

GLOBALG.A.P.



Control Points and Compliance Criteria Integrated Farm Assurance

CROPS BASE

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Nº	Control Point	Compliance Criteria	Level
CB	CROPS BASE		
CB.1	TRACEABILITY		
	<i>Traceability facilitates the recall/withdrawal of foods and enables customers to be provided with targeted and accurate information concerning implicated products.</i>		
CB. 1.1	Is 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 product to be traced back to the registered farm or, in a farmer group, to the registered farms of the group, and tracked forward to the immediate customer (One step up, one step down). Harvest information must link a batch to the production records or the farms of specific producers. (Refer to General Regulations Part III for information on segregation in Option 2). Produce handling must also be covered if applicable. No N/A.	Major Must
CB. 2	PROPAGATION MATERIAL		
	<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>		
CB. 2.1	Quality and Health		
CB. 2.1.1	Is there a document that guarantees seed quality (free from injurious pests, diseases, virus, etc.)?	A record/certificate of the seed quality is kept and available which states variety purity, variety name, batch number and seed vendor.	Recom.
CB. 2.1.2	Are quality guarantees or certified production guarantees documented for purchased propagation material?	There are records to document that propagation material complies with sector organization guidelines and fit for purpose (e.g. quality certificate, terms of deliverance, signed letters, or supplied by a nursery that has GLOBALG.A.P or GLOBALG.A.P recognized certification).	Minor Must

Nº	Control Point	Compliance Criteria	Level
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 must be available. Nursery means anywhere propagation material is produced, (including in-house grafting material selection). "Monitoring system" must include recording and identification of the mother plant or field of origin crop as applicable. Recording must 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 must be paid to the origin of the rootstocks through documentation.	Minor Must
CB. 2.2	Chemical Treatments and Dressings		
CB. 2.2.1	Is the use of chemical treatments of all purchased propagation material (seed, rootstocks, seedlings, plantlets, cuttings) recorded?	There are records with the name(s) of the product(s) used and its target pests and/or diseases (e.g. maintaining records/ seed packages, etc.). If seed has been treated for preservation purposes, evidence of the chemicals used must also be kept.	Minor Must
CB. 2.2.2	Are plant protection product treatments recorded for in-house nursery propagation materials applied during the plant propagation period?	Records of all plant protection product 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
CB. 2.3	Genetically Modified Organisms (N/A if no Genetically Modified varieties are used)		
CB. 2.3.1	Does the planting of or trials with GMO's 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 must be kept of the specific modification and/or the unique identifier. Specific husbandry and management advice must be obtained.	Major Must

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CB. 2.3.2	Is there documentation available when the producer is growing genetically modified organisms?	If GMO cultivars and/or products derived from genetic modification are used, documented 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 direct clients of the producer been informed of the GMO status of the product?	Documented evidence of communication must be provided.	Major Must
CB. 2.3.4	Is there a plan for handling 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 GMO crops stored separately from other crops to avoid adventitious mixing?	Visual assessment must be made of genetically modified (GMO) crops storage for integrity and identification.	Major Must
CB. 3	SITE HISTORY AND SITE MANAGEMENT		
CB 3.1	Does the producer keep records on seed/planting rate, sowing/planting date?	Records of sowing/planting, rate, and date must be kept and be available.	Minor Must
CB. 3.2	Is there, where feasible, crop rotation for annual crops?	The rotations can be verified from planting date and/or plant protection product application records.	Minor Must
CB. 4	SOIL MANAGEMENT		
<i>Soil is the basis of all agricultural production; the conservation and improvement of this valuable resource is essential. Good soil husbandry ensures long-term fertility of soil, aids yield and contributes to profitability.</i>			
CB. 4.1	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. 4.2	Have techniques been used to improve or maintain soil structure, and to avoid soil compaction?	Techniques applied are suitable for use on the land. There must be no visual evidence of soil compaction.	Minor Must

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CB. 4.3	Are field cultivation techniques used 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. 5	FERTILIZER APPLICATION		
	<i>The decision making process involves crop demands; the supply must be in the soil and available nutrients from farm manure and crop residues. Correct application to optimize use and storage procedures to avoid loss and contamination must be followed.</i>		
CB. 5.1	Nutrient Requirement		
CB. 5.1.1	Is the application of all fertilizers done according to the specific needs of the crop and soil condition?	Producer must demonstrate that consideration has been given to nutritional needs of the crop and soil fertility. Records of analyses and/or other crop-specific literature must be available as evidence. No N/A.	Minor Must
CB. 5.2	Advice on Quantity and Type of Fertilizer		
CB. 5.2.1	Are recommendations for application of fertilizers (organic or inorganic) given by competent, qualified persons?	Where the fertilizer records show that the technically responsible person making the choice of the fertilizer (organic or inorganic) is an external adviser, training and technical competence must be demonstrated via official qualifications, specific training courses, etc., unless employed for that purpose by a competent organization (e.g. official advisory services). Where the fertilizer records show that the technically responsible person determining quantity and type of fertilizer (organic or inorganic) is the producer, experience must 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.).	Minor Must

Nº	Control Point	Compliance Criteria	Level
CB. 5.3	Records of Application		
	5.3.1 to 5.3.6: Do records of all applications of soil and foliar fertilizers, both organic and inorganic, include the following criteria:		
CB. 5.3.1	Field, orchard or greenhouse reference?	Records are 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 must also be kept for hydroponic situations and where fertigation is used.	Minor Must
CB. 5.3.2	Application dates?	Detailed in the records of all fertilizer applications are the exact dates (day/month/year) of the application.	Minor Must
CB. 5.3.3	Applied fertilizer types?	Detailed in the records of all fertilizer applications are the trade name, type of fertilizer (e.g. N, P, K), and concentrations (e.g. 17-17-17). No N/A.	Minor Must
CB. 5.3.4	Applied quantities?	Detailed in the records of all fertilizer application is the amount of product to be applied in weight or volume. The actual quantity applied must be recorded, as this is not necessarily the same as the recommendation. No N/A.	Minor Must
CB. 5.3.5	Method of application?	Detailed in the records of all fertilizer applications are the method (e.g. via irrigation or mechanical distribution) and machinery used, if applicable. No N/A.	Minor Must
CB. 5.3.6	Operator details?	Detailed in the records of all fertilizer applications is the name of the operator who has applied the fertilizer. If a single individual makes all of the applications, it is acceptable to record the operator details only once. No N/A.	Minor Must

Nº	Control Point	Compliance Criteria	Level
CB. 5.4	Fertiliser Storage		
	5.4.1 to 5.4.7: Are all fertilizers stored:		
CB. 5.4.1	Separately from plant protection products?	The minimum requirement is to prevent physical cross contamination between fertilizers (organic and inorganic) and plant protection products by the use of a physical barrier (wall, sheeting, etc.). If fertilizers that are applied together with plant protection products (i.e. micronutrients or foliar fertilizers) are packed in a closed container, they can be stored with plant protection products.	Minor Must
CB. 5.4.2	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). Based on risk assessment (fertilizer type, weather conditions, temporary storage), plastic coverage could be acceptable. Storage cannot be directly on the soil/floor. It is allowable 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
CB. 5.4.3	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. 5.4.4	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. 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

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CB. 5.4.5	In an appropriate manner, which reduces the risk of contamination of watercourses?	All fertilizers are stored in a manner, which poses minimum risk of contamination to water sources. Liquid fertilizer stores must be surrounded by an impermeable barrier to contain a capacity to 110% of the volume of the largest container and consideration has been given to the proximity to water courses and flood risks, etc.	Minor Must
CB. 5.4.6	Not together with harvested products?	Fertilizers cannot be stored with harvested products.	Major Must
CB. 5.4.7	Is there an up-to-date fertilizer stock inventory or record of use available?	A stock inventory that indicates the contents of the store (type and amount) is available and it is updated at least once every 3 months.	Minor Must
CB. 5.5	Organic Fertilizer		
CB. 5.5.1	Has the use of human sewage sludge been banned on the farm?	No human sewage sludge is used on the farm for the production of GLOBALG.A.P registered crops. No N/A.	Major Must
CB. 5.5.2	Has a risk assessment been carried out for organic fertilizer, which, prior to application, considers its source, characteristics and intended use?	Documentary evidence is available to demonstrate that at least the following potential risks have been considered: type of organic fertilizer, method of composting, weed/seed content, heavy metal content, timing of application, and placement of organic fertilizer (e.g. direct contact to edible part of crop, ground between crops, etc.). This also applies to substrates from biogas plants. See Annex CB.1 Microbiological Hazards.	Minor Must
CB. 5.5.3	Has account been taken of the nutrient contribution of organic fertilizer applications?	An analysis is carried out or recognized standard values are used, which takes into account the contents of N-P-K nutrients in organic fertilizer applied.	Minor Must
CB. 5.5.4	Is organic fertilizer stored in an appropriate manner, which reduces the risk of contamination of the environment?	Organic fertilizers must be stored in a designated area. Appropriate measures have been taken to prevent contamination of surface water (e.g. concrete foundation and walls, specially built leak proof container, etc.) or must be stored at least 25 m from surface water bodies.	Minor Must

Nº	Control Point	Compliance Criteria	Level
CB. 5.6	Nutrient Content		
CB. 5.6.1	Are purchased fertilizers accompanied by documentary evidence of nutrient content (N,P,K)?	Documentary evidence detailing N, P, K content (or recognized standard values) is available for all fertilizers used on crops grown under GLOBALG.A.P within the last 12-month period.	Minor Must
CB. 5.6.2	Are purchased inorganic fertilizers accompanied by documentary evidence of chemical content, which includes heavy metals?	Documentary 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.
CB. 6	IRRIGATION/FERTIGATION		
	<i>Water is a scarce natural resource and irrigation should be triggered by appropriate forecasting and/or by technical equipment allowing for efficient use of irrigation water. For information about responsible water use see Annex CB 2.</i>		
CB. 6.1	Predicting Irrigation Requirements		
CB. 6.1.1	Have systematic methods of prediction been used to calculate the water requirement of the crop?	Calculations are available and are supported by data records (e.g. rain gauges, drainage trays for substrate, evaporation meters, water tension meters (determining % of moisture in the soil and soil maps). The data can be accumulated on a regional scale.	Recom.
CB. 6.2	Irrigation/Fertigation Method		
CB. 6.2.1	Can the producer justify the methods of irrigation used in light of water conservation?	The idea is to avoid wasting water. The irrigation system used is efficient. The producer uses the most efficient irrigation system – as is technically available and financially affordable, and complies with any legislation about local restrictions on water usage.	Major Must
CB. 6.2.2	Is there a water management plan to optimize water usage and reduce waste?	There must be a written action plan, which aims to optimize water usage on the farm. This can be either an individual plan or a regional activity if the farm is participating in and/or covered by such.	Recom.

Nº	Control Point	Compliance Criteria	Level
CB. 6.2.3	Are records of irrigation/fertigation water usage maintained?	Records are kept which indicate the date and volume per water meter or per irrigation unit. If the producer works with irrigation programs, the calculated duration of irrigation and actual quantity of irrigated water should be recorded.	Recom.
CB. 6.3	Quality of Irrigation Water		
CB. 6.3.1	Has the use of untreated sewage water for irrigation/fertigation been banned?	Untreated sewage is not used for irrigation/fertigation. Where treated sewage water or reclaimed water is used, water quality complies with the WHO published Guidelines for the Safe Use of Wastewater and Excreta in Agriculture and Aquaculture 1989. Also, when there is doubt if water is coming from a possibly polluted source (i.e. because of a village upstream, etc.) the farmer has to demonstrate through analysis that the water complies with the WHO guideline requirements or the local legislation for irrigation water. See Table 3 in Annex AF.1 for Risk Assessments. No N/A.	Major Must

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CB. 6.3.2	Has an annual risk assessment for irrigation/fertigation water pollution been completed?	<p>The risk assessment must consider potential microbial, chemical and physical pollution of all sources of irrigation/fertigation water. At a minimum, the risk assessment shall cover:</p> <ul style="list-style-type: none"> - Identification of the water sources - Irrigation method(s) - Timing of irrigation (during crop growth stage) - Contact of irrigation water with the crop <p>Type of crop:</p> <ul style="list-style-type: none"> - Crops that can be eaten raw and which do not have a protective skin that is removed before eating - Crops that can be eaten raw and either have no protective skin that is removed before eating or do have some risk or history of pathogen contamination - Crops that can be eaten raw and either have a protective skin that is removed before eating, or grow clear of the ground or have no significant history of pathogen contamination. - Crops that are always cooked <p>See Annex CB.1 Microbiological Hazards</p>	Minor Must
CB. 6.3.3	Is irrigation water analyzed at a frequency in line with the risk assessment (CB.6.3.2)?	The water analysis is carried out at a frequency according to the results of the risk assessment, which takes the characteristics of the crop into account. Samples are to be taken at exit point of the irrigation system or the nearest practical sampling point.	Minor Must
CB. 6.3.4	According to the risk assessment in CB.6.3.2, does the laboratory analysis consider microbial contaminants?	According to the risk analysis (if there is a risk of microbial contaminants), laboratory analysis provides a documented record of the relevant microbial contaminants through a laboratory analysis.	Minor Must
CB. 6.3.5	Does a suitable laboratory carry out the analysis?	Analysis results from appropriate laboratories, capable of performing microbiological analyses up to ISO 17025 level, or equivalent standard, should be available.	Recom.

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Nº	Control Point	Compliance Criteria	Level
CB 6.3.6	If the risk analysis so requires, have adverse results been acted upon before the next harvest cycle?	Records are available of corrective actions and/or decisions taken.	Minor Must
CB. 6.4	Supply of Irrigation/Fertigation Water		
CB. 6.4.1	To protect the environment, is water abstracted from a sustainable source?	Sustainable sources are sources that supply enough water under normal (average) conditions.	Minor Must
CB. 6.4.2	Has advice on abstraction been sought from water authorities, where necessary?	Where necessary, there must be written communication on this subject (e.g. letter, license, etc.).	Minor Must
CB. 7	INTEGRATED PEST MANAGEMENT		
<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.3) has been elaborated 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 must be implemented in the context of local physical (climatic, topographical etc), biological (pest complex, natural enemy complex, etc.) and economical conditions.</i>			
CB. 7.1	Has assistance with implementation of IPM systems been obtained through training or advice?	<p>Where an external adviser has provided assistance, training and technical competence must 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 technically responsible person is the producer, experience must 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.).</p>	Minor Must
CB.7.2 to 7.4: Can the producer show evidence of implementation of at least one activity that falls in the category of:			

Nº	Control Point	Compliance Criteria	Level
CB. 7.2	"Prevention"?	The producer can show evidence of implementing at least one activity that includes the adoption of production practices that could reduce the incidence and intensity of pest attacks, thereby reducing the need for intervention.	Major Must
CB. 7.3	"Observation and Monitoring"?	The producer can show evidence of a) implementing at least one activity 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
CB. 7.4	"Intervention"?	The producer show evidence that in situations where pest attacks adversely affects the economic value of a crop, intervention with specific pest control methods will take place. Where possible, non-chemical approaches must be considered.	Major Must
CB. 7.5	Have anti-resistance label and/or other recommendations been followed to maintain the effectiveness of available plant protection products?	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
CB. 8	PLANT PROTECTION PRODUCTS		
<i>In situations where pest attack will adversely affect the economic value of a crop, it may be necessary to intervene with specific pest control methods, including plant protection products (PPP). The correct use, handling and storage of plant protection products are essential.</i>			
CB. 8.1	Choice of Plant Protection Products		
CB. 8.1.1	Is a current list kept of plant protection products that are authorized in the country of production for use on crops being grown?	A list is available for the commercial brand names of plant protection products (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

Nº	Control Point	Compliance Criteria	Level
CB. 8.1.2	Do producers only use plant protection products that are currently authorized in the country of use for the target crop (i.e. where such official registration scheme exists)?	All the plant protection products 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 (Annex CB.4) on this subject and FAO International Code of Conduct on the Distribution and Use of Pesticides. Refer also to Annex CB.4 for cases where producer takes part in legal field trials for final approval of PPP by the local government. No N/A.	Major Must
CB. 8.1.3	Is the plant protection product applied appropriate for the target as recommended on the product label?	All the plant protection products 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 plant protection product intervention. If the producer uses off-label PPP, there must be evidence of official approval for use of that PPP on that crop in that country. No N/A.	Major Must
CB. 8.1.4	Are invoices of registered plant protection products kept?	Invoices of the registered plant protection products used must be kept for record keeping and available at the time of the external inspection. No N/A.	Minor Must
CB. 8.2	Advice on Quantity and Type of Plant Protection Production		
CB. 8.2.1	Do competent persons make the choice of plant protection products?	<p>Where the plant protection product records show that the technically responsible person making the choice of the plant protection products is a qualified adviser, technical competence can be demonstrated via official qualifications or specific training course attendance certificates. Fax and e-mails from advisors, governments, etc. are allowable.</p> <p>Where the plant protection product records show that the technically responsible person making the choice of plant protection products is the producer, experience must 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

Nº	Control Point	Compliance Criteria	Level
CB. 8.3	Records of Application		
	8.3.1 to 8.3.10: Are records of all plant protection product kept and do they include the following criteria:		
CB. 8.3.1	Crop name and/or variety?	All plant protection product application records specify the crop and/or variety treated. No N/A.	Major Must
CB. 8.3.2	Application location?	All plant protection product application records specify the geographical area, the name or reference of the farm, and the field, orchard or greenhouse where the crop is located. No N/A.	Major Must
CB. 8.3.3	Application date?	All plant protection product application records specify the exact dates (day/month/year) of the application. Record the actual date (end date, if applied more than one day) of application. No N/A.	Major Must
CB. 8.3.4	Product trade name and active ingredient?	All plant protection product application records shall specify the complete trade name (including formulation) and active ingredient or beneficial organism with scientific name. The active ingredient must be recorded or it must be possible to connect the trade name information to the active ingredient. No N/A.	Major Must
CB. 8.3.5	Operator?	The operator applying plant protection products has been identified in the records. If a single individual makes all the applications, it is acceptable to record the operator details only once. No N/A.	Minor Must
CB. 8.3.6	Justification for application?	The name of the pest(s), disease(s) and/or weed(s) treated is documented in all plant protection product application records. If common names are used then they must correspond to the names stated on the label. No N/A.	Minor Must
CB. 8.3.7	Technical authorization for application?	The technically responsible person making the decision of the use and the doses of the plant protection product(s) being applied has been identified in the records. No N/A.	Minor Must

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CB. 8.3.8	Product quantity applied?	All plant protection product 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 dosage in g/l or internationally recognized measures for the plant protection product. No N/A.	Minor Must
CB. 8.3.9	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 plant protection products applied (if there are various units, these are identified individually), are detailed in all plant protection product application records. No N/A.	Minor Must
CB. 8.3.10	Pre-harvest interval?	The pre-harvest interval has been recorded for all plant protection product applications where a pre-harvest interval is stated on the product label or if not on label, as stated by official source. No N/A, unless Flowers and Ornamentals Certification.	Major Must
CB. 8.4	Pre-Harvest Interval (Not Applicable for Flowers and Ornamentals)		
CB. 8.4.1	Have the registered pre-harvest intervals been observed?	The producer can demonstrate that all pre-harvest intervals have been observed for plant protection products applied to the crops, through the use of clear records such as plant protection product 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 8.6.2. No N/A, unless Flowers and Ornamentals production.	Major Must
CB. 8.5	Disposal of Surplus Application Mix		
CB. 8.5.1	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 are disposed of in a manner that does not compromise neither food safety nor the environment. Records are kept. No N/A.	Minor Must

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CB. 8.6	Plant Protection Product Residue Analysis (N/A for Flowers and Ornamental production)		
CB. 8.6.1	Can the producer demonstrate that information regarding the Country(ies) of Destination's (i.e. market in which the producer intends to trade) Maximum Residue Levels (MRLs) is available?	The producer or the producer's customer must 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 will 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 country(ies') MRLs. Where a group of countries is targeted together for trading the residue screening system must meet the strictest current applicable MRLs in the group. Refer to Annex CB.5 Residue Analysis.	Major Must
CB. 8.6.2	Has action been taken to meet the MRLs of the market the producer is intending to trade the produce in?	Where the MRLs of the market in which the producer is intending to trade the produce in are stricter than those of the country of production, the producer or the producer's customer can demonstrate that during the production cycle these MRLs have been taken into account (i.e. modification where necessary of plant protection product application regime and/or use of produce residue testing results).	Major Must
CB. 8.6.3	Has the producer completed a risk assessment to determine if the products will be compliant with the MRLs in the country of destination?	The risk assessment evaluates the PPP use and the potential risk of MRL exceedance. The risk assessment shall be based on the criteria explained in Annex CB.6 Guidance to MRL Exceedances.	Major Must

Nº	Control Point	Compliance Criteria	Level
CB. 8.6.4	Is there evidence of residue tests, based on the results of the risk assessment?	<p>Based on the outcome of the risk assessment, current documented evidence or records must be available of plant protection product residue analysis results for the GLOBALG.A.P registered product crops, or of participation in a third party plant protection product residue monitoring system which is traceable to the farm. When residue tests are required as a result of the risk assessment, the criteria relating to sampling procedures, accredited labs, etc., must be followed.</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 type of analysis according to Annex CB.6 Maximum Residue Limit Risk Assessment.</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"> - A track history of 4 or more years of analytical verification without detecting incidences (e.g. exceedances, use of non-authorized PPPs, etc.) - No or minimal use of PPPs - No use of PPP close to harvesting (spraying to harvest interval is much bigger than the PPP pre-harvest interval) - A risk assessment validated by an independent third party (e.g. CB inspector, expert, etc) or the customer <p>Exceptions to these conditions could be those crops where there is no use of PPPs, 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
	8.6.5 to 8.6.7 If a residue analysis has been done, have the following been complied with:		
CB 8.6.5	Correct sampling procedures are followed?	Documentary evidence exists demonstrating compliance with applicable sampling procedures. See Annex CB.5 Residue Analysis.	Minor Must

Nº	Control Point	Compliance Criteria	Level
CB 8.6.6	Laboratory used for residue testing is accredited by a competent national authority to ISO 17025 or equivalent standard?	There is clear documented evidence (on letterhead, copies of accreditations, etc.) that the laboratories used for plant protection product 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 must show evidence of participation in proficiency tests (e.g. FAPAS must be available). See Annex CB.5 Residue Analysis.	Minor Must
CB 8.6.7	An action plan is in place in the event of an MRL is exceeded?	There is a clear documented procedure of the remedial steps and actions (this will include communication to customers, product tracking exercise, etc.) to be taken where a plant protection product residue analysis indicates an MRL (either of the country of production or the countries in which the harvested product is intended to be traded in if different) is exceeded. See Annex CB.5 Residue Analysis.	Major Must
CB. 8.7	Plant Protection Product Storage		
The plant protection product store must comply with basic rules to ensure safe storage and use.			
CB. 8.7.1	Are plant protection products stored in accordance with local regulations?	The plant protection product storage facilities comply with all the appropriate current national, regional and local legislation and regulations.	Major Must
8.7.2 to 8.7.8: Are plant protection products stored in a location that is:			
CB. 8.7.2	Sound?	The plant protection product storage facilities are built in a manner, which is structurally sound and robust. No N/A.	Minor Must
CB. 8.7.3	Secure?	The plant protection product storage facilities are kept secure under lock and key. No N/A.	Major Must
CB. 8.7.4	Appropriate to the temperature conditions?	The plant protection products are stored according to label storage requirements. No N/A.	Minor Must

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Nº	Control Point	Compliance Criteria	Level
CB. 8.7.5	Fire-resistant?	The plant protection product storage facilities are built of materials that are fire resistant (Minimum requirement RF 30, i.e. 30 minutes resistance to fire). No N/A.	Minor Must
CB. 8.7.6	Well ventilated (in the case of walk-in storage)?	The plant protection product storage facilities have sufficient and constant ventilation of fresh air to avoid a build up of harmful vapors. No N/A.	Minor Must
CB. 8.7.7	Well lit?	The plant protection product 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
CB. 8.7.8	Located away from other materials?	The minimum requirement is to prevent cross contamination between plant protection products and other materials by the use of a physical barrier (wall, sheeting, etc.). No N/A.	Minor Must
CB. 8.7.9	Is all plant protection product storage shelving made of non-absorbent material?	The plant protection product storage facilities are equipped with shelving which is not absorbent in case of spillage (e.g. metal, rigid plastic, or covered with impermeable liner, etc.).	Minor Must
CB. 8.7.10	Is the plant protection product storage facility able to retain spillage?	The plant protection product storage facilities have retaining tanks or products are bunded 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. 8.7.11	Are there facilities for measuring and mixing plant protection products?	The plant protection product storage facilities or the plant protection product filling/mixing area if this is different, have measuring equipment whose graduation for containers and calibration verification for scales has been verified annually by the producer to assure accuracy of mixtures and are equipped with utensils (e.g. buckets, water supply point, etc.) for the safe and efficient handling of all plant protection products which can be applied. No N/A.	Major Must

Nº	Control Point	Compliance Criteria	Level
CB. 8.7.12	Are there facilities to deal with spillage?	The plant protection product 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 signposted and in a fixed location, to be used in case of spillage of plant protection product. No N/A.	Minor Must
CB. 8.7.13	Are keys and access to the plant protection product storage facility limited to workers with formal training in the handling of plant protection products?	The plant protection product 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 plant protection products. No N/A.	Minor Must
CB. 8.7.14	Are all plant protection products stored in their original package?	All the plant protection products that are currently in the storage facility are kept in the original containers and packs. In the case of breakage only, the new package must contain all the information of the original label. Refer to CB.8.9.1. No N/A.	Major Must
CB. 8.7.15	Are plant protection products approved for use on the crops registered for GLOBALG.A.P Certification, stored separately within the storage facility, from plant protection products used for other purposes?	Plant protection products 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 plant protection product store.	Minor Must
CB. 8.7.16	Are liquids not stored on shelves above powders?	All the plant protection products that are liquid formulations are stored on shelving, which is never above those products that are powder or granular formulations. No N/A.	Minor Must
CB. 8.7.17	Is there an up-to-date plant protection product stock inventory or record of use available?	A stock inventory that indicates the contents of the store (type and amount) is available and it is updated at least once every 3 months.	Minor Must
CB. 8.8	Plant Protection Product Handling (N/A if no Plant Protection Product Handling)		
CB. 8.8.1	Are all workers who have contact with plant protection products submitted voluntarily to annual health checks?	All workers who are in contact with plant protection products are voluntarily submitted to health checks annually. These health checks must comply with national, regional or local codes of practice and use of results must respect the legality of disclosure of personal data.	Recom.

Nº	Control Point	Compliance Criteria	Level
CB. 8.8.2	Are there procedures dealing with re-entry times on the farm?	There are clear documented procedures, which regulate all the re-entry intervals for plant protection products, applied to the crops according to the label instructions. Where no re-entry information is available on the label, there are no specific requirements, but the spray must have dried on the plants before workers re-enter the growing area.	Major Must
CB. 8.8.3	Is the accident procedure evident within 10 meters of the plant protection product/ chemical storage facilities?	An accident procedure containing all information detailed in AF.3.4.1 must visually display the basic steps of primary accident care and be accessible by all persons within 10 meters of the plant protection product/ chemical storage facilities and designated mixing areas. No N/A.	Minor Must
CB. 8.8.4	Are there facilities to deal with accidental operator contamination?	All plant protection product / chemical storage facilities and all filling/mixing areas present on the farm have eye wash capability, a source of clean water no more than 10 meters distant, a complete first aid kit and a clear accident procedure with emergency contact telephone numbers or basic steps of primary accident care, all permanently and clearly signed. No N/A.	Minor Must
CB 8.8.5	When mixing plant protection products, are the correct handling and filling procedures followed as stated on the label?	Facilities, including appropriate measuring equipment, must be adequate for mixing plant protection products, so that the correct handling and filling procedures, as stated on the label, can be followed. No N/A.	Minor Must
CB. 8.9	Empty Plant Protection Product Containers		
CB. 8.9.1	Is re-use of empty plant protection product containers for purposes other than containing and transporting the identical product avoided?	There is evidence that empty plant protection product 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

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Nº	Control Point	Compliance Criteria	Level
CB. 8.9.2	Does disposal of empty plant protection product containers occur in a manner that avoids exposure to humans?	By having a secure storage point, a safe handling system prior to the disposal, and a disposal method that avoids exposure to people, the system used to dispose of empty plant protection product containers ensures that persons cannot come into physical contact with the empty containers. No N/A.	Minor Must
CB. 8.9.3	Does disposal of empty plant protection product containers occur in a manner that avoids contamination of the environment?	By having a safe storage point and a handling system prior to disposal by an environmentally responsible method, the system of disposal of empty plant protection product containers minimizes the risk of contamination of the environment, watercourses and flora and fauna. No N/A.	Minor Must
CB. 8.9.4	Are official collection and disposal systems used when available?	Where official collection and disposal systems exist, there are documented records of participation by the producer.	Minor Must
CB. 8.9.5	If there is a collection system, are the empty containers adequately stored, labeled and handled according to the rules of a collection system?	All the empty plant protection product containers, once emptied, are not reused, and have been adequately stored, labeled and handled, according to the requirements of official collection and disposal schemes where applicable.	Minor Must
CB. 8.9.6	Are empty containers rinsed either via the use of an integrated pressure-rinsing device on the application equipment or at least three times with water?	Installed on the plant protection product application machinery there is pressure-rinsing equipment for plant protection product containers or there are clear written instructions to rinse each container 3 times prior to its disposal. No N/A.	Major Must
CB. 8.9.7	Is the rinsate from empty containers returned to the application equipment tank?	Either via the use of a container-handling device or via written procedure for the application equipment operators, the rinsate from the empty plant protection product containers is always put back into the application equipment tank when mixing.	Minor Must
CB. 8.9.8	Are empty containers kept secure until disposal is possible?	There is a designated secure store point for all empty plant protection product containers prior to disposal that is isolated from the crop and packaging materials (i.e. permanently signed and with physically restricted access for persons and fauna.)	Minor Must

Nº	Control Point	Compliance Criteria	Level
CB. 8.9.9	Are all local regulations regarding disposal or destruction of containers observed?	All the relevant national, regional and local regulations and legislation if such exists, have been complied with regarding the disposal of empty plant protection product containers.	Major Must
CB. 8.10	Obsolete Plant Protection Products		
CB. 8.10.1.	Are obsolete plant protection products securely maintained and identified and disposed of by authorized or approved channels?	There are documented records that indicate that obsolete plant protection products have been disposed of by officially authorized channels. When this is not possible, obsolete plant protection products are securely maintained and identifiable.	Minor Must
CB 8.11	Application of Substances Other than Fertilizer and Plant Protection Products		
CB 8.11.1	Are records available if substances are used on crops and/or soil that are not covered under the section Fertilizer and Plant Protection Products?	If home made preparations plant strengtheners, soil conditioners, or any other such substances are used on certified crops, records have to be available. These records shall include the name of the substance (e.g. plant from which it derives from), the trade name (if purchased product), the field, the date, and the amount. If, in the country of production, a registration scheme for this substance(s) exists, it has to be approved.	Minor Must

Nº	Control Point	Compliance Criteria	Level
CB 9	EQUIPMENT		
CB 9.1	Are equipment sensitive to food safety and the environment (e.g. fertilizer spreaders, plant protection product sprayers, irrigation systems, equipment used for weighing and temperature control) routinely verified and, where applicable, calibrated at least annually?	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. For example: Fertilizer spreader: There must, as a minimum, be documented 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 month. Plant protection product sprayers: See Annex CB.7 for guidance on compliance with visual inspection and functional tests of application equipment. The plant protection product 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.	Minor Must
CB. 9.2	Is the producer involved in an independent calibration-certification scheme, where available?	The producer's involvement in a calibration scheme is documented.	Recom.

ANNEX CB.1 GLOBALG.A.P GUIDELINE | MICROBIOLOGICAL HAZARDS

1. INTRODUCTION

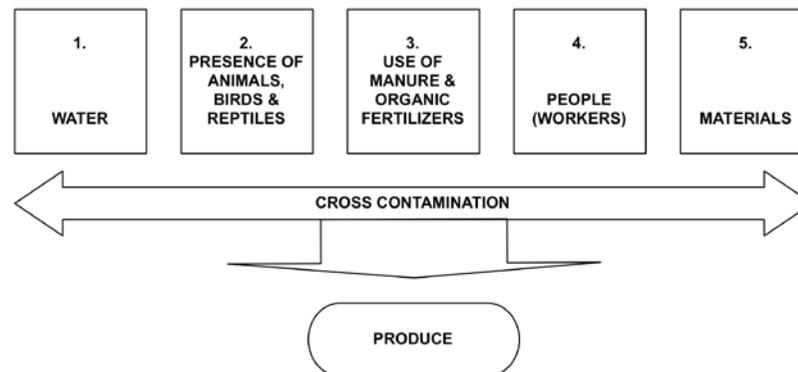
The scope of this Guideline is to facilitate the identification of the hygiene hazards during the harvest of fresh fruit and vegetables and the comprehension of the measures to consider avoidance of those hazards. Chemical and physical hazards are addressed in several sections of the GLOBALG.A.P Standard.

When hygiene is not taken into consideration, conditions for the presence of microorganisms (including human pathogenic) in produce are increased, originating a biological hazard that may cause food-borne illness in consumers.

Hygiene hazards are variable depending on several conditions that are specific to every farm, so it is not possible to explain in just a document all the mitigation procedures to be established in every case. Accordingly, this Guideline is not extensive and should not be considered that reflects all the hygiene hazards on a specific farm.

2. THE BASIC HAZARDS ON HYGIENE

It is recognized that there are five main probable sources of microbial contamination that a grower need to know and evaluate in his farm. Once identified the risk, also must be considered that cross-contamination can happen at any point of the production cycle:



3. IDENTIFICATION OF HAZARDS

The best way to avoid hazards, and therefore, risks in harvest is to take preventive measures. But the prevention is not a generic issue: it must be focused on risks associated to the specific farm conditions. This section provides guidance to growers in order to identify and avoid hygiene related hazards.

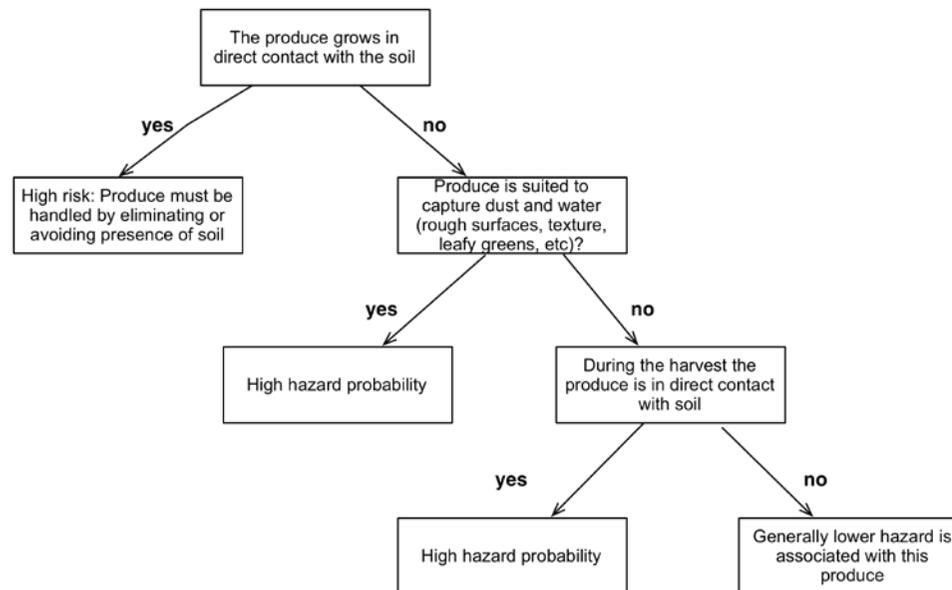
Continuous monitoring of conditions is advised even if the hazards are determined to have a low probability.

3.1 General:

3.1.1 Crop Characteristics

The first factor to consider is the essential characteristics of the crop. Some of these conditions increase the base for hazards, and growers need to think about that. A simple tool known as the “decision tree” can be used as it is shown next:

Decision tree to ascertain hazards inherent to the characteristics of a crop.



In those crops where due to its characteristics the hazards are identified as higher, more careful measures must be taken and probably a mix of measures must be considered to avoid the specific hazards.

3.2. Specific hazards

3.2.1. Water

3.2.1.1. Water used shortly before harvest

Depending on the source and distribution system, water can be contaminated from people and animals. There are some hazards because of water that carry pathogenic microorganisms and can survive to reach the consumer, especially in those products that according to their characteristics are of higher hazards. (See previous section).

In some crops water is used near or in a short period before harvest for purposes such as:

- Irrigation, including fertigation (hydroponics) (CB.6.3)
- Control of sun damage to the produce
- Last plant protection products applications (CB.8)

In case of irrigation, the water must comply with the local irrigation standards, but also it must be considered that if the water is used near harvest and gets into direct contact with the edible part of the produce, then the hazards are higher and measures must be taken to avoid water contamination from sewages, animals and birds.

In case of water use for control of sun damage or plant protection products near harvest, then the water to be used should be from origins that are free of contamination from animal, birds and sewage.

3.2.1.2 Water for washing of harvested produce and materials (FV.3)

Water used to wash produce must be from safe sources, preferably potable water or water that has been treated to eliminate bacteria. Basically there are four aspects to consider for establish the best hygienic practices related with the water for washing produce:

- a) Always use fresh, potable water. In case of water from wells, the extraction system must be designed, constructed and maintained as to protect potential contamination from water.
- b) In case the water is recirculated it must be treated by using a sanitizer agent. The weak points of the water treatment are generally controls and supervision to maintain their effect. Often they are forgotten or loosely made, so special emphasis should be given to records and the frequency of monitoring and corrective actions.
- c) Cleaning of the tank, piping and pumps used for the washing. The equipment should be cleaned and sanitized every day and maintained dry up to the next day.
- d) The frequency of the change of water. It should be determined in every specific case according to the type of produce, design of the washing equipment and information from the controls. The supplier of sanitizer should give guidance for that determination.

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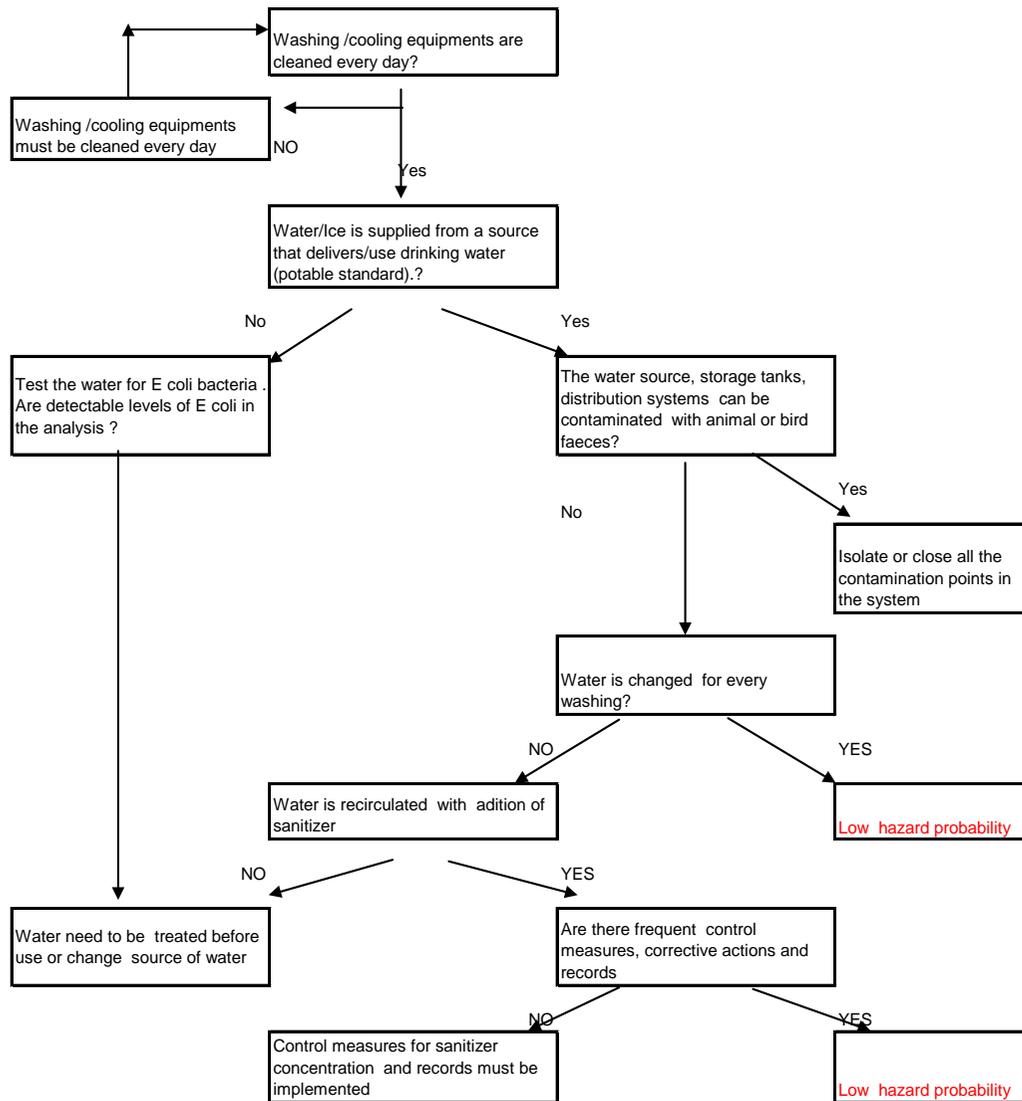
- e) Refills of water must be made only by using potable or clean treated water.
- f) Never use irrigation water (unless of potable quality) for wash or to “refresh” produce.

3.2.1.3 Water and ice for cooling harvested produce

The same decision tree can be used to assess the hazards in case of water and ice used in cooling process, but there are some additional considerations related to the storage of the ice:

- Source of ice:
 - Ice must always be obtained from drinking water (potable quality water). The grower must inform himself about the origin of the ice, by visiting the supplier and checking that it has been produced with controlled potable water.
- Storage of ice:
 - Ice must always be separated from soil.
 - Ice must be stored inside a covered tank or similar structure in order to avoid accidental contamination from animals or birds.
- Handling of ice
 - All tools used to handle or triturate the ice must be clean and stored in cabinets.
 - Never add non-potable water to wash or maintain ice.

Decision guideline for assessing the hazards of post harvest microbial contamination from water.



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Based on "Guidelines for on farm food safety for fresh produce. Australian Government." Dept. of Agriculture, fisheries and forestry

In products where parts of the roots or stems are also harvested, a pre washing must take place in order to clean the product from soil and reduce the possibility of contamination before the washing/cooling.

3.2.1.4 Water from non-controllable conditions, like flooding and heavy rains in harvest season

Hazardous contaminants can be deposited at the crop site by heavy flooding (e.g. toxic waste, fecal material, dead animals). Prevent cross-contamination by cleaning or sanitizing any equipment that may have been in contact with previously flooded soil.

FDA considers any crop that has come into contact with floodwater to be an "adulterated" commodity that cannot be sold for human consumption.

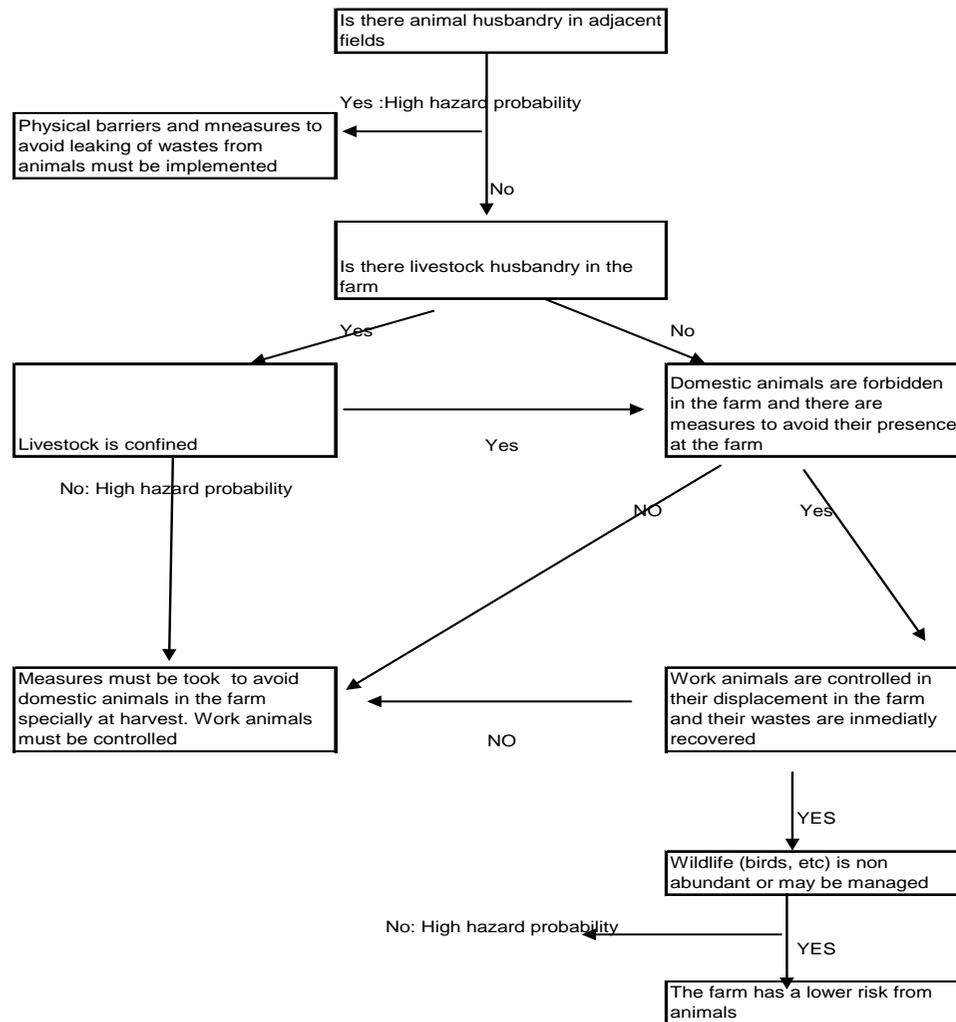
Areas that have been flooded in any time of the season must not be used to store produce or packing material.

3.2.2. Presence of animals, birds and reptile

Animals, birds and reptiles can contaminate produce and materials with microorganisms that can cause diseases to consumers and workers. It is necessary to take all measures to avoid their contact with the produce on farm, during harvest and post farm handling including transportation.

The next is a basic decision tree focused on the presence of animals during harvesting.

Decision tree to ascertain hazards due to presence of animals during harvest



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Attraction points to animals, rodents and birds must be avoided. For that purpose, all the produce discarded must be covered or taken out of the sector in harvest. Any produce that is suspected to have been in direct contact with rodents, animals, birds or reptile, must be discarded for fresh consumption. A pest control system must be in place in those areas used to store/maintain harvested produce.

3.2.3. Use of manure in the crop and the conditions in which manure is stored in the farm (CB.5.5)

Manure and other natural fertilizers, because of their origin, are a potential source of microbial contamination. For that reason the use of this type of natural fertilizers should be managed to avoid the possibilities for microbial contamination. During harvest special care must be taken in the next aspects:

1. Crops growing in or near the soil are most vulnerable to pathogens, which may survive in the soil. Low growing crops that may be splashed with soil during irrigation or heavy rainfall are also at risk because pathogens in manure can persist in the soil. Produce where the edible portion of the crop generally does not contact soil has less probability of contamination provided that produce that has had contact with the ground (e.g., windfalls) is not harvested.
2. The time lapse between manure application and harvest of fresh fruits and vegetables must be maximized. Untreated organic fertilizers should not be used from 60 days previous to the harvest season.
3. Avoid possible contamination from manure from neighbor land. Look for leachates or contamination through irrigation channels. Heavy rainfalls onto a manure pile can result in leachate to areas in harvest.
4. Do not locate manure storage or treatment sites in proximity to fresh fruit and vegetable production areas or area used for storage of harvest tools and materials.
5. Equipment used in harvest such as tractors, trucks and transporters must not traffic through areas having manure before entering a produce field. All equipment that has been in contact with untreated manure (e.g. tractors, tools) must be cleaned prior to access to harvest areas.

3.2.4. People (workers) Health and Hygiene

Proper hygiene in employees is a crucial element of food safety in every fresh produce production operation.

The compliance with proper hygiene measures by employees can be facilitated if they have access to:

- Sanitary infrastructure for employees
- Information and training in hygiene and health is given to all employees
- Supervision of the compliance of the instructions

3.2.4.1 Infrastructure for employees

To comply with the basic aspects of hygiene, employees need to have access to the use of specific installations and equipments.

a) Sanitary field stations. Workers in the field should have access to proper sanitary facilities in order to prevent hazards. The location and system of sanitary toilets to use on field will depend on local legislation, but basic recommendations for sanitary field stations are:

- The facility must be easily accessible to all workers and permit to use of toilets whenever necessary must be given
- Sanitary stations need to be in good and clean condition to avoid a threat to contamination of soil, water, crops and the workers themselves
- Signs indicating that hands must be washed after the use of the sanitary must be in place
- The elimination of residues must be done in such a way that does not contaminate the crop, land, produce or materials

b) Hand washing

- Clean water must be in place for the workers to wash their hands, as well as soap
- The water can be maintained in closed tanks with a faucet and maintained in a shadowed area
- The water must be changed every day
- The tank must be thoroughly washed frequently, according to the specific conditions in the farm

3.2.4.2. Information and training in hygiene and health for all employees.

Instruction and training on basic hygiene must be given to all the employees and supervisors.

a) The basic set of instructions must include:

- How to wash the hands
- When to wash hands
- How to handle cuts and injuries
- What to do in case of bleeding
- Post signs prohibiting eating, smoking, chewing gum and spit in the field
- Use of sanitary
- How to detect un-sanitary conditions in the field (birds, rodents, and evidence of their presence, domestic animals, how to handle garbage)

Supervisors also should be trained to recognize symptoms of diseases and how to handle that condition.

b) Training must include, at least, the handling of the specific produce and packaging in terms of hygiene. The follow up of the application of the hygiene principles and instructions must be included in the tasks of the supervisors.

4. Materials

4.1 Harvest containers and tools

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- Must be maintained clean and in good condition so they cannot contaminate nor damage the produce
- Workers should be trained to use only those containers and tools that are clean and in good condition. Remove all dirt as practicable from trailers and boxes between harvest uses
- Any container or tool suspected to have been in contact with animals manure or animal/human faeces, blood or having bird droppings, must be washed and disinfected before re use
- Harvesting containers should not be used for carrying any material or substance other than harvested fruits and vegetables. Agricultural workers should be trained in this aspect
- Containers for waste, by-products and inedible or dangerous substances, should be specifically identified. They should not be used for maintain fresh fruits or vegetables or packaging material that is used for fresh fruits and vegetables

4.2. Harvest machinery and equipment

- When harvest machinery is used, it should be properly calibrated and handled to prevent physical damage to produce
- Every day the machinery should be revised to assure that no produce is left inside the equipment
- Harvest machinery should be cleaned and washed according to the manufacturer's recommendations and the specific working condition

4.3. Transport

- Vehicles used for transport of fresh and packed fruit and vegetables should not be used for the transport of hygienically hazardous substances
- Any vehicle should be adequately cleaned, and where necessary disinfected, to avoid cross-contamination
- A dirty vehicle or one having remnants of produce shall never be used

4.4. Temporary storage of harvested produce

- Harvested produce must be maintained always in clean area
- Harvested produce must be protected from heat, animals or any source of possible contamination
- A pest control must be in place

5. BIBLIOGRAPHY

1. Department of Agriculture, Fisheries and Forestry, Australia: Guidelines for On-Farm Food Safety for Fresh Produce, Second Edition, 2004
2. EEC: Regulation (EC) No 852/2004 on the hygiene of foodstuff, of the European parliament and the council of 29 April 2004.
3. FAO: Code of hygiene practice for fresh fruit and vegetables CAC/RCP 53-2003, Codex Alimentarius, 2003.
4. Fundación para el Desarrollo Frutícola: Guía de Buenas Prácticas de higiene en frutas y vegetales, 2000 Chile.
5. U.S. Department of Health and Human Services, FDA, Center for Food Safety and Applied Nutrition: Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables, October, 1998.

ANNEX CB. 2 GLOBALG.A.P GUIDELINE | RESPONSIBLE WATER USE

Risk	Issue		Status	Action
Physical	Water scarcity	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 he do so in future?		
	Drought events	Does the river basin or area face droughts due to irregular rainfalls? Can this phenomenon affect the water usage of the producer? How flexible is the farm's water usage? Can this phenomenon affect the environment, social and/or cultural issues?		
	Flood events	Does the river basin or area face floods due to irregular rainfalls or water management? Can this phenomenon affect the producer? Can this phenomenon affect the environment, social and/or cultural issues?		
	Water pollution	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 environment, social and/or cultural issues?		
	Alternative water sources	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?		
Regulatory	Water allocation and management scheme	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 water usage of the producer included in the plan or scheme? If not, is the water usage of the producer coherent with the plan's allocation and management scheme? Does this plan consider adequately the environment, social and/or cultural issues?		
	Water usage permit	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?		

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	Non-authorized water usage	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 environment, social and/or cultural issues?		
	Priority usage	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?		
Reputational	Water conflict	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 he operates? Are similar water users involved in water conflicts in the river basin or area or adjacent areas?		
	Environmental issues	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 on 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 arisen? Is this plan implemented, audited and updated on a regular basis? Is this plan publicly accessible?		
	Social issues	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 on 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 arisen on the water usage? Is this plan implemented, audited and updated on a regular basis? Is this plan publicly accessible?		
	Cultural issues	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 on 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 arisen on the water usage? Is this plan implemented, audited and updated on a regular basis? Is this plan publicly accessible?		
	Farm's water management	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 arisen regarding the farm's water management? Is this plan implemented, audited and updated on a regular basis? Is this plan publicly accessible?		
Financial	Financing	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?		
	Insurance	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?		
	Water pricing	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?		

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ANNEX CB.3 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 to 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 can not 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 there of; 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 in to 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 a 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 programmes. 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. Therefore, 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 analyse 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 programme.

(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, regional 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 (EIL's) and Action Thresholds
 - Knowledge about organisms, which 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, vapour 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 specialised 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 has 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 neighbouring crops?
- What is the pesticide usage on neighbouring crops and the risk for pesticide drift?
- What are the potential of pest or disease problems, created by surrounding crops and vegetation?

ENGLISH VERSION

3.1.3 Soil and water samples

Take and analyse 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 to reduce problems with (deleted word) 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., solarisation, 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 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.

Analyse if neighbouring 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 neighbouring plots.

Make agreements and organise communication with Producers from neighbouring 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 fertilisation can be as detrimental to pest management as too little, because over fertilisation can result in free amino acids in the phloem and xylem, resulting in increased breeding potential of pests such as aphids.

ENGLISH VERSION

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, 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 minimise problems with certain pests, diseases or weeds (plastic mulches, reflective mulches, straw mulches, etc.).

4.1.2.6 Other technical measures

- Analyse 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 which harbour alternative hosts for natural enemies (banker plants))
- Use cover crops inside the field (pollen producing plants, nectar producing plants, plants which harbour 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, which 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 Organisation

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

This training should be refreshed on a regular basis.

4.2.2 Observation

Organise 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 minimised 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 can not be avoided. If the farmer 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 farmer 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

ENGLISH VERSION

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
- Chemosterilisation (this technique can be an alternative to the SIT technique): the males of a wild population of a pest are attracted to a bait which 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; fruitflies (Tephritidae, such as the Mediterranean Fruitfly: *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 (NOTE: In the case of screwworm and others both sexes are released) of the target pest.

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, azadirachtine, etc.)
- Soaps
- Diatomaceous earth
- Etc

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

4.3.6 Chemical Plant Protection Products

In case an intervention where a chemical plant protection products is needed, the products 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 of field observations in order to determine if the pest is in a sensitive stage of its life cycle. This can be important for optimising 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 what is the goal: total clean-up, 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 maximising the effect of a pesticide application.

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

ENGLISH VERSION

- 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 authorised 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 practise

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

ENGLISH VERSION

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, CO₂ etc.
- In 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 minimise 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 CPCCs

5.2 Storage and Transportation

5.2.1 Monitoring

- Look for sheltering sites for rodents, birds and insects
- Look for evidence of their presence (faeces, 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

ENGLISH VERSION

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

REFERENCES:

Fundacion para el Desarrollo Frutícola (2ª Ed. 2004): Guia para el Monitoreo de plagas. Santiago de Chile 50pp.
IOBC-OILB, 2004, Guidelines for Integrated Production. Principles and technical guidelines. 3rd edition, Switzerland.
Pimentel, D. (ed.), 1997, Techniques for reducing pesticide use, economic and environmental benefits. John Wiley & Sons. 444 p.
Pimentel, D. (ed.), 1991, Handbook of Pest Management in Agriculture. Vol. II. 2nd edn. CRC Press, Boca Raton.
PRINGLE, K.L. 2006. The use of economic thresholds in pest management: apples in South Africa. *South African Journal of Science* 102: 201-204.
Stern, V.M., Smith, R.F., Van Den Bosch, R. & Hagen, K.S. (1959). The integrated control concept. *Hilgardia* 29, 81-101.
FAO, International Code of Conduct on the Distribution and Use of Pesticides, 2002
EISA: Code on Integrated Farming

ANNEX CB.4 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
No Registration scheme exists: some control over PPP imports may be in place	PPs that are used must 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
A Registration scheme exists: 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, must 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, which 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 plant protection products (PPP), the producer can still receive GLOBALG.A.P Certification, even though part of the product will be destroyed or used for further analyses. There must be clear traceability and information on the area (size) used for the trials. The producer must 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 must 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 must not show residues of this product.

ANNEX CB.5 GLOBALG.A.P INTERPRETATION GUIDELINE | CB.8.6 - RESIDUE ANALYSIS

Control Point	Interpretation
CB.8.6.1	<ol style="list-style-type: none"> 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 produce is intended to be traded in must be available, or any other documentation that shows that the producer (or his direct customer) has incorporated this information. 2. Where communication with clients is presented by the producer it can be in the form of letters or other verifiable evidence. These can be present or future clients. 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 with. If the producer sells product on the market of the country of production, the current applicable (national) MRL list must still be available as in 1. above. 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). 5. This control point must be cross referenced with the information given at registration of the producer and any updates sent to the CB since registration, i.e. to verify if the producer sells his product exclusively on the market of the country of production and he declares this at registration.
CB.8.6.2	<ol style="list-style-type: none"> 1. Guidance must be sought from PPP industries/Grower Organizations or technically responsible advisors on how to adapt production methods (e.g. to increase Pre-harvest interval) that are necessary to take the stricter MRLs into account. 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 GAP such as Pre-harvest interval, dosage, etc. in the country of production covers this point already). 3. This control point must be cross-referenced with the information given at registration of the producer and any updates sent since registration.
CB.8.6.5	<ol style="list-style-type: none"> 1. According to a risk evaluation, a sampling plan is available with at least the following minimum requirements: <ul style="list-style-type: none"> o sample frequency is defined (e.g. 1 sample per x kg / pieces, package, or sample per week/month/year, etc.) o description of the sample method (GCMS-MS, LCMS-MS, specific methods, ...) The risk evaluation is done at least annually. 2. Sampling plan devised according to a risk-based procedure 3. Standardized Operating Procedure for Sampling – based on CODEX or EU regulations 4. Considerations: cross-contamination, traceability of samples (to the lab and the residue analysis results back to the samples source) process, sample / courier practices.
CB.8.6.6	<ol style="list-style-type: none"> 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. 2. Techniques should be able to detect to the appropriate performance limits (e.g. LOD 0,01 ppm, etc) 3. Maintenance of traceability.
CB.8.6.7	<ol style="list-style-type: none"> 1. See Burden of Proof in GLOBALG.A.P General Regulations 2. Verify the traceability of the results; identify the nature and source of the MRL exceedance. 3. Interpret laboratory results and agree appropriate action (involve relevant reference group – e.g. Expert, industry, grower, laboratory, etc.) 4. Implement corrective actions (where required) amendments of relevant controls and procedure, sanctions where required in case of an MRL exceedance. 5. Communication to relevant parties regarding an MRL exceedance.

ANNEX CB.6 GLOBALG.A.P GUIDELINE | CB.8.6.4 MRL EXCEEDANCE RISK ASSESSMENT**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 plant protection products (PPP) 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 Practice (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 must assess the risk associated with use of PPPs. The enclosed document provides examples of how MRL exceedances can occur so producers can modify their production procedures on farm during production.

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 neighbouring 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 harmonised MRLs
 - PHI not applicable to COD MRL (not relevant for produce of EU origin)
 - Lowering of MRL or withdrawal of a.i. – 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 homogenously in soil and in plant material
 - Sample size too small
 - No harmonised 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 labs 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

TO HELP YOU ASSESS YOUR RISKS THE “GLOBALG.A.P TOOLKIT FOR PRODUCERS” (available on the website) WILL GUIDE YOU THROUGH THE PROCEDURE

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 GAPs 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 GAPs 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 are 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 product 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. It is very different the risk in a mushroom production, a chestnut tree plantation or a table grape crop. In mushroom or chestnut tree plantation the risk assessment could conclude no residue analysis or minimal number of analyses is needed while in the grape it would be expected a much higher number of samples
- **Country of production:** The country where the area of production is located can have an impact. It should be known the historical data for each crop and country to assess the risk
- **Size:** surface or tons of production. The bigger the size the bigger the risk
- **Number of PMUs:** The higher the number of PMUs the bigger the risk
- **PPP use intensity:** This factor is normally related to the type of crop (some crops require more PPP use than other), the location of the production area (in some areas there are more advanced IPM techniques, in other more pest pressure, etc.) and the skills and know how 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, it should be taken as a main factor the number of producers. 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 thumb rule 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 is important to have a good understanding of the crop agronomy and PPP use. In some cases it is useful to identify in which moments of 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 PPP are applied closer to harvest; or are more sensible 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 should be considered if some fields have bigger risks than others. Possible cross-contaminations from adjacent fields, previous crops, etc. Field with more pest pressure; etc.

4. Type of analysis

There are multiple analyses available in 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 economical reasons should be identified and the risk of each one of these active ingredients should be assessed.*
 - It could be considered a low risk those active ingredients used at the beginning of the season, far away from harvest, that are not persistent and for which there has been no problems detected by the industry (laboratories, customers). In these cases the risk assessment could conclude that it is not needed to include the active ingredients 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.

ANNEX CB.7 GLOBALG.A.P GUIDELINE | GUIDELINE FOR 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