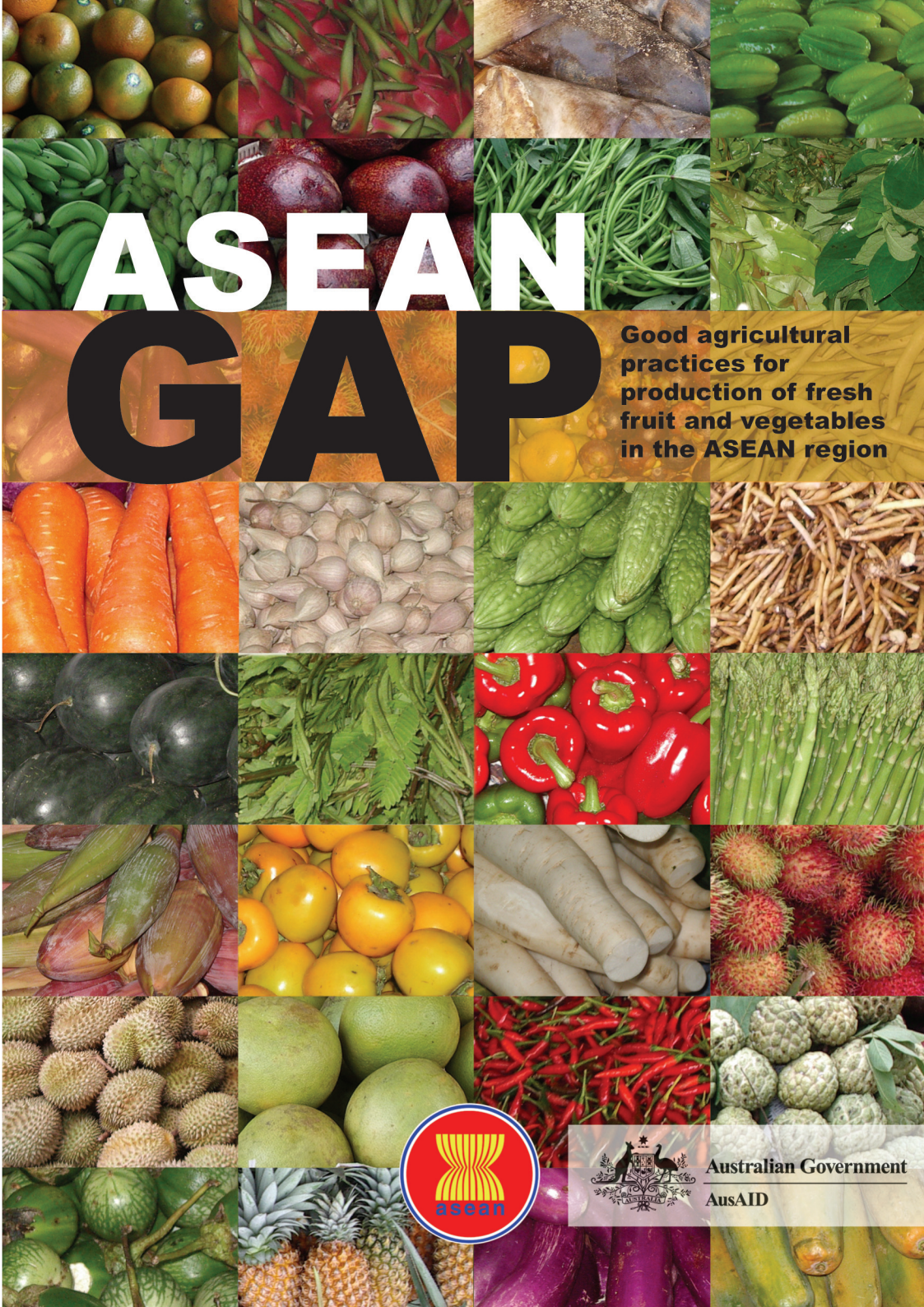
ASEAN
GAP
Good agricultural practices for production of fresh fruit and vegetables in the ASEAN region
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Good agricultural practices for production of fresh fruit and vegetables in the ASEAN region

Quality Assurance Systems for ASEAN Fruit and Vegetables Project
ASEAN Australia Development Cooperation Program

Cardno ACIL

Australian Government
AusAID

RMIT International

Contents

Foreword

ASEAN Good Agricultural Practice (GAP) is a regional standard to prevent the risks associated with production, harvesting and post-harvest handling of fresh fruit and vegetables and to facilitate their trade within and beyond the region. It sets the standard practice of on-farm production activities as well as that of local industries where the produce are processed and packed for sale. It is designed in four separate modules: (i) food safety; (ii) environmental management; (iii) worker health, safety and welfare; and (iv) produce quality to ensure that the associated risk factors are properly addressed and the content integrations across the modules are maximized.

The development of ASEAN GAP was based primarily on the criteria and experiences of national GAP implementation in Malaysia, Philippines, Singapore and Thailand. It also drew on certified GAP systems and guidelines from other countries and regions.

In the context of rapidly growing regional trade and globalizing food economy, the concept of GAP has evolved amid the concerns and commitments of a wide range of stakeholders, particularly in the areas of food safety and quality, environmental impact and sustainability of agriculture. These stakeholders include governments, food processing and retailing industries, farmers, agricultural workers, and consumers. From the production (supply) perspective, farmers or producers inherently apply practices that ensure the economic viability while preserving their own natural resource base and maintaining their cultural or social values. From the consumption (demand) perspective, consumers have immediate concerns on the safety and quality of the agricultural products as well as on the handling process.

Since GAP is being driven by demand factors at this moment, there are a number of possible implications that need to be addressed for further development and effective application in the field. A critical challenge is to ensure that the expanding use of GAP will not undermine the interests of smaller-scale producers, sustainability of domestic industries and livelihood opportunities of local communities in ASEAN Member Countries.

I am glad that special attention has been given to ensure that the standards and recommended practices developed in this booklet are relevant and achievable for all ASEAN Member Countries. While this ASEAN GAP is mainly intended to enhance the harmonization of product standards and facilitate the trade of fruits and vegetables in line with the roadmap for integration of agro-based products in ASEAN, we also hoped that this will serve as a benchmark in developing national GAP programs, particularly in less developing ASEAN Member Countries.

This publication is a product of the ASEAN Australia Development Cooperation Program project “Quality Assurance Systems for ASEAN Fruit and Vegetables”. On behalf of ASEAN Member Countries, I thank the Government of Australia for the provision of funding support and expertise in this project.

ONG KENG YONG
Secretary-General of ASEAN

Acknowledgements

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References

Many certified systems and guidelines for GAP from around the world were used as references to prepare ASEAN GAP. The main sources of information were:
- Malaysian Farm Certification Scheme for GAP (SALM), Department of Agriculture, Malaysia
- Quality Management System: Good Agricultural Practice, Ministry of Agriculture and Cooperatives, Thailand
- Good Agricultural Practice for Vegetable Farming Certification Scheme (GAP-VF), Agri-Food & Veterinary Authority of Singapore
- EUREPGAP Control Points and Compliance Criteria, Fruit and Vegetables

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- Freshcare On-Farm Code of Practice, Food Safety and Environment modules, Freshcare Ltd, Australia
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1. Introduction

1.1 Purpose and scope of ASEAN GAP

ASEAN GAP is a standard for good agricultural practice during the production, harvesting and postharvest handling of fresh fruit and vegetables in the ASEAN region. The practices in ASEAN GAP are aimed at preventing or minimising the risk of hazards occurring. The hazards covered by ASEAN GAP include food safety, environmental impacts, worker health, safety and welfare, and produce quality.

Global trade in fresh fruit and vegetables is increasing as trade becomes freer. Changes in consumer lifestyles in the ASEAN region and throughout the world are driving the demand for assurance that fruit and vegetables are safe to eat and of the right quality, and are produced and handled in a manner that does not cause harm to the environment and the health, safety and welfare of workers.

The impact of these trends is increasing requirements from retailers for compliance with GAP programs and the introduction by governments of legal requirements for food safety, environmental protection, and worker health, safety and welfare.

The member countries of ASEAN have common farming practices, infrastructures, and weather patterns. The implementation of GAP programs currently within the ASEAN region varies, with some countries having government certified systems and others beginning the journey with awareness programs for farmers.

The purpose of ASEAN GAP is to enhance the harmonisation of GAP programs within the ASEAN region. This will facilitate trade between ASEAN countries and to global markets, improve viability for farmers, and help sustain a safe food supply and the environment.

The scope of ASEAN GAP covers the production, harvesting and postharvest handling of fresh fruit and vegetables on farm and postharvest handling in locations where produce is packed for sale. Products that present a high risk to food safety, such as sprouts and fresh cut products, are not covered in the scope of ASEAN GAP. ASEAN GAP may be used for all types of productions systems but it is not a standard for certification of organic products or GMO free products.

1.2 How ASEAN GAP was developed

To develop ASEAN GAP, a series of three workshops were held involving representatives from the ASEAN member countries and the Australian project team. The initial workshop drew on the experiences with implementing GAP programs in Malaysia, Thailand, Singapore, and Philippines. Certified systems and guidelines for GAP from other countries in the world were also reviewed.

Subsequent workshops refined the standard to ensure that the recommended practices were relevant and achievable for all member countries and consistent with existing GAP programs.

1.3 Structure of ASEAN GAP

ASEAN GAP consists of four modules covering food safety, environmental management, worker health, safety and welfare, and produce quality. Each module can be used alone or in combination with other modules. This enables progressive implementation of ASEAN GAP, module by module based on individual country priorities.

The modules have been divided into sections, some of which are common to all modules and others are specific to one module. For example, Chemicals, Training, Documents and Records, and Review of Practices are common sections. All four modules can be integrated into one standard.

Appendix 1 presents a summary of the various sections contained in each module.

Appendix 2 contains a glossary of abbreviations and terms used in this publication.

A companion publication provides guidelines for the interpretation and implementation of the practices in ASEAN GAP. This publication is titled, "Guidelines for Implementing ASEAN GAP for Fresh Fruit and Vegetables".

Site history and management

1. The risk of contaminating produce with chemical and biological hazards from the previous use of the site or from adjoining sites is assessed for each crop grown and a record is kept of any significant risks identified.
2. Where a significant risk of chemical or biological contamination of produce has been identified, either the site is not used for production of fresh produce or remedial action is taken to manage the risk.
3. If remedial action is required to manage the risk, the actions are monitored to check that contamination of the produce does not occur and a record is kept of the actions taken and monitoring results.
4. The location of any contaminated sites on the property, which are unsuitable for production of fresh produce, is recorded.

Planting material

5. If planting material is produced on the farm, a record is kept of any chemical treatment used and the reason for use.
6. If planting material is obtained from another farm or nursery, a record is kept of the name of the supplier and the date of supply.
7. Varieties known to be toxic for human consumption are not grown.

Fertilisers and soil additives

8. The risk of chemical and biological contamination of produce from the use of fertilisers or soil additives is assessed for each crop grown and a record is kept of any significant hazards identified.
9. If a significant hazard from the use of fertilisers or soil additives is identified, measures are taken to minimise the risk of contamination of produce.
10. Fertilisers and soil additives are selected to minimise the risk of contamination of produce with heavy metals.
11. Untreated organic materials are not applied in situations where there is a significant risk of contaminating the produce.
12. Where an organic material is treated on the farm before application, the method, date and duration of the treatment are recorded.
13. If a product containing organic materials is obtained from off the farm and there is a significant risk of contaminating the produce, documentation is available from the supplier to show that the material has been treated to minimise the risk of contaminating the produce.
14. Human sewage is not used for production of any fresh produce destined for human consumption.
15. Equipment used to apply fertilisers and soil additives is maintained in working condition and checked for effective operation at least annually by a technically competent person.
16. Areas or facilities for storage, mixing and loading of fertilisers and soil additives and for composting of organic materials are located, constructed and maintained to minimise the risk of contamination of production sites and water sources.
17. A record of fertilisers and soil additives obtained is kept, detailing the source, product

name, and date and quantity obtained.

18. The application of fertilisers and soil additives is recorded, detailing the date, name of the product or material used, treatment location, application rate, application method, and operator name.

Water

19. The risk of chemical and biological contamination of produce is assessed for water used before harvest for irrigation, fertigation, and applying chemicals, and after harvest for handling, washing, produce treatment, and cleaning and sanitation. A record is kept of any significant hazards identified
20. Where water testing is required to assess the risk of contamination, tests are conducted at a frequency appropriate to the conditions impacting on the water supply, and a record of test results is kept.
21. Where the risk of chemical and biological contamination of produce is significant, either a safe alternative water source is used or the water is treated and monitored and a record is kept of the treatment method and monitoring results.
22. Untreated sewage water is not used during production and postharvest handling of produce. In countries where the use of treated water is permitted, the water quality must comply with the relevant regulations.

Chemicals

Agrochemicals

23. Employers and workers have been trained to a level appropriate to their area of responsibility for chemical use.
24. If the choice of chemical products is made by advisers, proof of their technical competence is available.
25. Integrated pest management systems are used where possible to minimise the use of inorganic chemicals.
26. Chemicals are only purchased from licensed suppliers.
27. Chemicals and biopesticides used on crops are approved by a competent authority in the country where the crop is grown and intended to be traded, and documentation is available to confirm approval.
28. Up to date information on chemical MRL standards for the country where produce is intended to be traded, is available from a competent authority.
29. Chemicals are applied according to label directions or a permit issued by a competent authority to prevent residue levels exceeding the MRL in the country where produce is intended to be traded.
30. To check that chemicals are applied correctly, produce is tested for chemical residues at a frequency required by customers or a competent authority in the country where produce is intended to be traded. The laboratory used is accredited by a competent authority.
31. The mixing of more than two chemicals is avoided, unless recommended by a competent authority.
32. Withholding periods for the interval between chemical application and harvest are observed.
33. Equipment used to apply chemicals is maintained in working condition and checked for effective operation at least annually by a technically competent person.
34. Equipment is washed after each use and washing waste is disposed of in a manner that

does not present a risk of contaminating the produce.

35. Surplus application mixes are disposed of in a manner that does not present a risk of contaminating the produce.
36. Chemicals are stored in a well lit, sound and secure structure, with only authorised people allowed access. The structure is located and constructed to minimise the risk of contaminating produce and equipped with emergency facilities in the event of a chemical spill.
37. Liquid formulations of chemicals are not stored on shelves above powders.
38. Chemicals are stored in the original container with a legible label and according to label directions or instructions from a competent authority. If a chemical is transferred to another container, the new container is clearly marked with the brand name, rate of use and withholding period.
39. Empty chemical containers are not re-used and are kept secure until disposal.
40. Empty chemical containers are disposed of according to relevant country regulations and in a manner that minimises the risk of contaminating produce. Official collection and disposal systems are used where available.
41. Obsolete chemicals that are unusable or no longer approved are clearly identified and kept secure until disposal.
42. Obsolete chemicals are disposed of through official collection systems or in legal off-site areas.
43. The application of chemicals is recorded for each crop, detailing the chemical used, reason for application, treatment location, date, rate and method of application, withholding period, and operator name.
44. A record of chemicals obtained is kept, detailing chemical name, supplier of chemical, date and quantity obtained, and expiry or manufacture date.
45. Where applicable, a record of chemicals held in storage is kept, detailing chemical name, date and quantity obtained and date when completely used or disposed of.
46. If chemical residues in excess of the MRL are detected in the country where produce is traded, marketing of the produce is ceased. The cause of the contamination is investigated, corrective actions are taken to prevent re-occurrence, and a record is kept of the incident and actions taken.

Other chemicals

47. Fuels, oils, and other non-agrochemicals are handled, stored and disposed of in a manner that minimises the risk of contaminating produce.

Harvesting and handling produce

Equipment, containers and materials

48. Equipment, containers and materials that contact produce are made of materials that will not contaminate produce.
49. Containers used for storage of waste, chemicals, and other dangerous substances are clearly identified and are not used for holding produce.
50. Equipment and containers are regularly maintained to minimise contamination of produce.
51. Equipment, containers and materials are stored in areas separated from chemicals, fertilisers and soil additives and measures are taken to minimise contamination from pests.
52. Equipment, containers and materials are checked for soundness and cleanliness before use and cleaned, repaired or discarded as required.

53. Harvested produce is not placed in direct contact with soil or the floor of handling, packing or storage areas.

Buildings and structures

54. Buildings and structures used for growing, packing, handling and storage of produce are constructed and maintained to minimise the risk of contaminating produce.
55. Grease, oil, fuel, and farm machinery are segregated from handling, packing and storage areas to prevent contamination of produce.
56. Sewage, waste disposal and drainage systems are constructed to minimise the risk of contaminating the production site and water supply.
57. Lights above areas where produce and packing containers and materials are exposed, are either shatter proof or protected with shatter proof covers. In the event of a light breaking, exposed produce is rejected and equipment and packing containers and materials are cleaned.
58. Where equipment and tools that may be a source of physical hazards are located in the same building as produce handling, packing and storage areas, the equipment and tools are screened with a physical barrier or are not operated during packing, handling, and storage of produce.

Cleaning and sanitation

59. Packing, handling and storage areas and equipment, tools, containers and materials that may be a source of contaminating the produce are identified, and instructions are prepared and followed for cleaning and sanitation.
60. Appropriate cleaning and sanitation chemicals are selected to minimise the risk of these chemicals causing contamination of produce.

Animals and pest control

61. Domestic and farm animals are excluded from the production site, particularly for crops grown in or close to the ground, and from areas where produce is harvested, packed and stored.
62. Measures are taken to prevent the presence of pests in and around handling, packing and storage areas.
63. Baits and traps used for pest control are located and maintained to minimise the risk of contaminating the produce and packing containers and materials. The location of baits and traps is recorded.

Personal hygiene

64. Workers have appropriate knowledge or are trained in personal hygiene practices and a record of training is kept.
65. Written instructions on personal hygiene practices are provided to workers or displayed in prominent locations.
66. Toilets and hand washing facilities are readily available to workers and are maintained in a hygienic condition.
67. Sewage is disposed of in a manner that minimises the risk of direct or indirect contamination of produce.

Produce treatment

68. The application, storage, and disposal of chemicals used after harvest, including pesticides and waxes, follow the same practices as described in the Chemical section.
69. The use of water for treating produce after harvest follow the same practices as described in the Water section
70. The final water applied to the edible parts of produce is equivalent in quality to potable water standard.

Storage and transport

71. Containers filled with produce are not placed in direct contact with soil where there is a significant risk of contaminating produce from soil on the bottom of containers.
72. Pallets are checked before use for cleanliness, chemical spills, foreign objects and pest infestation and are cleaned, covered with protective material or rejected if there is a significant risk of contaminating produce.
73. Transport vehicles are checked before use for cleanliness, chemical spills, foreign objects, and pest infestation, and cleaned if there is a significant risk of contaminating produce.
74. Produce is stored and transported separate from goods that are a potential source of chemical, biological and physical contamination.

Traceability and recall

75. Each separate production site is identified by a name or code. The name or code is placed on the site and recorded on a property map. The site name or code is recorded on all documents and records that refer to the site.
76. Packed containers are clearly marked with an identification to enable traceability of the produce to the farm or site where the produce is grown.
77. A record is kept of the date of supply and destination for each consignment of produce.
78. When produce is identified as being contaminated or potentially contaminated, the produce is isolated and distribution prevented or if sold, the buyer is immediately notified.
79. The cause of any contamination is investigated and corrective actions are taken to prevent re-occurrence and a record is kept of the incident and actions taken.

Training

80. Employers and workers have appropriate knowledge or are trained in their area of responsibility relevant to good agricultural practice and a record of training is kept.

Documents and records

81. Records of good agricultural practices are kept for a minimum period of at least two years or for a longer period if required by government legislation or customers.
82. Out of date documents are discarded and only current versions are used.

Review of practices

83. All practices are reviewed at least once each year to ensure that they are done correctly and actions are taken to correct any deficiencies identified. A record is kept of practices reviewed and corrective actions taken.
84. Actions are taken to resolve complaints related to food safety, and a record is kept of the complaint and actions taken.

3. Environmental Management Module

Site history and management

1. Sites used for production comply with country regulations that restrict production at high altitudes or on steep slopes.
2. For new sites, the risk of causing environmental harm on and off the site is assessed for the proposed use and a record is kept of all potential hazards identified. The risk assessment shall consider:
   - the prior use of the site,
   - potential impacts of crop production and postharvest handling on and off the site,
   - potential impacts of adjacent sites on the new site.
3. Where a significant risk is identified, either the site is not used for crop production and postharvest handling or measures are taken to prevent or minimise the potential hazards.
4. A property layout map is available showing the location of:
   a. crop production sites,
   b. environmentally sensitive areas and highly degraded areas,
   c. chemical storage and mixing areas, chemical application equipment cleaning areas, and postharvest chemical treatment areas,
   d. areas or facilities for storage, mixing and composting of fertilisers and soil additives
   e. water courses, storage sites, and significant drainage lines, run-off areas and discharge points, and
   f. property buildings, structures and roads.
   5. Highly degraded areas are managed to minimise further degradation.
   6. Management of site activities conforms to country environmental legislation covering air, water, noise, soil, biodiversity and other environmental issues.

Planting material

7. To minimise chemical usage and nutrient runoff, planting material is selected for disease resistance and compatibility with site properties such as soil type and nutrient levels.

Soil and substrates

8. The intended production practices are suitable to the soil type and do not increase the risk of environmental degradation.
9. Where available, soil maps are used to plan rotation and production programs.
10. Cultivation practices that improve or maintain soil structure and minimise soil compaction and erosion are used.
11. The use of chemical fumigants to sterilise soils and substrates is justified and a record is kept of the location, date, product, application rate and method, and operator name.

Fertilisers and soil additives

12. Nutrient application is based on recommendations from a competent authority or on soil, leaf or sap testing to minimise nutrient runoff and leaching.
13. Areas or facilities for storage, mixing and loading of fertilisers and soil additives and for composting of organic matter are located, constructed and maintained to minimise the risk of environmental harm on and off the site.
14. Equipment used to apply fertilisers and soil additives is maintained in working condition and checked for effective operation at least annually by a technically competent person.
15. The application of fertilisers and soil additives is recorded, detailing the name of the product or material, date, treatment location, application rate and method, and operator name.

16. For hydroponic production systems, the mixing, application and disposal of the nutrient solution is monitored and recorded.

Water

17. Irrigation use is based on crop water requirements, water availability, soil moisture levels, and consideration of environmental impact on and off the site.
18. An efficient irrigation system is used to minimise wastage of water and the risk of environmental harm on and off the site.
19. The irrigation system is checked for operational efficiency during each use, according to manufacturer's instructions or other appropriate methods, and maintained to ensure efficient delivery.
20. A record is kept of irrigation use, detailing crop, date, location, volume of water applied or duration of irrigation, and name of person who managed the irrigation activity.
21. Water collection, storage, and use is managed to comply with country regulatory requirements.
22. Water used from sources that may cause environmental harm to land and soil, waterways and sensitive areas is managed or treated to minimize the risk of environmental harm.
23. Water from toilets and drainage systems are disposed of in a manner that minimises the risk of environmental harm on and off the site.
24. Water discharged from the property, including waste water from harvesting, cleaning and handling operations, is managed or treated to minimize off site environmental harm.

Chemicals

Agrochemicals

25. Employers and workers have been trained to a level appropriate to their area of responsibility for chemical application.
26. If the choice of chemical products is made by advisers, proof of their technical competence is available.
27. Crop protection measures are appropriate for the control of pests and based on recommendations from a competent authority or monitoring of crop pests.
28. Integrated pest management systems and non-chemical products are used where possible to minimise the use of chemicals.
29. Chemicals are only purchased from licensed suppliers.
30. Chemicals used are approved for the targeted crop by a competent authority in the country of application, and up to date documentation is available to demonstrate the current approval status.
31. Chemicals are applied according to label directions or a permit issued by a competent authority.
32. A rotation strategy for chemical application and other crop protection measures are used to avoid pest resistance.
33. The application of chemicals (ground and aerial) is managed to minimise the risk of spray drift to neighbouring properties and environmentally sensitive areas.
34. Appropriate volumes of chemicals are mixed to minimise the amount of surplus chemical remaining after application.
35. Surplus chemical mixes and tank washing are disposed of in a manner that minimises the risk of environmental harm on and off the site.

36. Equipment used to apply chemicals is maintained in working condition and checked for effective operation at least annually by a technically competent person.
37. Chemicals are stored in a well light, sound and secure structure, with only authorised people allowed access. The structure is located and constructed to minimise the risk of contaminating the environment and equipped with emergency facilities in the event of a chemical spill.
38. Chemicals are stored in the original container with a legible label and according to label directions or instructions from a competent authority. If a chemical is transferred to another container, the new container is clearly marked with the brand name, rate of use and withholding period.
39. Empty chemical containers are not re-used and are kept secure until disposal.
40. Empty chemical containers are disposed of according to relevant country regulations and in a manner that minimises the risk of causing environmental harm on and off the site. Official collection and disposal systems are used where available.
41. Obsolete chemicals, that are unusable or no longer approved, are clearly identified and kept secure until disposal.
42. Obsolete chemicals are disposed of through official collection systems or in legal off-site areas.
43. The application of chemicals is recorded for each crop, detailing the chemical used, reason for application, application date, treatment location, application rate and method, weather conditions, and operator name.
44. Where applicable, a record of chemicals held in storage is kept, detailing chemical name, date and quantity purchased and date when completely used or disposed of.

Other chemicals

45. Fuels, oils, and other non-agrochemicals are handled, stored and disposed of in a manner that minimises the risk of contaminating the environment.

Harvesting and handling produce

46. The application, storage, and disposal of chemicals used after harvest, such as pesticides and waxes, follow the same practices as described in the Chemicals section.

Waste and energy efficiency

47. A waste management plan is documented and followed, including identifying types of waste products generated by property activities and using practices to minimize waste generation, to reuse or recycle waste and to store and dispose of waste.
48. Consumption of electricity and fuel is reviewed and efficient operating practices are identified and used.
49. Machinery and equipment are serviced to maintain operational efficiency or are replaced.

Biodiversity

50. Property activities comply with country regulations covering protected plant and animal species to ensure that protected species are not damaged.
51. To conserve native plant and animal species, access and activity is managed in significant remnant native vegetation areas, wildlife corridors, and vegetation areas on and near the banks of waterways.
52. Measures are used to control feral animals and environmental pests.

Air

53. The generation of offensive odour, smoke, dust, and noise is managed to minimise the impact on neighbouring properties.

Training

54. Employers and workers have appropriate knowledge or are trained in their area of responsibility relevant to good agricultural practices and a record of training is kept.

Documents and records

55. Records of good agricultural practices are kept for a minimum period of at least two years or for a longer period if required by legislation or customers.
56. Out of date documents are discarded and only current versions of documents relevant to good agricultural practice are used.

Review of practices

57. All practices are reviewed at least once each year to ensure that they are done correctly and actions are taken to correct any deficiencies identified or if changes occur to environmental regulations.
58. A record is kept to show that all practices have been reviewed and any corrective actions taken are documented.
59. Actions are taken to resolve complaints related to environmental management, and a record is kept of the complaint and actions taken.

Chemicals

Agrochemicals

1. Chemicals are handled and applied by authorised workers with appropriate knowledge and skills.
2. Chemicals are stored in a well light, sound and secure structure, with only authorised people allowed access. The structure is located and constructed to minimise the risk of contaminating workers and equipped with emergency facilities in the event of a chemical spill.
3. Chemicals are stored in the original container with a legible label and according to label directions or instructions from a competent authority. If a chemical is transferred to another container, the new container is clearly marked with the brand name, rate of use and withholding period.
4. Where there is a significant risk of chemical contamination of workers, Material Safety Data Sheets or safety instructions from chemical labels are readily available.
5. Facilities and first aid measures are readily available to treat workers contaminated with chemicals.
6. Accident and emergency instructions are documented and displayed in a prominent location within or close to the chemical storage area.
7. Workers handling and applying chemicals and entering newly sprayed sites are equipped with suitable protective clothing and equipment for the chemical used.
8. Protected clothing is cleaned and stored separately from crop protection products.
9. Access to sites where chemicals are being applied or newly applied is restricted for an appropriate period relevant to the chemical used.
10. If required, chemical application in areas of public access is marked with warning signs.

Harvesting and handling produce

Personal hygiene

11. Workers have appropriate knowledge or are trained in personal hygiene practices and a record of training is kept.
12. Written instructions on personal hygiene practices are provided to workers or displayed in prominent locations.
13. Toilets and hand washing facilities are readily available to workers and are maintained in a hygienic condition.
14. Sewage is disposed of in a manner that minimises the risk of contamination of workers.
15. Where employers are required to provide medical and health cover, any serious health issue is reported to the relevant health authority.
16. Where required, foreign workers complete mandatory medical checks and a record is kept.
17. Measures are taken to minimise the presence of animals and vermin with infectious disease in production sites and around handling, packing and storage areas.

Working conditions

18. Working conditions are suitable for workers and protective clothing is supplied where conditions are hazardous to workers.
19. All farm vehicles, equipment and tools, including electrical and mechanical devices, are adequately guarded and maintained and inspected on a regular basis for potential hazards to users.

20. Safe manual handling practices are followed to minimise the risk of injury from lifting heavy objects and excessive twisting and reaching movements.

Worker welfare

21. Where provided by an employer, living quarters are suitable for human habitation and contain basic services and facilities.
22. The minimum working age shall comply with country regulations. Where regulations are absent, workers shall be older than 15 years of age.

Training

23. New workers are informed about the risks associated with health and safety when starting at the worksite.
24. Workers have appropriate knowledge or are trained to a level appropriate to their area of responsibility in the following areas:
    - operating vehicles, equipment and tools,
    - accident and emergency procedures,
    - safe use of chemicals,
    - personal hygiene.

Documents and records

25. Records of good agricultural practices are kept for a minimum period of at least two years or for a longer period if required by government legislation or customers.
26. Out of date documents are discarded and only current versions are used.

Review of practices

27. All practices are reviewed at least once each year to ensure that they are done correctly and actions are taken to correct any deficiencies identified.
28. A record is kept to show that all practices have been reviewed and any corrective actions taken are documented.
29. Actions are taken to resolve complaints related to worker health, safety and welfare, and a record is kept of the complaint and actions taken.

5. Produce Quality Module

Quality plan

1. Practices that are critical to managing produce quality during production, harvesting and postharvest handling are identified in a quality plan for the crop grown.

Planting material

2. Crop varieties are selected to satisfy market requirements.
3. If planting material is obtained from another farm or nursery, either a recognised plant health certificate or a guarantee that the material is good quality is provided by the supplier.

Fertilisers and soil additives

4. Nutrient application is based on recommendations from a competent authority or on soil or leaf or sap testing and the nutritional requirements for the crop grown.
5. Equipment used to apply fertilisers and soil additives is maintained in working condition and checked for effective operation at least annually by a technically competent person.
6. Areas and facilities for composting of organic materials are located, constructed and maintained to prevent contamination of crops by diseases.
7. The application of fertilisers and soil additives is recorded, detailing the name of the product or material, date, treatment location, application rate and method, and operator name.

Water

8. Irrigation use is based on crop water requirements, water availability, and soil moisture levels.
9. A record of irrigation use is kept, detailing the crop, date, location, and volume of water applied or duration of irrigation.

Chemicals

Agrochemicals

10. Employers and workers have been trained to a level appropriate to their area of responsibility for chemical application.
11. Crop protection measures are appropriate for the control of pests.
12. Integrated pest management systems are used where possible.
13. Chemicals are only purchased from licensed suppliers.
14. Chemicals used on crops are approved by a competent authority in the country where the crop is grown and intended to be traded, and documentation is available to confirm approval.
15. Chemicals are applied according to label directions or a permit issued by a competent authority.
16. A chemical rotation strategy and other crop protection measures are used to avoid pest resistance.
17. Equipment used to apply chemicals is maintained in working condition and checked for effective operation at least annually by a technically competent person.
18. The application of chemicals is recorded for each crop, detailing the chemical used, reason for application, treatment location, date, rate and method of application, weather conditions, and operator name.

Harvesting and handling produce

Harvesting

19. An appropriate maturity index is used to determine when to harvest produce.
20. An appropriate technique is used for harvesting of produce.
21. Equipment and tools are suitable for harvesting and are checked for cleanliness before use and cleaned as required.
22. Containers are suitable for harvesting of produce and are not overfilled.
23. Liners are used to protect produce if containers have rough surfaces.
24. Containers are covered to reduce moisture loss and exposure to the sun.
25. Containers are checked for soundness and cleanliness before use and cleaned or discarded as required.
26. Produce is harvested in the coolest time of the day and harvesting in the rain is avoided if possible.
27. Produce is removed from the field as quickly as possible.
28. Harvested produce is placed in the shade if long delays occur before transport.
29. Packed containers are not stacked on top of each other unless they are designed to support the container and minimise mechanical damage.
30. Containers are secured during transport to minimise mechanical damage.

Handling produce

31. Equipment is constructed to minimise excessive drops and impacts.
32. Equipment, containers and materials that contact produce are regularly cleaned and maintained to minimise mechanical damage.
33. Measures are taken to prevent the presence of pests in and around handling, packing and storage areas.
34. Where required, produce is treated to minimise disease development and loss of quality.
35. Water used after harvest for handling, washing, and produce treatment is treated or changed regularly to minimise contamination from spoilage organism.
36. Produce is packed and stored in covered areas.
37. Produce is not placed in direct contact with soil or the floor of handling, packing or storage areas.
38. Produce is graded and packed according to customer or market requirements
39. Protective materials are used where required to protect produce from rough surfaces of containers and excessive moisture loss.
40. Field heat is removed using appropriate cooling methods.

Storage and transport

41. For long delays before transport, produce is held at the lowest suitable temperature available.
42. Transport vehicles are covered and appropriate temperature conditions are used to minimise quality loss.
43. Transport vehicles are checked before use for cleanliness, foreign objects, and vermin infestation, and cleaned if there is a significant risk of mechanical damage and contamination from spoilage organisms.

44. Mixing of non-compatible produce during transport is avoided.
45. Produce is transported quickly to the destination.

Traceability and recall

46. Each separate production site is identified by a name or code. A sign with the name or code is placed on the site and recorded on a property map. The site name or code is recorded on all documents and records that refer to the site.
47. Packed containers are clearly marked with an identification to enable traceability of the produce to the farm or site where the produce is grown.
48. A record is kept of the date of supply and destination for each consignment of produce.

Training

49. Employers and workers have appropriate knowledge or are trained in their area of responsibility relevant to good agricultural practices and a record of training is kept.

Documents and records

50. Records of good agricultural practices are kept for a minimum period of at least two years or for a longer period if required by government legislation or customers.
51. Out of date documents are discarded and only current versions are used.

Review of practices

52. All practices are reviewed at least once each year to ensure that they are done correctly and actions are taken to correct any deficiencies identified.
53. A record is kept to show that all practices have been reviewed and any corrective actions taken are documented.
54. Actions are taken to resolve complaints related to produce quality, and a record is kept of the complaint and actions taken.

Appendix 1. Integration of modules

Contents	Modules			
	Food safety	Environmental management	Worker health, safety, welfare	Produce quality
Site history and management	√	√		
Planting material	√	√		√
Soil and substrates		√		
Fertilisers and soil additives	√	√		√
Water	√	√		√
Chemicals	√	√		√
Harvesting and handling produce	√	√		√
Waste and energy efficiency		√		
Biodiversity		√		
Air		√		
Working conditions			√	
Produce quality plan				√
Worker welfare			√	
Traceability and recall	√			√
Training	√	√	√	√
Documents and records	√	√	√	√
Reviewing practices	√	√	√	√

Appendix 2. Glossary

Abbreviations

AADCP	ASEAN-Australia Development Cooperation Program
ASEAN	Association of Southeast Asian Nations
AusAID	Australian Agency for International Development
GAP	Good Agricultural Practice
MRL	zMaximum Residue Limit
QA	Quality Assurance
QASAFV	Quality Assurance Systems for ASEAN Fruit and Vegetables

Terms

Biopesticide	A pesticide that is manufactured from biological sources.
Cleaning	The removal of soil, dirt, grease or other foreign matter.
Competent authority	An organisation or company that is a recognised authority to develop or monitor standards, rules of operation, codes of practice, regulations, and policies. Examples include government departments, international committees such as CODEX, industry organisations, QA/GAP system owners, and auditing companies.
Composting	A managed process where organic materials are subjected to moisture, heat and microorganisms for a specified period to pro duce a product known as compost.
Contamination	Food safety - the introduction or transfer of a food safety hazard to produce or to the inputs that contact produce, such as soil, water, equipment, and people. Environment - the introduction or occurrence of a hazard into the environment.
Customer	A business or person who buys or receives produce. For example, a packer, marketing group, distributor, wholesaler, exporter, processor, retailer, or consumer.
Domestic animals	Animals that are raised as family pets or as a source of food for the family- for example dogs, cats, cows, chickens, ducks, birds, sheep, monkeys, mice, rabbits.
Environment	The surroundings in which a business operates, including land scape, soil, air, water, flora, fauna, humans and their interrelation.
Environmental hazard	A source of environmental harm or a situation with a potential to cause harm.
Environmental harm	Any adverse change to the environment, wholly or partially resulting from the business's activities, products or services.
Farm animals	Animals that are raised for commercial purposes - for example, cows, sheep, chickens, ducks.
Faeces	The waste from the intestinal tract of animals, - also known as manure.
Fertigation	The application of nutrients through an irrigation system.

Food safety hazard	Any chemical, biological or physical substance or property that can cause fruit and vegetables to become an unac ceptable health risk to consumers.
Foreign objects	Unwanted objects in or around produce that may affect food safety or quality - for example, glass, metal, wood, stones, soil, leaves, stems, plastic, and weed seeds.
Fumigation	The applicant of a chemical to control pests in the soil or substrate, such as insects, diseases and weeds.
Good agricultural practice	Practices used to prevent or reduce the risk of hazards occurring during production, harvesting, postharvest han dling of produce.
Hazard	An adverse affect or harm to produce, the environment or workers.
Integrated pest management	A system for managing pests that integrates multiple strategies to minimise the use of chemical pesticides, such as encouraging beneficial insects and micro-organisms to flourish, good crop hygiene and plant health, regular monitoring of crops for pests, using biological control agents and soft pesticides, and selective use of chemical pesticides.
Maturity	A stage of development in the process of the growth of fruit and vegetables.
Maturity index	A method used to measure or predict the maturity of fruit and vegetables
Maximum Residue Limit (MRL)	The maximum amount of a chemical that is permitted by a competent authority in fruit and vegetables for sale for human consumption.
Obsolete chemical	A chemical that is no longer suitable for use. For example approval for use of the chemical may be withdrawn, the chemical is older than the use by date, the container may be damaged and the chemical soiled.
Organic material	A material originating from plants and animals and not from synthetic sources.
Persistent chemicals	Organochlorine pesticides, heavy metals and other chemicals that remain for long periods in soil, water and the general environment (for example, herbicides in ground water).
Pest	An unwanted animal or plant that affects the production, quality and safety of fruit and vegetables - for example, insects, diseases, weeds, rodents, birds.
Pesticide	Products used to control pests - for example, insecticides, fungicides, herbicides, fumigants. Pesticides can be manufactured from chemical or biological sources.
Potable water	Water that is suitable for human consumption as approved by WHO or equivalent country regulations.

Produce	Fruit and vegetables (including herbs)
Property	The whole area of a farm or business. It includes all houses, buildings, production areas, roads, fauna and flora, and watercourses within the surveyed boundaries of the property.
Quality	The combination of produce characteristics that are critical to meeting customer expectations and needs.
Quality hazard	Something that reduces the quality of produce.
Remedial action	Action taken to remove or minimise or prevent re-occurrence of a hazard.
Risk	The chance of something happening that will impact upon a hazard (for example, food safety). It is usually measured in terms of likelihood and consequences.
Sanitise	Reducing the level of microorganisms through using chemicals, heat and other methods.
Sensitive areas	Areas at high risk of environmental harm from chemicals, water, nutrients, waste, and so on, originating from property activity. Examples include biodiverse areas, other crops, livestock areas, watercourses, marine areas, wetlands, native fauna and flora, soils, neighbouring properties and public areas.
Site	A defined area on the property - for example, a production site.
Soil additives	Products or materials that are added to the soil to improve fertility, structure or control weeds. Examples are animal manure, sawdust, compost, seaweed, fish-based products.
Spoilage	Deterioration causing the produce to be less saleable or unsaleable.
Target	The item or site to which an activity is directed. For example, applying a pesticide spray to a target crop to control a target pest or applying fertiliser to a target paddock for crop nutrition.
Traceability	The ability to follow the movement of produce through the specified stages of production and distribution.
Withholding period	The minimum period permitted between application of a pesticide and harvest of the produce.
Workers	All people working on a farm or in a business, including family members and contractors.

Notes


asean


Australian Government
AusAID


Cardno
ACIL


RMIT International