presence of diseases and pests (including nematodes)
- The presence of pesticide residues, heavy metals, or other toxins
- The nutritional level of the soil

### 3.1.4 Analysis and Evaluation of the Risk Assessment

Based on an analysis of this risk assessment, and of the monitoring records of the previous years (see 4.2.) (if such records exist for this new plot), identify the measures that should be taken in order to prevent or reduce problems with specific and relevant pests, diseases, and weeds in this particular crop.

## 3.2 PREVENTION

Where relevant, the following preventive measures should be considered for new plots:

### 3.2.1 Soil

For the prevention of (soil) pests, nematodes, (root) diseases, and weeds the following measures could be taken:

- Crop rotation according to a crop rotation program, and depending on the crop
- Year of rest, fallow, depending on the crop
- Disinfection of the soil, or of the growing substrate (e.g., solarization, fumigation, inundation, steaming, hot water)
- Promotion and/or augmentation of beneficial macrobial and microbial soil organisms
- Clean tillage or sanitation of crop residues (including fruits in the case of tree crops) to reduce overwintering populations of certain pests or diseases

### 3.2.2 Water

Preventive measures should be taken in order to ensure:

- Clean water (meeting local regulations about pests, diseases, and chemical residues, or reduce their content if applicable)
- Optimal irrigation methods and/or use of fertigation

### 3.2.3 Plants

Preventive measures that can be taken to reduce problems with pests, nematodes, and diseases are:

- Choice of optimal, resistant varieties
- Use of resistant rootstock (grafting)
- Pest and disease free starting material (seeds or plants). This may include testing for pests and pathogens in the rhizosphere
- Optimal plant spacing or plant density

### 3.2.4 Climate

Climatic conditions can have a big influence on the development of diseases, as well as on pests and weeds. Therefore, consider:

- Cultural measures to prevent or reduce the development of pests and/or diseases
- The establishment of an agro-climatological monitoring station or subscription to an information or warning service

### 3.2.5 Timing

With respect to the (first) appearance of key pests, diseases and weeds during the cropping season, consider:

- The possibility of choosing an optimal planting date to reduce (avoid) problems with key pest, diseases, and weeds
- The choice of early maturing varieties, or short-season varieties, in order to avoid periods with high infestation pressure from certain pests or diseases

### 3.2.6 Location and Plot Selection

Analyze if neighboring crops could be a source of especially problematic harmful pests or diseases.

## 4 POTENTIAL MEASURES FOR IPM DURING CROPPING

### 4.1 PREVENTION

Preventive measures are an essential part of an IPM approach. Their goal is to keep pest, disease, and weed populations below the action threshold. In any case, producers must consider the most suitable preventive measures, according to their particular situation, and to the relevant pests, diseases, and weeds for their crop and location.

#### 4.1.1 Cleanliness of the Farm (Hygiene and Sanitation)

Hygienic measures are aimed at preventing pest, diseases, and weeds from entering the field and from further spreading or dispersing in the crop.

##### 4.1.1.1 Prevent transmission of pests, diseases, and weeds by vectors by:

- Identifying vectors, such as insects, animals, pets, rodents
- Identifying actions to keep these vectors out of the crop
- Identifying if weeds in the borders or adjacent areas can be hosting pests

##### 4.1.1.2 Prevent transmission of pests, diseases, and weeds by people by:

- Working from healthy to diseased plants and areas
- Wearing suitable clothing, gloves, shoes, hairnets (depending on the crop)
- Disinfecting hands, shoes, clothes before entering the field, especially after visiting plots from other producers (depending on the crop)

##### 4.1.1.3 Prevent transmission of pests, disease, and weeds by equipment or materials by:

- Cleaning all equipment (incl. machines) and materials after working and before entering a new field
- Using different, dedicated equipment and materials in different fields (if possible), depending on the crops
- Using clean harvesting boxes and crates

##### 4.1.1.4 Prevent transmission of pests, diseases, and weeds by managing crop residues:

- Clean the orchard after pruning, harvest, leaf picking or any other task that has produced organic residues
- Don't keep any crop residues near the field

##### 4.1.1.5 Prevent pesticide drift from neighboring plots.

Make agreements and organize communication with producers from neighboring plots in order to eliminate the risk for undesired pesticide drift.

#### **4.1.2 Cultural and Technical Measures**

##### **4.1.2.1 Optimal Crop Care (fertilization, irrigation, etc.)**

Remember, too much fertilization can be as detrimental to pest management as too little, because over-fertilization can result in free amino acids in the phloem and xylem, resulting in increased breeding potential of pests such as aphids. Optimal crop care results in a healthier crop, which is better able to resist pests and disease attack.

##### **4.1.2.2 Canopy Management and Micro-Climate**

Use cultural measures, such as pruning, canopy management and leaf picking, in order to assure an optimal micro-climate (humidity, temperature, light, air) in the crop canopy to prevent or reduce the development of pests and/or diseases.

##### **4.1.2.3 Cropping Systems**

Different cropping systems can be used to prevent or reduce problems with pests, diseases, and weeds:

- Cover crops to prevent weeds and to stimulate natural enemies
- Special types of cropping systems: Mixed crops, strip cropping, strip harvesting, and permaculture
- Other practices related to the cropping system (e.g. fallow field margins to prevent immigration of pests such as slugs and snails)

##### **4.1.2.4 Exclusion Techniques (in protected crops)**

Especially in protected crops, different techniques can be used to exclude harmful pests from the crop, such as insect proof netting or UV-cut foils in plastic tunnels to reduce immigration of certain pests, air locks, and double entry doors.

##### **4.1.2.5 Mulching**

Evaluate if mulches could help to minimize problems with certain pests, diseases, or weeds (plastic mulches, reflective mulches, straw mulches, etc.).

##### **4.1.2.6 Other technical measures**

- Analyze which other preventive technical measures could be undertaken
- Prevent mechanical plant and product damage

#### **4.1.3 Conservation Biological Control**

##### **4.1.3.1 Measures to increase populations of natural enemies and pollinators in and around the crop:**

- Use of different cropping systems (strip cropping, strip harvesting, mixed crops, permaculture, other)
- Use of border crops (including hedgerows) (pollen producing plants, nectar producing plants, plants that harbor alternative hosts for natural enemies (banker plants))
- Use cover crops inside the field (pollen producing plants, nectar producing plants, plants that harbor alternative hosts for natural enemies (banker plants))
- Use of attractants for natural enemies
- Providing hiding and nesting places for natural enemies and pollinators
- Providing food sources when the crop is dormant in the case of deciduous fruits
- Use of selective chemicals, selective placement and/or timing of sprays where and when chemical control is necessary
- Use of push-pull technology (attract-and-kill, use of repellents)

4.1.3.2 Provide nesting places for predatory birds to control rodents

4.1.3.3 Prevent population reduction of natural enemies by using pesticides

- Use of selective pesticides that are compatible with natural enemies
- Use of selective application techniques (spot treatments, soil application of systemic products, bait sprays on the tree skirt, attract-and-kill, etc.)

## **4.2 MONITORING AND DECISION SUPPORT TOOLS**

Monitoring is a major tool for reducing the number of interventions with chemical plant protection products and is fundamental for a reliable and sustainable IPM program. Monitoring is preferably used in combination with the decision support tools.

### **4.2.1 Organization**

- Nominate a responsible person for scouting and monitoring
- This person must receive training in:
  - Recognizing pests, diseases, and weeds
  - Scouting and monitoring techniques
  - Record keeping

This training should be refreshed on a regular basis.

### **4.2.2 Observation**

Organize a monitoring and scouting program for the farm:

- Identify which pests, diseases, and weeds should be monitored and why
- Establish how they should be monitored (direct observation in the crop on key plant parts, traps, indicator plants, etc.)
- Establish during which period of the year, and at which life stages of the pest, monitoring should occur
- Participate in existing area-wide monitoring/warning systems
- Identify the monitoring frequency
- Establish the area that constitutes a monitoring unit
- Establish the amount of sampling points per unit area

### **4.2.3 Record Keeping**

- Establish record sheets (computer or paper based), which include:
  - Identification of the plot and crop being monitored
  - Name of the monitor
  - Date of monitoring
  - Name of the pest, disease or weed being monitored

- Number of samples
- Number of findings
- Life cycle stage of the findings (in case of pests)
- Comparison with thresholds
- Location inside the plot
- Decision taken
- Record sheets should be archived in order to allow comparison of records from different years and different plots.

#### 4.2.4 Warning Systems and Decision Tools

- Use of predictive models and decision support systems (e.g. temperature-driven phenological computer models, degree-day models) in combination with information from monitoring and weather forecasts
- Use of area-wide warning systems

#### 4.2.5 Evaluation/Decision Making

- Use action thresholds for the relevant pests, diseases, and weeds to decide whether or not an intervention is needed
- Document the decisions that were taken to perform a certain intervention
- Make an analysis of the records at the end of the season, draw conclusions and plan adaptations of the IPM program for the following season

### 4.3 INTERVENTION

In case interventions have to be made, there are several non-chemical methods that can be applied. In case pesticides have to be applied, their use can be minimized by using optimal application techniques and by preventing the development of pesticide resistance.

In some cases, such as the need to obtain pest quarantine compliance for a quarantine pest, disease or weed, a phytosanitary requirement is made by third countries. In such cases the use of plant protection products often cannot be avoided. If the producer is forced to use chemical plant protection products because of specific quarantine issues, he must use and supply information about prevention and monitoring methods to support the necessity of such application.

#### 4.3.1 Mechanical/Physical Control

Before resorting to chemical methods, a producer should evaluate mechanical or physical techniques to kill or remove harmful pests, diseases, or weeds such as

- Pests:
  - Rouging and isolating infested leaves, fruits, or plants (sanitation)
  - Vacuuming of pests (e.g. *Lygus spp.*)
  - Other
- Diseases:
  - Rouging and isolating damaged and infected leaves, fruits, or plants (sanitation)

- Weeds:
  - Mowing
  - Hand removal of weeds
  - Mechanical weeding
  - Etc.

#### 4.3.2 Semiochemicals

Semiochemicals can be used in different ways to control pests:

- Attract-and-kill (a.k.a. lure-and-kill), including:
  - Mass-trapping with semiochemicals
  - Trap crops
  - Bait spraying techniques
- Chemosterilization (this technique can be an alternative to the SIT technique): the males of a wild population of a pest are attracted to bait that is laced with a chemosterilant
- Repellents
- Mating disruption (mating confusion)

#### 4.3.3 Augmentative Biological Control

Different natural enemies and microbial products can be released or applied to manage populations of pests and also of diseases:

- Seasonal inoculative or inundative releases of mass-reared natural enemies to control harmful insects and mites
- Use of insect-pathogenic viruses (NPV or baculo viruses), fungi, bacteria, or nematodes to control harmful insects and mites
- Use of antagonistic fungi and bacteria to control root and leaf diseases

#### 4.3.4 Sterile Insect Technique (SIT)

This area-wide technique is successfully used in many areas of the world to manage populations, for example; fruit flies (*Tephritidae*, such as the Mediterranean fruit fly: *Ceratitis capitata*), certain species of *Lepidoptera* (e.g. cotton bollworm: *Pectinophora gossypiella*; codling moth, *Cydia pomonella*) and certain species of flies of veterinary importance (e.g. screwworm fly: *Cochliomyia hominivorax*) by frequently releasing mass-reared sterile insects of the target pest (note: In the case of the screwworm and others, both sexes are released).

#### 4.3.5 Use of Natural Products

Different natural products can be used to control pest, diseases, and weeds. Also in this case, diligent care should be taken to make sure that they are compatible with an IPM approach and do not pose any health or food safety issues.

- Oils (mineral oils and vegetable oils)
- Botanicals (e.g. natural pyrethrum, azadirachtin, etc.)



- Soaps
- Diatomaceous earth
- Etc.

*Note: Care should be taken that these products are properly registered as PPPs in the country of production, where applicable.*

#### 4.3.6 Chemical Plant Protection Products

In the case an intervention where a chemical plant protection product is needed, the product must be selected in advance. The requirement of CB 8.1.1 is useful for this purpose. The next considerations should be included:

##### 4.3.6.1 Warning Systems and Decision Making

In order to make an optimal decision on timing and targeting the following information is needed:

- What is the optimal timing of application in order to obtain the maximum effect on the target pest, disease, or weed?
- Information about the re-entry interval and about the harvest interval
- Information about the correct application frequency
- A weather forecast with information about:
  - Wind and temperature conditions in order to avoid problems during the applications
  - The possibility for rain during the post intervention period
- The use of predictive models and field observations in order to determine whether the pest is in a sensitive stage of its life cycle. This can be important for optimizing applications so as to avoid additional applications

##### 4.3.6.2 Action Threshold

Document the action threshold for the relevant pests, diseases and weeds.

##### 4.3.6.3 Product Selection (See 2.2. 'Plant Protection Products')

- Before applying a chemical product, determine the goal—total cleanup, spot treatments, population correction, compatibility with natural enemies, etc.—and select a product according to your goal.
- In the case of applying tank mixes, identify whether or not there are any known negative cocktail effects that should be avoided.

##### 4.3.6.4 Anti-Resistance Management

Development of pesticide resistance (1) reduces the number of available pesticides and (2) often leads to more frequent application of higher dosages and therefore increased risk of exceeding the MRL. Therefore, it is very important to have an anti-resistance management plan so as to prevent the development of resistance against chemical pesticides.

##### 4.3.6.5 Application

Optimal application of pesticides can drastically reduce pesticide usage while maximizing the effect of a pesticide application.

- Identify and use the optimal spraying equipment (including type and size of nozzles) and technique:

- Pressure
- Driving speed
- Amount of water
- pH of the water, if relevant to the plant protection product
- Use of adjuvants (effective stickers and spreaders)
- Periodic calibration of the spraying equipment
- Keep records of calibration
- Use of application techniques that are selective for natural enemies

NOTE: See 4.1.3.1 and 4.1.3.3 - Use of selective chemicals, selective placement, and/or timing of sprays where and when chemical control is necessary.

Evaluate the possibility of using selective ways by which a chemical plant protection product could be applied without disturbing the populations of natural enemies in the crop and to integrate it into an IPM program, such as:

- Low rate, electrostatic application
- Spot treatments
- Strip applications
- Treatment of only a part of the plants
- Timing of applications when the pest and natural enemy(ies) are not active in the crop
- Bait spraying
- Use of baits and traps (e.g. against fruit flies (*Tephritidae*))

4.3.6.6 Nominate a person who is responsible for the application of crop protection products. Such a person must have:

- Periodic training in pesticide application
- Knowledge in calibration of the equipment

4.3.6.7 Obsolete Plant Protection Products

- Obsolete plant protection products have to be securely maintained, identified, and disposed of, by an authorized or approved channel.

4.3.6.8 Empty Plant Protection Containers

- No re-use of empty plant protection containers
- Three times rinsing before disposal
- Safe and secure storage of empty containers
- Disposal according to legal requirements/good practices

## **5 POTENTIAL MEASURES FOR IPM POST-HARVEST**

### **5.1 POST-HARVEST TREATMENTS**

When post-harvest intervention is needed, the following factors should be taken into account:

#### **5.1.1 Selection of Techniques and Products**

When selecting an intervention technique or product:

- Priority must be given to the use of non-chemical techniques, such as the use of heating, freezing, irradiation, washing, CO<sub>2</sub>, etc.
- In the case chemical plant protection products have to be used, they must be selected in advance while giving priority to products with short persistence.

#### **5.1.2 Application Technique**

In order to minimize the amount of chemical plant protection products to be applied, the following points should be taken care of:

- The application equipment has to be calibrated (volume applied to volumes of produce in the packing line).
- The dose has to be prepared by using calibrated measuring equipment.

#### **5.1.3 Record of Applications**

Records of the applications should be kept according to GLOBALG.A.P. CPCC.

### **5.2 STORAGE AND TRANSPORTATION**

#### **5.2.1 Monitoring**

- Look for sheltering sites for rodents, birds, and insects
- Look for evidence of their presence (feces, hairs, feathers)
- Revise the conditions of the cargo area and transport media such as lorries and boats

#### **5.2.2 Prevention**

Different measures can be taken to eliminate pests and diseases during storage and transportation:

- Optimal storage and transport packaging
- Optimal storage and transport conditions
  - Optimal climatic conditions (temperature, relative humidity, air movement, ventilation, etc.).
  - Atmosphere (e.g. ULO, ...)
- Clean boxes, crates, climate rooms, trucks...
- Prevention of stored product pests and diseases (including rodents) by for example exclusion techniques

### 5.2.3 Intervention

Different intervention techniques can be used to control pests and diseases during storage and transportation:

- Trapping techniques
- Semiochemicals
- Biological pest control
- Chemical control
- Freezing or heating
- Controlled atmosphere
- Other

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**ANNEX CB 3 GLOBALG.A.P. GUIDELINE: PLANT PROTECTION PRODUCT USE IN COUNTRIES THAT ALLOW EXTRAPOLATION**

Registration Scheme in Country of Use	Safe Use Criteria (Operator and Environment)	Authorization of PPP for Use on Individual Crops
<b>No registration scheme exists:</b> Some control over PPP imports may be in place.	PPPs that are used shall have clear guidance for the user to allow for the safe use of the product in line with the 'International Code of Conduct on the Distribution and Use of Pesticides' (FAO Rome 2002).	Extrapolated uses are permitted.
<b>A registration scheme exists:</b> Imported PPPs are permitted for sale with the label of the country of origin. This may be in addition to the national labels for the PPPs.	The user of the PPP, which is a direct import, shall be provided with clear guidance to allow for the safe use of the product. This guidance could be in the form of label translations or notes provided by the distributor.	1. The imported PPP carries a label that matches the national approval.
		2. The imported PPP carries a label that is different to the current national approval. In this case this PPP can be used on the crop where the national approval is valid.
		3. The crop is not covered on the national label. Extrapolated uses are permitted, if the national scheme explicitly allows this practice.

**EXCEPTION:**

Where field trials are performed by producers in cooperation with the government as the final trials before approval of PPPs, the producer can still receive GLOBALG.A.P. certification, even though part of the product will be destroyed or used for further analyses. There shall be clear traceability and information on the area (size) used for the trials. The producer shall also have available meaningful documents indicating that the producer is taking part in a legal field trial in full conformity with the legislation of the country of production. Furthermore, clear procedures shall exist on the management of these trials. The PPPs that are being trialed are not allowed for use on the product to be certified and the residue testing shall not show residues of this product.

**ANNEX CB 4 GLOBALG.A.P. GUIDELINE: CB 7.6 RESIDUE ANALYSIS**

<b>Control Point</b>	<b>Interpretation</b>
CB 7.6.1	<ol style="list-style-type: none"> <li>1. In all cases, evidence of the list of the current applicable MRLs for the country(ies)/region (even if it is the country of production itself) where the produce is intended to be traded in shall be available, or any other documentation that shows that the producer (or his direct customer) has incorporated this information.</li> <li>2. Communication with clients presented by the producer can be in the form of letters or other verifiable evidence. These can be present or future clients.</li> <li>3. As an alternative to 2., where for example the producer does not yet know with whom trading will take place, the producer can participate in a residue screening system that meets the strictest MRLs (or import tolerances if they exist and are different) in the country or region where produce is intended to be traded in. Where there is a harmonized MRL for that region, it must be conformed to. If the producer sells the product on the market of the country of production, the current applicable (national) MRL list shall still be available as in 1. above.</li> <li>4. Internal segregation and traceability of certified produce is needed if trying to meet MRLs of different markets for different batches of produce (i.e. simultaneous production for US, EU, country of production).</li> <li>5. This control point must be cross-referenced with the information given at the registration of the producer and any updates sent to the CB since registration, i.e. to verify if the producer sells his/her product exclusively on the market of the country of production and declares this at registration.</li> </ol>
CB 7.6.2	<ol style="list-style-type: none"> <li>1. Guidance shall be sought from PPP industries/grower organizations or technically responsible advisers on how to adapt production methods (e.g. to increase pre-harvest interval) that are necessary to take the stricter MRLs into account.</li> <li>2. If the producer sells his product exclusively on the national market of the country of production and he declares this at registration, this control point is considered complied with (since legislation on G.A.P. such as pre-harvest interval, dosage, etc. in the country of production covers this point already).</li> <li>3. This control point must be cross-referenced with the information given at the registration of the producer and any updates sent since registration.</li> </ol>
CB 7.6.5	<ol style="list-style-type: none"> <li>1. According to a risk evaluation, a sampling plan is available with at least the following minimum requirements: <ul style="list-style-type: none"> <li>• Sample frequency is defined (e.g. 1 sample per x kg / pieces, package, or sample per week/month/year, etc.).</li> <li>• Description of the analysis method (GCMS-MS, LCMS-MS, specific methods, ...).</li> </ul>                     The risk evaluation is done at least annually.                 </li> <li>2. Sampling plan devised according to a risk-based procedure.</li> <li>3. Standardized operating procedure for sampling based on the Codex Alimentarius or EU regulations.</li> <li>4. Considerations: cross-contamination, traceability of samples (to the lab and the residue analysis results back to the samples source) process, sample/courier practices.</li> </ol>
CB 7.6.6	<ol style="list-style-type: none"> <li>1. Proficiency testing is part of ISO 17025 accreditation. It is, however, important for the labs that are in the process of accreditation to ISO 17025 or labs accredited to an equivalent standard (e.g. GLP) to prove participation in proficiency testing.</li> <li>2. Techniques should be able to detect to the appropriate performance limits (e.g. LOD 0.01 ppm, etc.).</li> <li>3. Maintenance of traceability.</li> </ol>
CB 7.6.7	<ol style="list-style-type: none"> <li>1. See '4.3.3 Burden of Proof' in GLOBALG.A.P. General Regulations Part I.</li> <li>2. Verify the traceability of the results; identify the nature and source of the MRL exceedance.</li> <li>3. Interpret laboratory results and agree appropriate action (involve relevant reference group, e.g. expert, industry, grower, laboratory, etc.)</li> <li>4. Implement corrective actions (where required), amendments of relevant controls and procedure, sanctions where required in case of an MRL exceedance.</li> <li>5. Communication to relevant parties regarding an MRL exceedance.</li> </ol>

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## **ANNEX CB 5 GLOBALG.A.P. GUIDELINE: CB 7.6.3 MAXIMUM RESIDUE LIMIT EXCEEDANCE RISK ASSESSMENT**

### **THIS ANNEX INCLUDES MANDATORY MINIMUM CRITERIA FOR RESIDUE MONITORING SYSTEMS**

#### **1. Background**

Today, consumers are used to choosing year-round from a diverse variety of fresh and processed food products of high quality at affordable prices. To satisfy this demand, in many cases plants have to be protected during growth against pest and diseases through the application of PPPs according to the principle, “as little as possible, as much as necessary”.

In order to have a set of standards on PPP residues on food and feed, to enable trade in food commodities to take place, to check compliance with good agricultural practices (G.A.P.) and to ensure that human health is protected, legally applicable maximum residue limits (MRLs) are set.

It is in the interest of all persons working in primary agricultural production and the food chain, including GLOBALG.A.P., to ensure that practical measures are taken to ensure compliance with these trading standards. For GLOBALG.A.P., a key tool is the GLOBALG.A.P. standards and their correct implementation.

However, despite many due diligence measures in place at producer level, it is not always possible to achieve 100 % compliance to MRLs; yet it is the responsibility of all in the food production chain to avoid exceedances of MRLs.

In order to deliver improved compliance to GLOBALG.A.P. protocols, producers shall assess the risk associated with use of PPPs. The enclosed document provides examples of how MRL exceedances can occur so that producers can modify their on-farm production procedures during production.

#### **2. Key Reasons Why MRL Exceedances May Occur**

- Non-compliance with good agricultural practices and label instructions, including improper or illegal use of PPPs.
- No proper quality assurance standard applied to check production methods.
- Differences in MRLs between the country of production (COP) and country of destination (COD), and other legal challenges in the application and communication of MRLs, such as occasional changes to MRLs midway through the growing season which fail to allow a producer to change his G.A.P. to ensure the final product complies with the modified MRL.
- Exceptional circumstances, where abnormal crop conditions, climatic or agronomic conditions are experienced.

#### **I. PRODUCER LEVEL (Field Level)**

##### Cases that can be controlled by producers

- Failure to observe and comply with the on-label use instructions of PPPs:
  - Application method
  - Pre-harvest interval
  - Handling and mixing
  - Errors in calculating concentration or spray volumes

- Growing practices (covered vs. open production)
- Application of non-registered PPPs (e.g. on minor crops)
- No proper use of additives or oils
- Application of illegal PPPs or use of formulation from non-authentic sources
- Failure to comply with general good agricultural practices (e.g. cleaning of equipment, discharge of spray mixture, management practices, including water management) and PHI
- Wrong delivery system, improper use of the application equipment or poor condition of the equipment (e.g. calibration, wrong nozzles)
- Use of compost produced from treated plants
- Residues in the following (rotational) crops
- Sampling methods (by producer):
  - Cross-contamination during sampling in field/pack-house
  - Incorrect sample taken due to human error in field/pack-house

Cases where control by producer is minimal

- Rapid plant growth after application, leading to earlier harvest than foreseen and hence reduced PHI
- Spray drift from very closely planted neighboring crops

**II. OFF FARM LEVEL (Post Farm Gate)**

Cases that can be controlled by producers

- Non-compliance with label instructions for post-harvest treatment used in downstream processing (e.g. pack houses) (see above)
- Poor management practices (e.g. failure to follow instructions and rules regarding hygiene/sanitation, safe storage and transport of PPPs which are designed to avoid direct contact of produce and PPPs)

No direct control by producer

- Lack of a complete set of globally harmonized MRLs
  - PHI not applicable to COD MRL (not relevant for produce of EU origin)
  - Lowering of MRL or withdrawal of AI (active ingredients) combined with insufficient communication of changes
  - Different MRLs in COP and COD
  - Confusion regarding which MRL to comply with, given use of many several legal and private standards each with various MRL requirements
- Sampling methods (by third parties):
  - Cross-contamination during sampling:
    - In field



- At depot
- In store
- Incorrect sample taken due to human error:
  - In field
  - At depot
  - In store
- Dry matter not divided homogeneously in soil and in plant material
- Sample size too small
- No harmonized sampling methods
- Testing and laboratory
  - Inherently large error margin to residue analyses
  - Wrong analytical method used
  - False positives (interference from plant-made actives or poor lab procedure or matrix effect)
  - Contrasting ability of certified and approved labs
- Statistical methods used, and conservatism in the way MRLs are set
  - According to EU regulations, MRLs are set based on a limited number of field trials using specified statistical methods, and in this context the ALARA (as low as reasonably achievable) principle is employed
  - Due to the conservative way in which MRLs are set, and the statistical procedures that are in place, it is a mathematical inevitability that there will be a certain small percentage of MRL exceedances. The statistical possibility of such exceedances could only be eliminated by revising the legislation.

## **A) GUIDELINES TO UNDERTAKE A RISK ASSESSMENT TO DEFINE A SAMPLING PLAN TO ENSURE COMPLIANCE WITH THE MRLs**

### **1. Background and Principles**

- This risk assessment should conclude:
  - If PPP analyses are needed or not and how many
  - Where and when to take the samples
  - What type of analysis to perform
- The usual output of this risk assessment is a sampling plan that indicates how many, where and when samples are taken and what analysis to perform. The risk assessment is the process followed to reach these conclusions and should include the reasoning and considerations done.
- Producers shall have systems to verify the correct implementation of the G.A.P.s and the compliance of the product with the legal MRLs. PPP residue analysis is a very efficient verification system.
- The sampling program should:
  - Be a robust verification system of the G.A.P. implementation at farm and produce handling level
  - Be a robust verification system that the residues in the product comply with the legal MRLs and customer specifications, if applicable

- Control there is no cross-contamination from neighbors, adjacent fields or through the environment (water, soil, application equipment, etc.)
- Control that only authorized products are used (i.e. only products registered for the crop are used in case the country of product has a PPP registration scheme; for organic products, control that only products allowed in organic farming are used)
- The risk assessment should be done per crop (or group of similar crops, as can be the case of herbs), since the type of crop normally has a major impact on the risk.
- The risk assessment shall be documented and reviewed annually.

## 2. Number of Samples

Factors to take into account to define the number of samples should include at least the following:

- **Crop:** The type of crop can have a major impact on the risk. The risk is very different in a mushroom production, a chestnut tree plantation, or a table grape crop. In a mushroom or chestnut tree plantation, the risk assessment could conclude no residue analysis, or a minimal number of analyses is needed, while in the grape plantation, a much higher number of samples would be expected.
- **Country of production:** The country where the area of production is located can have an impact. The historical data for each crop and country should be known in order to assess the risk.
- **Size:** Surface or tons of production. The bigger the size, the bigger the risk.
- **Number of production sites:** The higher the number of production sites, the bigger the risk.
- **PPP use intensity:** This factor is normally related to the type of crop (some crops require more PPP use than others), the location of the production (in some areas there are more advanced IPM techniques, in other areas there is more pest pressure, etc.), and the skills and expertise of each individual producer.
- **Producer historical data:** The historical data on PPP issues related to each individual producer should be taken into account.
- For **producer groups**, in addition to the factors above, the number of producers should be taken as a main factor. The bigger the number of producers, the bigger the risk.

The number of samples needs to be decided on a case per case scenario.

Note: A rule of thumb that could serve as a guideline: in many cases the value of the sampling + analysis is around 0.1- 0.5 % of the value of the crop.

## 3. When and Where to Take the Samples

Once the number of samples is defined, it is important to decide when and where to take the samples.

- **When:** For each crop the most risky periods should be identified. To identify these periods, historical data for that crop and area should be considered. Also, it is important to have a good understanding of the crop agronomy and PPP use. In some cases, it is useful to identify at which points in the cycle there are more problems to comply with the pre-harvest intervals.
- **Where** to take the samples: this includes varieties and also locations.

- Crop varieties: Probably the risk of the different varieties is not the same. Some varieties tend to have more spraying than others; or PPPs are applied closer to harvest; or are more sensitive to pest or diseases.
- Sampling point: Should be considered if samples should be taken in the field, in the pack-houses, in transit, in destination, etc.
- Origin of product: Also, it should be considered whether some fields have bigger risks than others, as well as possible cross-contaminations from adjacent fields, previous crops, etc., and fields with more pest pressure, etc.

#### 4. Type of Analysis

There are multiple analyses available on the market and it is important to select those that are most appropriate and economically affordable. Considerations that should be made are:

- If *post-harvest treatments* are used, these should also be covered by the analysis.
- The analysis should cover all (or at least most) of the active ingredients used as well as other active ingredients not used but that could be present in the environment (sprayed by the neighbor in another crop, cross-contamination, etc.).
- Active ingredients used that are not covered by the analysis due to technical or economic reasons should be identified and the risk of each one of these active ingredients should be assessed.
  - Those active ingredients used at the beginning of the season, far away from harvest, not persistent, and for which the industry (laboratories, customers) has detected no problems could be considered a low risk. In these cases, the risk assessment could conclude that these active ingredients do not need to be included in the analysis scope.

Other active ingredients with higher risks should be included in the analysis screening wherever possible. This could be done at origin in other laboratories, at destination by the customers, or in specific analysis undertaken not on a routine basis but just spot validation of the use of this PPP.

### B) MANDATORY MINIMUM CRITERIA OF A RESIDUE MONITORING SYSTEM (RMS)

#### Background

In the framework of GLOBALG.A.P. control point and compliance criterion CB 7.6.4 and based on the outcome of the risk assessment, residue analysis *or participation in a second- or third-party plant protection product residue monitoring system* is required.

In order to ensure a harmonized interpretation and level of consistency across the residue monitoring systems used by producers, the following have been established as the minimum requirements that all residue monitoring systems shall comply with in order to be considered compliant with the GLOBALG.A.P. requirements.

Having these criteria defined also makes it possible to reduce the need for multiple assessments of one and the same residue monitoring system, which may be servicing several GLOBALG.A.P. producers.

Definition of first-, second- and third-party sampling:

1. First-party sampling: When the producer (Option 1) or a producer group member (Option 2 member) takes the product sample from its own production. For IFA certification, the first-party sampling (self-sampling) is acceptable, but an RMS cannot be based on first-party sampling.
2. Second-party sampling body: The sampling organization is a 2<sup>nd</sup> party sampling body when it is a separate, but identifiable part of an organization that is involved in production, supply, purchase and/or ownership of the products sampled by the RMS (e.g. the option 2 QMS runs an RMS for their members; a customer's sampling program on their supplier, an independent laboratory runs an RMS). Second-party sampling bodies supply sampling services only to their related organization. A second-party sampling body may form a part of a user or supplier organization, or an intermediate or end customer of the products sampled.
3. Third-party sampling body: The sampling organization is a 3<sup>rd</sup> party sampling body when it is a separate organization that is not involved in production, supply, purchase or ownership of the products sampled (e.g. an independent company, an inspection body or a CB runs an RMS). It shall demonstrate that it does not have common ownership with the sampled producer, nor have common ownership appointees on the boards (or equivalent) of the organizations, is not directly reporting to the same higher level of management, does not have contractual arrangements, informal understandings or other means that may have an ability to influence the outcome of the sampling.

When an RMS uses different combinations of the above; it shall be classified according to the lower level (e.g. an RMS is using partly 2<sup>nd</sup> and partly 3<sup>rd</sup> party sampling, it shall be classified as a 2<sup>nd</sup> party sampling RMS).

When the CB publishes their evaluated RMS, the following needs to be included as the minimum:

1. Residue monitoring system name
2. Certification body performing the evaluation
3. Sampling type (second party sampling/third party sampling)
4. Link or contact details where to get information of producers/GGNs under the scope of the RMS
5. Territorial scope of activity (i.e.: country)
6. Date of evaluation and validity (valid from and valid to date)

Multiple CBs in a country or in a region may agree to publish the evaluated RMS with the help of the local National Technical Working Group (NTWG).

## 1. Basic Requirements

1.1 The objective of the residue monitoring system is to provide evidence that the use of plant protection products by producers complies with the MRLs in the country of destination of the produce.

1.2 The system shall be independent from the participating producer(s). A producer group as defined by GLOBALG.A.P. is allowed to operate its own monitoring system.

1.3 The operator of the monitoring system shall keep current data of the participating producers. This data shall at a minimum include producer name, identification code or GGN where available, address and crop specifications (i.e. product and area).

1.4 The RMS operator and the participating producer shall have a mutual agreement on service conditions (e.g. a signed application form). These conditions shall specify rights and duties regarding the usage of the monitoring system.

1.5 Registration is producer and crop specific. The producer needs to arrange other sampling means for those products not included in the RMS and the CB needs to evaluate that during the inspection accordingly.

## **2. Risk Assessment**

2.1 A risk assessment shall be carried out by the operator of the RMS, not by each producer participating in it.

2.2 The risk assessment shall take all relevant factors into consideration (e.g. crop/product, climatic conditions, history, active ingredients (AI), size of company and number of Production sites, continuous harvest, country of production PPP registration restrictions, country of destination MRLs, etc.). Reference to sources (data) as evidence for an adequate risk analysis is required. The most critical period and locations should be determined for each crop.

2.3 The sampling frequency (number of samples to be taken per crop per season) shall be based on this risk analysis and clearly described. (CB 7.6.4. and this same Annex CB 5 above)

2.4 The analysis method to be used by the laboratories shall be determined. The range of AI to be analyzed by the laboratory shall be defined based on a crop specific risk assessment. The risk assessment shall take into consideration:

- PPPs that could have been applied on the crop
- PPPs actually applied
- Any other contaminants (e.g. persistent environmental residues)

2.5 The risk assessment shall be carried out annually and result in an annual monitoring plan that includes the products, number of participants, number of samples, period of sampling, and type of analysis.

## **3. Sample Taking**

3.1 Sampling shall take place according to the instructions of the EU Directive 2002/63/EC or other applicable local regulations. Where these do not exist, ISO 7002 ('Agricultural Products'), ISO 874 ('Fresh Fruit and Vegetables'), or Codex Alimentarius CAC /GL 33-1999 shall be followed.

3.2 Inert bags shall be used which shall be identified correctly (CB 7.6.5. and Annex CB 5). Samples shall be traceable to individual producers. Preferably, the sampling location shall also be recorded (e.g. lot number, field number, greenhouse number, etc.) Mixed or pool of samples that contains sampled materials from more producers in sample is not allowed.

3.3 Sampling shall take place from harvestable or harvested produce.

## **4. Testing Results**

4.1 The laboratory that carries out the produce analysis shall be ISO 17025 accredited for the relevant testing methods (e.g. GCMS, LCMS). See CB 7.6.6. and Annex CB 5). (Minor Must).

4.2 The test results shall be compared with the applicable legislation (country of production and/or country of destination).

4.3 The test results shall always be reported in writing to the producer concerned.

4.4 Test results shall be traceable to the farm concerned. Tests carried out by the producer's client are only valid if they are traceable to the producer.

## **5. Plan of Action** (CB 7.6.7. and Annex CB 5)

5.1 Producers shall have a procedure (action plan) for situations when MRLs are exceeded or use of illegal/not approved plant protection products is detected. This procedure can be part of AF 9.1. 'Recall/Withdrawal Procedure'.

5.2 Producers shall keep records of all actions carried out in connection with incidences related to plant protection product residues.

5.3 The RMS shall inform the producer and the CB in case of an exceedance of the legal limit. This shall not lead to an automatic sanctioning of the producer; however, the CB shall investigate each case.

## **6. Records**

6.1 Records (e.g. test results, correspondence with producer and, if applicable, actions taken because of non-compliances) shall be kept for a minimum of 2 years.

6.2 Records shall include:

- i. System documentation including the risk assessments
- ii. Annual update of the risk assessments including the determination analysis method, the list of active ingredients to be analyzed
- iii. The annual monitoring plan
- iv. Analysis reports
- v. Records of follow up actions
- vi. Communication with producers
- vii. Annual summary of the result

6.3 Producers do not need to keep the records on the farm but they shall be available during the audit (e.g. made available by the RMS operator on request).

## **ANNEX CB 6 GLOBALG.A.P. GUIDELINE: VISUAL INSPECTION AND FUNCTIONAL TESTS OF APPLICATION EQUIPMENT**

1. There shall be no leakages from the pump, spray liquid tank (when the cover is closed), pipes, hoses, and filters.
2. All devices for measuring, switching on and off, adjusting pressure and/or flow rate shall work reliably and there shall be no leakages.
3. The nozzle equipment shall be suitable for appropriate application of the plant protection products. All nozzles shall be identical (type, size, material, and origin), form a uniform spray jet (e.g. uniform shape, homogeneous spray), and there shall be no dripping after switching off the nozzles.
4. All the different parts of the equipment (sprayer), e.g. nozzle holder/carrier, filters, blower, etc. shall be in good condition and work reliably.

Source: Base document: DIN EN 13790-1:2004. 'Agricultural machinery - Sprayers; Inspection of Sprayers in Use - Part 1: Field Crop Sprayers'

**VERSION/EDITION UPDATE REGISTER**

New Document	Replaced Document	Date of Publication	Description of Modifications
160201_GG_IFA_CPCC_CB_V5_0-1_en	150724_GG_IFA_CPCC_CB_V5-0_en	1 February 2016	CB 4.4.2 CC – bullet points added for better legibility; Annex CB 2 – 4.3.6.5 – numbering corrected; Annex CB 5 – 1. 2 <sup>nd</sup> paragraph - missing comma added.
160630_GG_IFA_CPCC_CB_V5_0-2_en	160201_GG_IFA_CPCC_CB_V5_0-1_en	1 July 2016	CB 4.1.1 CC - amendment in second paragraph; CB 5.2 + 7.2 – titles of chapters changed; CB 7.2.1 CC – amendment in first and second paragraph; CB 7.6.3 CC – one sentence added; Annex CB 2 – numbering 3.1.4 added; Annex CB 4 – reference corrected in title.
170630_GG_IFA_CPCC_CB_V5_1_en	160630_GG_IFA_CPCC_CB_V5_0-2_en	1 July 2017	CB 5.2.1 – change in level CB 5.2.2 – change in level CB 7.6 – text added to title CB 7.11.1 (CP) – change of wording CB 7.11.1 (CC) – change of wording Annex CB 1, 3. Table 5.2.1 – change in level Annex CB 1, 3. Table 5.2.2 – change in level Annex CB 5 – II – one sentence deleted
190201_GG_IFA_CPCC_CB_V5_2_en	170630_GG_IFA_CPCC_CB_V5_1_en	1 February 2019	CB 5.3.4 – clarification Clarification of Annex CB 5 GLOBALG.A.P. Guideline B): Mandatory Minimum Criteria of a Residue Monitoring System (RMS)

If you want to receive more information on the modifications in this document, see details in the [document version with traceable changes](#) or contact the GLOBALG.A.P. Secretariat at [translation\\_support@globalgap.org](mailto:translation_support@globalgap.org).

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GLOBALG.A.P.

# INTEGRATED FARM ASSURANCE

## Plant Propagation Material – Best Practices for Nurseries

CONTROL POINTS AND COMPLIANCE CRITERIA

ENGLISH VERSION 5.2

VALID FROM: 1 FEBRUARY 2019

OBLIGATORY FROM: 1 AUGUST 2019

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**Note:**

Implementation for PPM certification in version 5 will include compliance with modules AF, CB, and PPM.

N°	Control Points	Compliance Criteria	Level
<b>PPM</b>	<b>PLANT PROPAGATION MATERIAL - BEST PRACTICES FOR NURSERIES -</b>		
<b>PPM 1</b>	<b>SITE AND SOIL MANAGEMENT</b>		
<b>PPM 1.1</b>	<b>Soil Fumigation</b> (N/A if no Soil Fumigation)		
PPM 1.1.1	Is there a written justification for the use of soil fumigants?	There is written evidence and justification for the use of soil fumigants, which includes the location, date, active ingredient, doses, method of application, and operator. The use of methyl bromide as soil fumigant is not permitted.	Minor Must
PPM 1.1.2	Does the propagator explore alternatives to chemical fumigation before resorting to the use of chemical fumigants?	The propagator is able to demonstrate assessment of alternatives to chemical soil fumigation through technical knowledge, written evidence, or accepted local practice, and has implemented them where feasible.	Recom.
PPM 1.1.3	Is any pre-planting interval complied with?	The pre-planting interval as well as planting dates (see PPM 3.3.1) shall be recorded. Producer shall comply with any applicable pre-planting interval.	Minor Must
<b>PPM 2</b>	<b>SUBSTRATES</b>		
	<i>Substrates are any growing medium used for holding plants in place of soil that has been imported to the site and can be removed after use (e.g. peat, rockwool, etc.).</i>		
PPM 2.1	Is the code of practice available from the substrate supplier?	The propagator has available the code of practice from the substrate supplier regarding the environmental strategies of the company.	Minor Must
PPM 2.2	Are substrates traceable to the source and do substrates of natural origin not come from designated conservation areas?	Records attesting the origin of the substrates of natural origin being used are available. These records demonstrate that the substrates do not come from designated conservation areas.	Minor Must
PPM 2.3	Is there a specification for all substrates used on the nursery?	A specification stating the nutrient level, texture, and purpose of the substrates used on the nursery is available.	Minor Must
PPM 2.4	Is there a nutrient analysis available for the substrates purchased?	A nutrient analysis conducted by an independent laboratory is available for the batches of substrates used.	Minor Must
PPM 2.5	Is there a disease analysis available for the substrates purchased?	A disease analysis (e.g. <i>salmonella</i> , <i>listeria</i> , <i>E. coli</i> , club root for brassicas, etc.) shall be available from the substrate supplier. Evidence is available that shows each batch of rockwool has been tested for pythium prior to dispatch.	Minor Must

N°	Control Points	Compliance Criteria	Level
PPM 2.6	Is the bulk density of the rockwool recorded?	There is a record that details the bulk density of each batch of rockwool used.	Minor Must
PPM 2.7	Are samples of each batch of substrates kept?	Samples of each batch of substrates are kept until the estimated harvest date.	Minor Must
PPM 2.8	Are substrates of different sources and specifications segregated?	The storage area for all substrates is organized to allow for the segregation of different sources and specifications to prevent the possibility of batch mixing. No N/A.	Minor Must
PPM 2.9	Is all storage of substrates weatherproof?	All peat, both loose and bagged, is to be stored under cover or is covered to prevent environmental contamination. No N/A.	Minor Must
PPM 2.10	Does the propagator participate in recycling programs for substrates, where available?	The propagator keeps records of substrate recycling with quantities recycled and dates. Invoices/loading dockets are acceptable. If no participation in a recycling program is available, this should be justified.	Recom.
PPM 2.11	When substrates are reused, are non-chemical sterilization techniques given priority?	When substrates are reused, documented evidence shows that steaming or other non-chemical sterilization technique is the option used.	Minor Must.
PPM 2.12	If chemicals are used to sterilize substrates for reuse, have the location, the date of sterilization, type of chemical, method of sterilization, name of the operator, and pre-planting interval been recorded?	When the substrates are sterilized on the nursery, the name or reference of the field or greenhouse is recorded. If the substrates are sterilized off the nursery, then the name and location of the company that sterilizes the substrate are recorded. The following are all correctly recorded: the dates of sterilization (day/month/year), the name and active ingredient, the machinery (e.g. 1,000 l-tank etc.), the method (e.g. drenching, fogging), the operator's name (the person who actually applied the chemicals and did the sterilization), and the pre-planting interval.	Major Must
<b>PPM 3</b>	<b>PROPAGATION</b>		
<b>PPM 3.1</b>	<b>General</b>		
PPM 3.1.1	Has a hygiene analysis been performed for the propagation operation and on-nursery transport?	There is a documented and up-to-date (reviewed annually) risk analysis covering physical, chemical and microbiological contaminants, and human transmissible diseases customized to the products. It shall also include PPM 3.1.2 to PPM 3.1.6. The risk analysis shall be tailored to the scale of the nursery, the crop, and the technical level of the business. No N/A.	Major Must
PPM 3.1.2	Has a hygiene procedure been implemented for the propagation process?	The nursery manager or other nominated person is responsible for the implementation of the hygiene procedures. No N/A.	Major Must

N°	Control Points	Compliance Criteria	Level
PPM 3.1.3	Do workers have access to clean handwashing equipment in the vicinity of their work?	Fixed or mobile handwashing equipment to clean and disinfect hands is accessible to workers.	Major Must
PPM 3.1.4	Do harvest workers have access to clean toilets in the vicinity of their work?	Fixed or mobile toilets (including pit latrines) constructed of materials that are easy to clean and with catch basins designed to prevent contamination in the propagation area are accessible to workers within 500 m and they are in a good state of hygiene. Where an employee is working independently, the 500 m can be modified to allow the presence of toilets at an increased distance, provided there is reasonable and adequate transport available to the worker.	Minor Must
PPM 3.1.5	Are the containers and tools used in production processes cleaned, maintained and protected from contamination?	Reusable containers, tools (i.e. scissors, knives, pruning shears, etc.), and other equipment/machinery are cleaned and maintained, and a cleaning and disinfection schedule is in place (at least once a year) to prevent contamination of the plants.	Major Must
PPM 3.1.6	Are containers used exclusively for plants?	Plant containers are only used to contain plants (i.e. no agricultural chemicals, lubricants, oil, cleaning chemicals, plant or other debris, lunch bags, tools, etc.). If multi-purpose trailers, carts, etc. are used as containers, they shall be disinfected prior to use.	Minor Must
<b>PPM 3.2</b>	<b>Propagation Material</b>		
PPM 3.2.1	Is the propagator aware of the importance of effective crop husbandry in relation to the 'mother crops' (i.e. the vegetative propagated crop) of the registered plants?	Cropping techniques and measures are adopted in the 'mother crops' that can minimize inputs such as plant protection products and fertilizers in the registered plants.	Minor Must
PPM 3.2.2	Is all propagataion material traceable to the supplier and batch number?	Records shall be maintained of the propagation material supplier and the batch lot number identification, which prove traceability. Propagation material shall be grown under the ownership of the certified/applicant propagator/nursery at least 3 months before being sold as certified. In the case the propagation cycle is shorter than 3 months, at least two thirds of the cycle shall be done by the propagator/nursery. No N/A.	Major Must
PPM 3.2.3	Is there documentation available from the propagation material supplier regarding the GMO status of the seed supplied?	There shall be a documented statement supplied by the propagation material supplier that details the GMO status of the propagation material supplied.	Minor Must

N°	Control Points	Compliance Criteria	Level
PPM 3.2.4	Do the varieties grown have resistance/tolerance to commercially important pests and diseases?	The propagator is able to justify that varieties grown have pest and disease resistance/tolerance, when available, and can justify varietal selection.	Minor Must
PPM 3.2.5	Are propagation material of different species, varieties, and sources segregated to prevent batch contamination?	Where propagation material from different source/species/varieties are stored, they shall be segregated to prevent mixing of batches. No N/A.	Minor Must
<b>PPM 3.3</b>	<b>Propagation Records</b>		
	Records on propagation shall be kept and shall include the following criteria:		
PPM 3.3.1	The sowing/planting schedule	Records of the sowing/planting schedule shall detail the variety and batch number/source of the propagation material/seed used. No N/A.	Minor Must
PPM 3.3.2	The substrate batch number	Records shall detail the batch number of the substrate used. No N/A.	Minor Must
PPM 3.3.3	The customer reference	Records shall detail the customer reference number, either by code, name, purchase order number, etc.	Minor Must
PPM 3.3.4	The pricking out/transplanting schedule	Records shall detail the pricking out/transplanting schedule, where applicable.	Minor Must
PPM 3.3.5	Is there a record (on each stillage or bin) of any plant protection product treatment applied to young plants that could affect the health of clients or staff?	Where young plants are treated with plant protection products prior to dispatch from the nursery, the record of this and any relevant occupational and safety hazard warning labels are to be attached to each bin of seedlings (e.g. brassica treated prior to dispatch from the nursery).	Minor Must
<b>PPM 4</b>	<b>PROPAGATION FACILITIES</b>		
<b>PPM 4.1</b>	<b>Propagation Facilities Maintenance</b>		
	Are the following maintenance schedules and records in place?		
PPM 4.1.1	For the growing area/house structure?	All maintenance and cleaning of the growing area/house structure shall be scheduled and recorded.	Minor Must
PPM 4.1.2	For the ventilation system where applicable?	All maintenance of the ventilation system within the growing houses shall be scheduled and recorded. If subcontractors are used, copies of their invoices are acceptable for a record of the maintenance performed.	Minor Must

N°	Control Points	Compliance Criteria	Level
PPM 4.1.3	For the heating system, where applicable?	All maintenance of the heating system shall be scheduled and recorded. If subcontractors are used, copies of their invoices are acceptable for a record of the maintenance performed. If the heating system is direct fire, an inspection may be required.	Minor Must
PPM 4.1.4	For the lighting system, where applicable?	All maintenance of the lighting system within the growing houses shall be scheduled and recorded. If subcontractors are used, copies of their invoices are acceptable for a record of the maintenance performed.	Minor Must
PPM 4.1.5	For the CO <sub>2</sub> enrichment system, where applicable?	All maintenance of the CO <sub>2</sub> enrichment system within the growing houses shall be scheduled and recorded. If subcontractors are used, copies of their invoices are acceptable for a record of the maintenance performed.	Minor Must
PPM 4.1.6	For the germination, room where applicable?	All maintenance of the germination room shall be scheduled and recorded. If subcontractors are used, copies of their invoices are acceptable for a record of the maintenance performed.	Minor Must
PPM 4.1.7	Are plant and seed handling facilities and equipment cleaned and maintained so as to prevent contamination?	Plant and seed handling facilities and equipment (i.e. process lines and machinery, walls, floors, storage areas, pallets, etc.) shall be cleaned and/or maintained according to the cleaning schedule to prevent contamination, and documented records are kept. No N/A.	Minor Must
PPM 4.1.8	Are weeds controlled on the nursery?	Weeds are controlled within the growing houses and around the nursery site. Weed free strips are maintained around the exterior of the glasshouses and laying out areas.	Minor Must
<b>PPM 4.2</b>	<b>Cleaning</b>		
PPM 4.2.1	Are the stillages cleaned out between batches and disinfected on an annual basis?	Stillages are brushed out to remove any debris as necessary between batches of plants. There is an annual cleaning program where stillages are washed with a biocide. This cleaning is recorded.	Minor Must
PPM 4.2.2	Is the seeder cleaned between varieties/species and is this cleaning recorded?	The cleaning of the seeder between varieties/species eliminates the risk of contamination of varieties. This cleaning shall be recorded.	Minor Must
PPM 4.2.3	When biocides are used to wash trays, are there records of such use?	The product trade name and rate of biocides used in the tray wash shall be recorded. The recording system indicates the minimum time interval between the application of a biocide and the filling of a tray with media.	Major Must

Nº	Control Points	Compliance Criteria	Level
PPM 4.2.4	Does the nursery have a discharge license for the disposal of the water from the tray-washing facility?	Where water from the tray wash is being discharged into a watercourse, ditches, or the water system, and the country legislation requires it, the nursery shall have a discharge license issued by the appropriate authority (e.g. environmental agency) that approves the discharge.	Minor Must
PPM 4.2.5	Are floors designed to allow and ensure drainage where water is used for cleaning?	Floors are designed with slopes and/or drainage channels and kept free and clear to ensure drainage.	Minor Must
PPM 4.2.6	Are rejected plants and waste material stored in designated areas that are routinely cleaned and disinfected?	Rejected plants and waste material are stored in designated areas that are routinely cleaned and disinfected to prevent contamination, and documented cleaning records are kept.	Minor Must
PPM 4.2.7	Are cleaning agents, lubricants, etc. kept in a designated area, separate from plants and materials used to handle plants?	Cleaning agents, lubricants etc. are kept in a designated area separate and apart from where plants are packed to avoid chemical contamination of plants. Access is be limited to trained staff only.	Minor Must
<b>PPM 4.3</b>	<b>Safety and Hygiene</b>		
PPM 4.3.1	Are breakage safe lamps or lamps with a protective cap used above the seeding and storage areas?	Light bulbs and fixtures suspended above produce or material used for produce handling are of a safety type or are protected/shielded so as to prevent contamination of plants in case of breakage.	Minor Must
PPM 4.3.2	Are there written procedures for handling glass and clear hard plastic in place?	Written procedures exist for handling glass or clear hard plastic breakages in propagation houses, preparation and storage areas.	Minor Must
PPM 4.3.3	Is access of vermin and domestic animals to the facilities restricted?	Vermin and domestic animal access to facilities is managed to prevent plant contamination. This can be contracted out, but its effectiveness shall be recorded and be demonstrable.	Minor Must
PPM 4.3.4	Are there facilities to segregate clean trays and stillages from those that have been returned from customers/the field and may be contaminated?	There are facilities for the segregation of clean and dirty trays and stillages to prevent the potential for contamination of plants to be dispatched from the nursery.	Minor Must
PPM 4.3.5	Is there an emergency power supply in the event of a power failure?	There is an emergency power supply available that is of suitable capacity. It can either be owned or hired. If hired, evidence demonstrating suitable capacity shall be provided. There is a three-phase connection available adjacent to the mains distribution board.	Minor Must



N°	Control Points	Compliance Criteria	Level
<b>PPM 5</b>	<b>WORKERS' HEALTH, SAFETY, AND WELFARE</b>		
<b>PPM 5.1</b>	<b>Risk Assessments</b>		
PPM 5.1.1	Does the nursery have employer's liability insurance if required by local legislation?	The current certificate shall be displayed with the health and safety policies and in accordance with local legislation.	Major Must
PPM 5.1.2	Is there a health surveillance program for those employees involved in plant protection product applications and workshops?	Workers who undertake plant protection product applications on the nursery shall receive regular health checks in line with local legislation/recommendations. Workers who work in a workshop environment shall have regular health checks where identified within the risk assessment of AF 4.1.1.	Minor Must
<b>PPM 5.2</b>	<b>Training</b>		
PPM 5.2.1	Is there an induction-training program for all new staff?	Induction training is required to familiarize new staff with health and safety requirements, emergency procedures, first aid and hygiene requirements. The induction training shall be documented.	Major Must
PPM 5.2.2	Are all workers who operate forklift trucks suitably trained and qualified?	All workers who operate forklift trucks for the nursery shall hold up-to-date certificates for their training. Copies of the certificates shall be kept and shall detail the training date. Additional authorization for use and an annual competency assessment are required.	Major Must
PPM 5.2.3	Are all workers who operate loading shovels suitably trained and qualified?	All workers who operate loading shovels for the nursery shall hold up-to-date certificates for their training. Copies of the certificates shall be kept and shall detail the training date. Additional authorization for use and an annual competency assessment are required.	Minor Must
PPM 5.2.4	Do all staff who drive for the nursery suitably qualified?	All staff members who drive for the nursery should hold a current full driving license. Copies of all driving licenses for staff are kept and this are updated annually.	Recom.
<b>PPM 5.3</b>	<b>Hazards and First Aid</b>		
PPM 5.3.1	Is there an accident book on site?	There shall be a formal system for reporting and recording any accidents that occur on every unit/site of the nursery. No N/A.	Major Must

N°	Control Points	Compliance Criteria	Level
<b>PPM 6</b>	<b>TRADING TERMS AND CONDITIONS</b>		
<b>PPM 6.1</b>	<b>General</b>		
PPM 6.1.1	Have trading terms and conditions been communicated to customers?	The terms under which the business operates shall be communicated to all customers.	Major Must
PPM 6.1.2	Are orders confirmed with customers?	The order confirmation shall include reference to the trading terms and conditions, variety, quantity, cell size, delivery date and time, specification, and price.	Major Must
PPM 6.1.3	Are detailed invoices created for each order dispatched?	Invoices that detail the batch number, variety, cell size, and quantity are documented for each order. Details of any plant protection products applied and dates are available to the customer if requested. Where plant protection products have been applied to the plants prior to dispatch, all bins shall be labeled with the name of the plant protection product, rate and date applied.	Minor Must
PPM 6.1.4	Is national legislation regarding official certification (e.g. EU Plant Passport Regulations) complied with?	Records of relevant official nursery registration (e.g. EU Plant Passport Number) and inspections shall be kept by the nursery.	Major Must
PPM 6.1.5	Is there a record of the number of plants supplied as a site?	Records shall be kept showing the total number of plants supplied as a site in a production year.	Major Must
<b>PPM 6.2</b>	<b>Quality Guarantees or Certified Production Guarantee</b>		
PPM 6.2.1	Are all plants supplied with a documented quality guarantee or certified production guarantee?	All plants shall be supplied to the customer with a document that certifies or guarantees that the propagation material complies with sector organization guidelines and is healthy and fit for its purpose (e.g. quality certificate, terms of deliverance, signed letters, plant passports). No N/A.	Major Must

**VERSION/EDITION UPDATE REGISTER**

New Document	Replaced Document	Date of Publication	Description of Modifications
160630_GG_IFA_CPCC_PPM_V5_0-2_en	160201_GG_IFA_CPCC_PPM_V5_0-1_en	1 July 2016	Addition of clarification - “Best Practices for Nurseries ” -
170630_GG_IFA_CPCC_PPM_V5_1_en	160630_GG_IFA_CPCC_PPM_V5_0-2_en	1 July 2017	No modification in this module. Update because of changes in AF and CB modules.
190201_GG_IFA_CPCC_PPM_V5_2_en	170630_GG_IFA_CPCC_PPM_V5_1_en	1 February 2019	PPM 3.2.2 – clarification of transition period

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