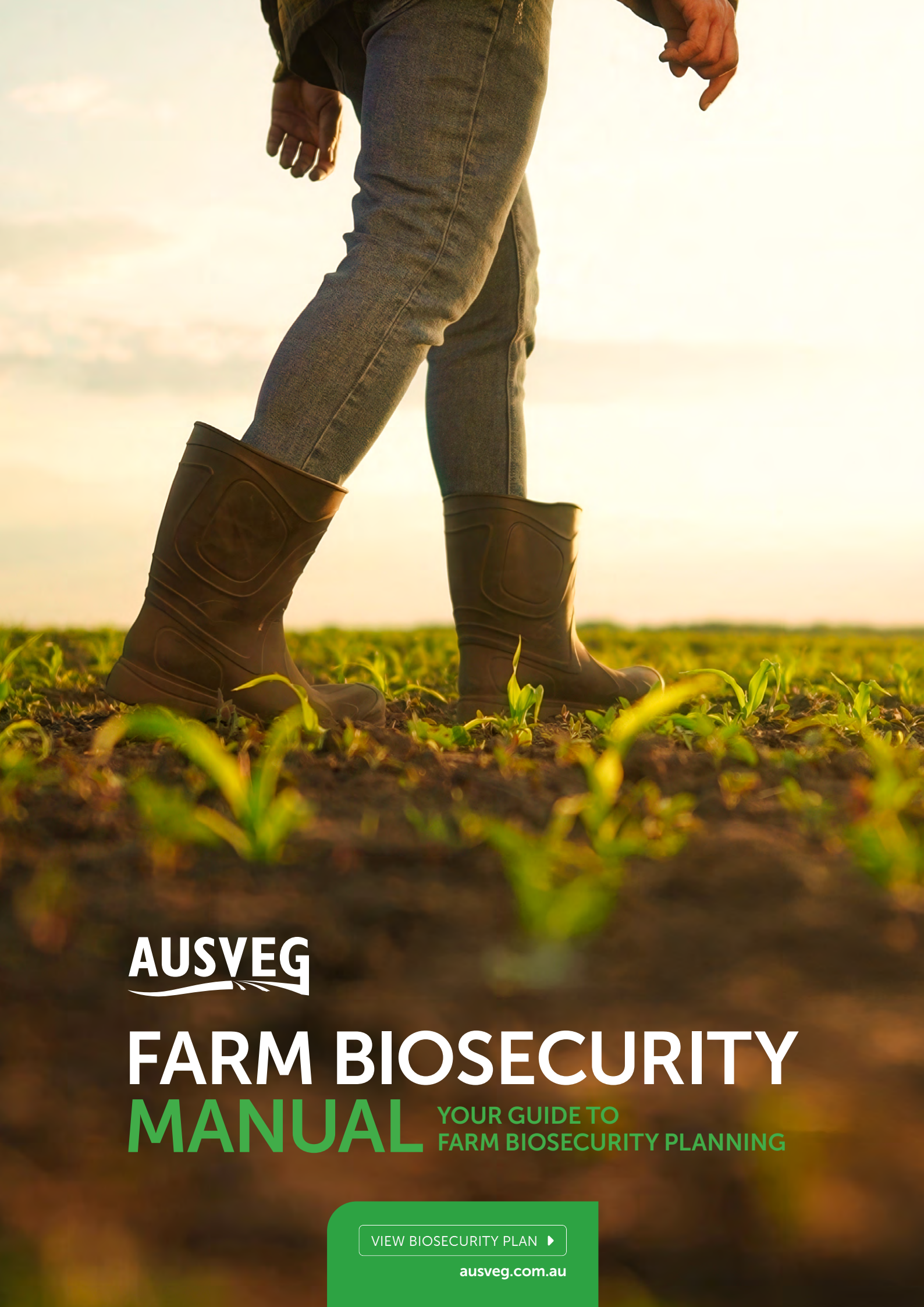

AUSVEG

FARM BIOSECURITY MANUAL

YOUR GUIDE TO FARM BIOSECURITY PLANNING

VIEW BIOSECURITY PLAN

ausveg.com.au

The *Farm Biosecurity Manual* is brought to you by the AUSVEG Farm Biosecurity and VegWatch programs.

This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit **horticulture.com.au**

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PREPARING A FARM BIOSECURITY PLAN

The best defence against pests and diseases is the integration of biosecurity practices into your everyday business operations. Biosecurity is about managing the risk of pests and diseases impacting your business. By managing these risks, you can reduce the chance of pests and diseases being carried onto and around your property.

Why develop a farm biosecurity plan?

Having a plan helps you assess the risks of pests, diseases and weeds being introduced or spread onto your property and decide what you'll do to manage those risks. The benefits of having a strong farm biosecurity plan for your business include:

- Reduced risk of introducing new pests and diseases.
- Lower pest and disease management costs.
- Maintained and enhanced access to domestic and international markets.
- Faster response and recovery if a new pest, disease, or weed does arrive.

How to use this farm biosecurity manual

This manual is your practical guide to developing a biosecurity plan tailored specifically to your business. It provides the essential information, examples, and tools to help you identify risks and choose effective practices.

Use this guide to help you assess potential entry pathways for pests and diseases and outline actions you'll implement to reduce associated risks. A self-assessment checklist will help you evaluate your current practices and pinpoint areas for improvement. Using a farm map to visualise how your property layout relates to the risk pathways will help you locate where you can implement the most effective strategies.

Effective biosecurity measures should be integrated into your routine business practices. We recommend reviewing your biosecurity plan regularly as part of your overall business planning.

VIEW BIOSECURITY PLAN

CONTENTS

Leaf damage on pak choy caused by fall armyworm *(Spodoptera frugiperda)*.

FARM BIOSECURITY PRACTICES

Six Risk Pathways

- Vehicles and equipment
- Staff and farm visitors
- Farm inputs
- Waste and weeds
- Packaging, bins and pallets
- Weather

This section outlines the recommended biosecurity practices for Australian farms. Understanding the main pathways by which plant pests, diseases, and weeds spread onto farms is fundamental to your biosecurity.

The *AUSVEG Farm Biosecurity Manual* identifies six main pathways by which plant pests, diseases and weeds can spread onto farms. The manual also presents actions that can be put in place to reduce risks associated with these pathways. The *Biosecurity Plan (page 30)* will help you identify what is already in place, and where improvements can be made.

Identifying where high-risk points are located on your farm and putting preventative measures in place to reduce these risks, are critical for a solid farm biosecurity plan. Plant pests, diseases and weeds can spread onto farms through the Six Risk Pathways.

Colorado potato beetles (CPB) are a significant pest to various vegetable crops, including potatoes, eggplants, tomatoes, and peppers. Both adults and larvae feed on plant leaves, and without control, they can cause severe defoliation.

RISK PATHWAY 1

Vehicles & equipment

Vehicles and equipment often collect soil and plant material in grilles, tyre treads and on wheel rims.

Bacteria, fungi, viruses, nematodes, insects and even insect eggs, can remain alive without host plants for long periods of time in soil and can be spread by vehicles and equipment that have soil and plant material on them, especially when they are:

1. **Not cleaned.**
2. **Driving across your production areas.**

Contaminated soil and other material can be spread into your paddocks.

Maintain the hygiene of vehicles and equipment, and ensure that all vehicles coming onto your property are clean beforehand to reduce the spread of contamination into your production areas.

Alternatively, all visitor and staff vehicles remain outside of growing sites and only designated farm vehicles are used in production areas.

Top. Established vehicle paths near production areas reduces the likelihood of spreading pests and diseases. Above. A vehicle and equipment wash down bay provides protection against soilborne pathogens and hitchhiker pests. ©Queensland Department of Agriculture and Fisheries.

CRITICAL CASE STUDY
Present in Australia

Fusarium wilt

Fusarium oxysporum

WHAT IS IT?

- Fungal disease.
- Impacts many vegetable crops, including brassicas, beans, capsicums, cucurbits, peas.
- Several strains currently present in Australia (some strains are not yet known to occur in Australia).

The fungus is soil-borne and infects plants through their root systems. As the fungus travels up the plant stem, it invades plant cells producing toxins and causes leaf yellowing, wilting and internal discolouration.

HOW CAN IT BE SPREAD?

1. Vehicles and equipment that have come into contact with contaminated soil and are not cleaned before travelling to new areas.

This pathway is likely to spread other diseases including *Ralstonia* species (bacterial wilt) and weeds (e.g. wild radish). Managing the risks of vehicles and equipment means you reduce the risks of introducing new pests and diseases onto your property.

RISK PATHWAY 1

Vehicles & equipment

Management strategies

1. Have one main farm entry point

One (or two) main farm entrance point ensures farm traffic is directed via gate signs and visitors are informed about property access, designated parking areas and who to contact.

Combine these practices with a visitor register to keep track of who has entered your property and when, in case of any pest or disease outbreaks.

2. Clean vehicles and equipment, or leave them outside the gate

By cleaning vehicles and equipment before they enter production areas, the risks of transmitting pests or diseases are reduced.

Use a machinery register to keep track of where vehicles and equipment have been used, especially if they are being used across multiple properties.

Use a concrete (or similar) designated parking area for vehicle and equipment wash downs and ensure that run-off is directed away from production areas. Regularly monitor the area around the wash down facility for pest and disease symptoms.

3. Use designated parking areas and established vehicle paths

Manage vehicle movement around a property to reduce the chances of spreading pests and diseases.

Use a designated parking area with a registration system for staff and visitors. Limit the movement of these vehicles to ensure they are not spreading pests and diseases onto the production areas.

Pests and diseases are more likely to be spread around farm when vehicles travel off established roads/tracks. Ensure onsite vehicles and any staff or visitors are aware of your farm's biosecurity requirements to travel on designated pathways between growing areas.

Providing a designated parking area away from production areas will help you manage who is coming onto your property.

HIGH-RISK CASE STUDY
NOT present in Australia

Pale potato cyst nematode

Globodera pallida

WHAT IS IT?

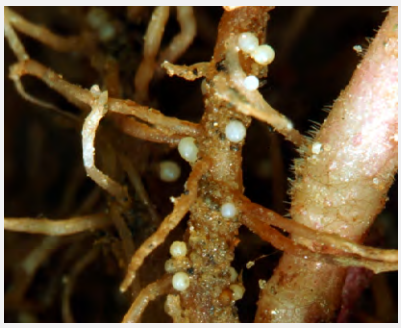
- Exotic pest.
- Symptoms appear similar to nutrient deficiencies due to reduced root system.
- During or after flowering, very tiny white, yellow or brown cysts can be seen on tubers and roots.
- Soil-borne.

HOW CAN IT BE SPREAD?

1. Vehicles and equipment (and any surface) that has come into contact with PCN-infested soil.
2. Unwashed root crops, seed potatoes, potted nursery stock and packaging, boots, livestock and waste.

PCN can survive as cysts in soil for up to 20 years in the absence of any host species.

By managing vehicles and equipment, the risks of transporting unwanted harmful pests and diseases onto and around your property is significantly reduced.



Top. Plants affected by PCN. ©Florida Division of Plant Industry. Bugwood.org. Above. Female PCN on roots. ©Bonsak Hammeraas, NIBIO - The Norwegian Institute of Bioeconomy Research, Bugwood.org

RISK PATHWAY 2

Staff & farm visitors

If it can move, it can carry pests and diseases.

While farm visitors like contractors, agronomists, and other industry staff are critical to farming operations, they enter properties at a risk to a farm's biosecurity.

Harmful pests and diseases can hitchhike on:

1. **Clothing.**
2. **Shoes.**
3. **Hands.**
4. **Vehicles, tools and equipment.**

For this reason, staff and farm visitors are a risk that should be managed accordingly.

Staff and visitors that are not trained, or are unaware of your farm's biosecurity practices, can introduce and spread pests, diseases and weeds and degrade biosecurity protocols that are in place.

It can be difficult to trace the source of a pest outbreak without knowledge of who has visited your farm. Using a visitor register is a simple way to monitor this risk.

Above. Visitor sign-in register example. ©AUSVEG
Pests, diseases and weeds can be present on shoes, clothing and hands. Use a footbath with disinfectant to manage the risks of soil-borne pests, diseases and weeds.

CRITICAL CASE STUDY
Present in Australia

Pigweed

Portulaca oleracea

WHAT IS IT?

- Restricts crop yield and quality.
- Increases the costs of production and impacts management decisions.
- Is considered to be one of the most important weed species in vegetable production.

HOW CAN IT BE SPREAD?

1. Seeds fall directly to the ground from the parent plant. Pigweed relies entirely on external dispersal methods for spread.
2. In soil on shoes and clothes of staff and visitors to farm.

Pigweed is known for rapid population increases once it becomes established in vegetable fields. It is important to manage visitors and equipment to control the spread of this weed and other soil-borne pests and diseases than can similarly be spread through contaminated shoes and clothing.

Other weeds like nutgrass (*Cyperus rotundus*), can similarly be spread by clinging onto staff and visitor clothing and shoes.

RISK PATHWAY 2

Staff & farm visitors

Management strategies

1. Install biosecurity gate signs

Biosecurity signs indicate to visitors and staff that farm biosecurity practices are in place. Gate signs can also be used to direct traffic to designated parking areas and inform visitors about property access points.

2. Ensure shoes and clothes are clean

Staff and visitors should practice general hygiene when coming onto farm. This means ensuring shoes and clothing are clean as pathogens (fungi, bacteria) and viruses are spread through:

1. **Physical contact.**
2. **Contaminated clothing.**

Provide accessible cleaning equipment like boot brushes and a footbath with chemical disinfectant to reduce the risks associated with staff and visitors.

3. Use a visitor sign-in register

Every visitor should sign in upon entry to the farm to track visitors and communicate biosecurity rules. If possible, ask visitors about previous movements in other growing regions. This aids in complying with health and safety laws by keeping an accurate record of who is on the property and when, in case of an incident.

4. Train staff in biosecurity and visitors

Induct all staff in on-farm biosecurity practices so they are aware of how pests and diseases can be spread and how they can personally reduce these risks.

AUSVEG can provide you with a biosecurity sign.
Scan the QR code or email info@ausveg.com.au to get your sign today!

HIGH-RISK CASE STUDY
NOT present in Australia

Late blight

Phytophthora infestans
A2 mating type

WHAT IS IT?

- Can severely impact production of solanceous species (including potato, tomato, eggplant).
- This mating type is more harmful, fungicide resistant, and infectious than the A1 type that is already present in Australia.
- Causes death of whole plants within days of infection.
- Entry and establishment potential into Australia is considered 'high'.

HOW CAN IT BE SPREAD?

1. Short distances between plants/ properties by wind and rain.
2. Via physical contact as it's highly contagious.
3. By hitchhiking on clothing, gloves, knives, vehicles and equipment - all of which are associated with staff and visitors.

Practicing good farm hygiene and ensuring visitors and staff are aware of your biosecurity practices in place will greatly reduce the likelihood of introducing new diseases into your production system.


Symptoms of late blight.

RISK PATHWAY 3

Farm inputs

Anything brought onto your property can potentially introduce plant pests.

Farm inputs, include:

1. **Fertiliser.**
2. **Compost.**
3. **Seedlings.**
4. **Seeds.**

Any of these inputs can contribute to the spread of plant pests and diseases.

Many plant pathogens are able to survive in seeds, which is often how plant diseases spread to new regions over large distances.

Organic fertilisers like manure and compost can be sources of plant pests and diseases too. Ensure material is composted thoroughly to destroy their ability to conceal any pests and diseases.

Seeds, seedlings, fertiliser and compost should be sourced from reputable or certified suppliers and guaranteed a high health status.

CRITICAL CASE STUDY
Present in Australia

Black rot

Xanthomonas campestris

? WHAT IS IT?

- Bacterial disease.
- Causes significant devastation to brassica crops world-wide.
- The disease is seed-borne, meaning it can be transmitted through infected seeds.
- Characterised by yellow 'V-shaped' lesions with blackened veins, leading to necrosis and dry, pale brown areas.

HOW CAN IT BE SPREAD?

1. Seeds are the major means of disease spread.
2. Contaminated plant material.

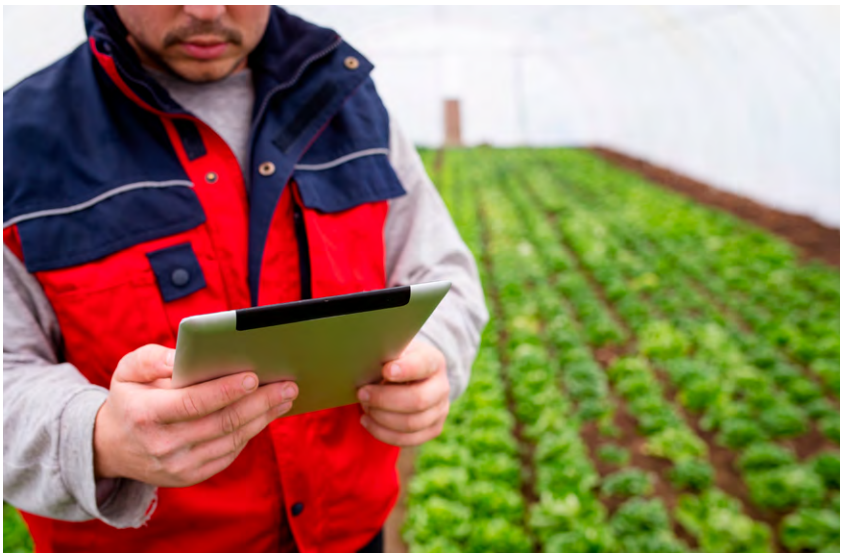
It is often difficult to detect as seeds can appear symptom less but do infect seedlings after germination.

Once established in a location, the disease must be managed carefully as any contaminated plant material can aid disease spread and it can persist in a field for up to two years. Black rot can be easily controlled through managing the risks of farm inputs. Many other diseases can be spread through farm inputs including to tobamoviruses and *Acidovorax* fungal species.

Top. Black rot on cabbage leaves. Above. Broccoli leaves remain green even though the leaf area has been attacked by Black rot.

Farm inputs

Management strategies



Maintain records of farm input sources including fertilisers, seedlings, seeds. List application dates and location applied.

1. Source planting material from reputable suppliers

Source planting and propagation material from a reputable supplier and ensure the products have a health status (e.g. seed certification). This may involve buying from a reputable nursery and ensuring planting materials are tested prior to use on farm.

Use certified seeds as these are tested upon arrival in Australia to ensure they are free from major disease-causing organisms.

2. Inspect seedlings upon arrival

Inspect seeds and seedlings upon arrival for the presence of any insect feeding or disease symptoms.

Where possible, isolate new plant material away from healthy plants to ensure they are pest and disease free prior to planting.

Regularly check newly planted seeds or seedlings for signs of pests and diseases. Depending on the circumstances, an application of a chemical control agent may be necessary before planting to ensure that there is no spread to your growing areas.

3. Maintain your records

Maintain a seed and seedling register and record the presence and/or absence of pest and disease, source of fertilisers, application dates and where they were applied in case of any pest or disease occurrence as a result of these farm inputs.

HIGH-RISK CASE STUDY
NOT present in Australia

Exotic thrips

Caliothrips fasciatus (Bean thrip)

WHAT IS IT?

- Feed and reproduce on a large variety of vegetable crops.
- Can damage to flowers, foliage and fruit of crops, such as silvery marks, pod scarring or leaf curling.
- Cause significant economic and environmental impacts by contaminating produce, reducing quality and impacting market access.

HOW CAN IT BE SPREAD?

1. Easily on plant material and wind.
2. Via hitchhiking as they hide in small, protected places like flowers or growing tips of young seedlings.

Management of farm inputs reduces the risks of introducing harmful thrip species onto your property. For example, exotic thrips like the bean thrip (*Caliothrips fasciatus*) are commonly intercepted at Australia's borders hiding in the navel of imported oranges.

Top. Bean thrip leaf damage on blue wild indigo (*Baptisia australis*). ©Whitney Cranshaw, Colorado State University, Bugwood.org.
Above. Female *Caliothrips fasciatus*. ©lucidcentral.org

RISK PATHWAY 4

Waste and weeds

Plant waste and weeds can be breeding grounds for plant pests and diseases.

Controlling weeds allows you to break pest and disease life cycles for reduced pressure.

Any plant material can transport harmful pests and diseases whether they are transported by vehicles, equipment, or people. Waste in the field produced from harvested crops can also conceal and provide a protected environment for pests and diseases, leading to high infestations.

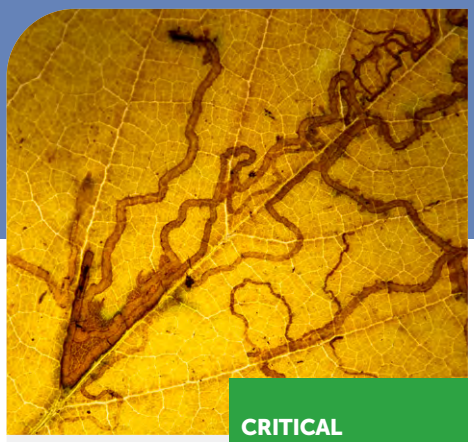
Weeds:

1. **Outgrow crops**
2. **Compete for valuable resources**
3. **Act as hosts for many plant pests and diseases.**

Weeds can serve as a reservoir for pests and diseases which can then multiply and move out when new crops emerge. This causes costly damage.

Abandoned unmarketable produce can attract pests and diseases too.

Controlling weeds may reduce the ability of pests and diseases to remain in your fields after a crop has been harvested and can break the life cycle.



CRITICAL CASE STUDY
Present in Australia

American serpentine leafminer

Liriomyza trifolii

WHAT IS IT?

- Exotic leafminer.
- A poor flier.
- Recently been detected in northern Australia (July 2021).

HOW CAN IT BE SPREAD?

1. Wind.
2. Contaminated plant material, like seedlings.
3. Weed hosts that support pest populations, which allows them to spread to crops.

The American serpentine leafminer (ASLM) causes damage through adult 'sucking' feeding habits and egg laying into leaves. The mines are caused by larvae tunneling through leaf tissue. This damage reduces the leaf's ability to photosynthesise, leading to reductions in crop productivity and leaves the crop vulnerable to infection.

Mismanagement of plant and weed waste on-farm enables further pest spread around your property.

Waste and weeds

Management strategies

Monitor weeds for pest and disease symptoms as many weeds are alternate suitable pest and disease hosts.

1. Clean up, dispose of and store plant waste appropriately

It is important to manage waste as a source of potential pest and disease spread. To manage this risk, plant waste should be cleaned up or disposed of (e.g. sprayed out, deep burial, burning, composting, etc.).

Waste should be kept away from growing areas and water sources where possible.

2. Implement a weed management plan

Establish a weed management plan for your property and maintain weed-free buffer zones around growing areas.

By controlling weed populations, this helps prevent the chances of pests and diseases surviving on weeds and spreading to crops each season.

3. Monitor and survey weeds

Monitor and survey weeds along boundaries and in wildlife corridors for pests and disease symptoms. This should be carried out regularly and during both crop and fallow periods as weeds are able to provide breeding grounds for pests despite there being no preferred host crop available.

If not managed, this can lead to high pest pressure at the start of each season when seedlings are most vulnerable.

CRITICAL CASE STUDY
Present in Australia

Tomato potato psyllid TPP

Bactericera cockerelli

? WHAT IS IT?

- Tiny sap sucking insect.
- Can carry the bacterium *Candidatus Liberibacter solanacearum* (CLso) which is associated with yellow decline in carrots and zebra chip disease in potato.
- Currently restricted to South West WA and Bellarine Peninsula, Victoria (as of November 2024).

HOW CAN IT BE SPREAD?

1. Wind.
2. Contaminated plant material, like seedlings.
3. Weed hosts that support pest populations, which allows them to spread to crops.

When TPP is present, signs include insects jumping from foliage when disturbed, as adults (called 'jumping plant lice') jump or fly. Heavily infested plants may wilt, with yellowing leaves and upward curling. Psyllids excrete white, sugar-like granules that coat leaves and stems, causing sooty mould. Sticky honeydew makes plants look dirty, and growth may be stunted with shortened internodes or stem death, resembling other potato and tomato issues. Early detection is crucial to reduce damage. Mismanagement of plant and weed waste on-farm enables further pest spread around your property.

Above. Adult TPP. ©Plant & Food Research New Zealand

RISK PATHWAY 5

Packaging, bins & pallets

Packaging, bins and pallets are commonly re-used, often cross state borders, and are transferred between properties.

Where possible, pallets should be stored appropriately. This includes storage on a hard, clean surface that is away from production areas.

Just like vehicles and equipment, soil and plant material from harvested crops can carry pests and disease organisms onto your farm. This is especially the case with green leafy material that is attached to surfaces which may be infected with a range of diseases from previous users.

Biosecurity risks:

1. Transporting produce without safeguards, risking pest/disease introduction to new regions.
2. Re-using packaging, bins and pallets that have previously been used to store or transport produce without implementing proper hygiene practices first.

CRITICAL CASE STUDY
Present in Australia

Cucumber green mottle mosaic virus

CGMMV

HOW CAN IT BE SPREAD?

1. Physical contact as it is a highly contagious virus.
2. Contaminated packaging, bins and pallets that have not been cleaned and disinfected appropriately before they are reused in the supply chain.

The natural short distance spread of CGMMV is through contact of contaminated soil, plant material, debris, water and packaging materials as the virus can survive on surfaces and in soil without host plants for long periods of time.

This contributes to its high spread rate and emphasizes the need to practice good farm hygiene when reusing equipment or packaging materials from the supply chain and on farm.

Symptoms of Cucumber green mottle mosaic virus

RISK PATHWAY 5

Packaging, bins & pallets

Management strategies

Clean and sanitise plastic bins before reusing in the supply chain. Pallets used in post-harvest practices are free from any soil or plant material and are stored on dry, hard floor and away from production areas. Images ©PHA.

1. Wash and disinfect field crates and bins regularly

Cardboard packaging materials should not be reused as they are unable to be properly cleaned and disinfected after transporting crops/produce.

Plastic bins or packaging that are able to be reused should be disinfected before using them again in the supply chain.

Pallets should also be cleaned of any plant or soil material to reduce the spread of any pests and diseases that may be present on the pallet.

2. Store packaging, bins and pallets appropriately

Pallets used for transporting produce should be stored on a clean, hard surface in a covered area that is away from production areas.

This greatly reduces the risks of pallets concealing any unwanted, harmful pests and diseases.

HIGH-RISK CASE STUDY
NOT present in Australia

Brown marmorated stink bug

Halyomorpha halys

? WHAT IS IT?

- Significant threat to all of Australia's plant production industries.
- Voracious generalist feeder.
- Over 300 known host plants.

HOW CAN IT BE SPREAD?

1. Hitchhikes on a range of cargo from planting materials to electrical goods.
2. Packaging, bins and pallets are a potential major means of spreading BMSB if it were to arrive and establish in Australia.

You can protect your farm by checking your property frequently for the presence of unusual pests. Take care when opening packages from overseas.

Field crates, bins and pallets could be preferred habitats for BMSB adults.

Top. BMSB adult. Above. Newly hatched BMSB nymphs and egg mass.

RISK PATHWAY 6

Weather

WIND, RAIN & EXTREME WEATHER EVENTS

Pests and diseases can spread much further when assisted by wind and water.

Routine crop monitoring offers the best chance to detect new pests and diseases early, before they become established. This early detection is crucial for preventing their establishment on your property and avoiding ongoing control expenses.

Sticky traps and other trap types can assist crop monitoring. Sticky traps are a cheap and effective tool to measure what beneficial insects and pests have recently arrived.

Integrate these methods into your weekly schedule and ensure staff are trained to identify priority pests and diseases.

Top. Train staff to be aware of common and exotic plant pests and diseases. Above. Yellow sticky traps or similar can provide indications into pest and beneficial insect levels in crops.

CRITICAL CASE STUDY
Present in Australia

Fall armyworm

Spodoptera frugiperda

WHAT IS IT?

- Destructive moth that attacks over 350 plant species, including sweetcorn, potato and capsicum.
- Originated from the Americas, travelled to West Africa in 2016 and reached Australia's shores in early 2020.

HOW CAN IT BE SPREAD?

1. **Flying -** they are strong fliers with adult females able to migrate distances up to 100 kilometres in one night and 500 kilometres in a lifetime.
2. **Wind -** adults can be spread much further with assistance from wind.

Integrated pest management is key to FAW management with a focus on crop monitoring for early pest detection and timely management. Early detection ensures quick and accurate timing of control methods on newly hatched egg clusters before they can shelter within the crevices of plants (e.g. leaf whorls).

Regular crop surveillance and monitoring for eggs and larvae helps minimise damages and reduce harvest losses by allowing you to get on top of the problem before things get out of control. Wind can also assist the spread of thrips, whiteflies and fungal spores, presenting a significant risk to crop health.

RISK PATHWAY 6

Weather

WIND, RAIN & EXTREME WEATHER EVENTS

Management strategies

Not much can be done to manage wind and water but you can ensure drainage is appropriately channelled away from your production areas.

1. Regularly monitor and survey crops

Carry out regular pest and disease monitoring in crops and surrounding vegetation.

Record all observations, including:

1. Date.
2. Pests identified.
3. Growing area affected.
4. Level of infestation.
5. Proposed treatment plan.
6. Absence of sensitive or exotic pests.

2. Use traps to aid pest surveillance

Use sticky traps or other suitable insect traps to aid pest monitoring for beneficial insects and pests. Record the details listed above. Where possible, record the absence of any exotic pests of concern for your region (e.g. Serpentine leafminer, if it is not yet present in your production area).

3. Train staff to be aware of common and exotic plant pests

Ensure all staff and other regular farm visitors are aware of, and are trained in how to identify, any common pests and diseases as well as any exotic pests and diseases of specific concern.

This increases the likelihood of early detections in cases of new pest or disease occurrences on farm.

Above L-R. Regularly and routinely check crops and surrounding vegetation or weeds for signs of pests and diseases. Use traps to aid pest surveillance

HIGH-RISK CASE STUDY

NOT present in Australia

Black bean aphid

Aphis fabae

? WHAT IS IT?

- Widespread throughout Europe, Asia, the Americas and Africa.
- Wide host range, including many important vegetable crops.
- Can infect crops with a range of harmful viruses.
- Has high entry and establishment potential into Australia.

HOW CAN IT BE SPREAD?

1. Via plant material.
2. Via wind - a major means of aphid spread.

It could potentially arrive in Australia through wind-assisted flights.

If this pest were to arrive in Australia via airborne pathways, early detection is the best means possible for eradication efforts before it negatively impacts plant industries.

Top. A colony of black bean aphids.
Above. *Aphis fabae* on faba bean plants.

KNOW THE THREATS
HIGH-PRIORITY PESTS AND DISEASES

Exotic pests and diseases

Australia's vegetable growers must be aware of serious exotic pests and diseases that could bypass border controls. This information details high-priority threats to the vegetable industry, a list reviewed annually by biosecurity experts. **For the latest updates, consult the AUSVEG website.**

Established pests and diseases

Established pests of biosecurity significance are pests that are contained within one or more regions, have market access implications, and a significant impact on production, but can be kept off a property through farm biosecurity practices.

How are threats assessed

Each pest is evaluated based on specific criteria and assigned an overall risk rating. Pests rated as high risk are classified as High Priority Pests (HPP), a designation agreed upon by the vegetable industry and government bodies to ensure coordinated biosecurity efforts.

Inset. Spotted Cucumber Beetle *Diabrotica undecimpunctata.*
Top right. Pepper yellow leaf curl disease. Above. Adult carrot rust fly *Psila rosae.*

High Priority Pests

Entry potential: There is a risk of introduction through a number of possible pathways including the legal importation of plant material as well as illegal pathways, contamination and through natural means such as wind.

Spread: The natural spread of the pest to most production areas would be largely unhindered or as a contaminant would be difficult to manage hitchhiking.

Establishment: The pest would be able to survive (establish) in environment conditions that prevail in Australia in the majority of regions where the host is grown.

Economic impact: The pest would severely impact on production, including host mortality or significant impacts on either crop quality or storage losses, or severe impacts on market access.

VEGETABLE INDUSTRY HPP
SCAN THE QR CODE FOR THE LATEST HIGH-RISK PESTS AND DISEASES

This information has been compiled from a wide range of sources—including past records, existing protection plans, industry experience, published and peer-reviewed research, local and international studies, as well as insights from specialists and experts.

TRAIN, PLAN AND RECORD

Make sure that biosecurity procedures and threats are included in staff training and that biosecurity is part of farm planning activities.

Record keeping is also an important part of managing your business, providing the ability to trace where planting material and other inputs came from and where produce goes.

Train your team on biosecurity

Ensure everyone on your property, including staff, family, and contractors, understands biosecurity risks and your procedures to prevent the spread of diseases, pests, and weeds.

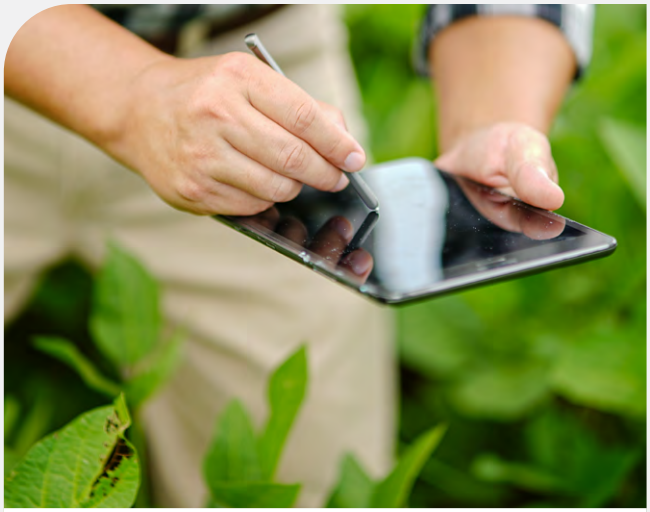
Provide staff with formal training on biosecurity standards and how to monitor crops for problems. Emphasise recognising and reporting unusual or exotic pests, especially for those working on grading lines. Posting awareness posters in sheds can also help.

Record keeping

Accurate record keeping enables traceability, and acts as a point of reference or evidence. Records can also be used to identify areas of potential biosecurity risk when developing and reviewing farm biosecurity practices.

Records should include:

- Pest and disease monitoring and surveillance activities.
- Movement and introduction of plants, plant materials and produce.
- Vehicle and machinery cleaning.
- Staff training.
- Visitor information.
- Farm inputs/waste and weeds.
- Chemical usage.



Immediate Response Steps

If you suspect a pest or disease on your farm, take the following steps immediately:

- Mark the area.
- Take photographs of the suspected pest, disease or affected plant/s.
- Collect or contain suspected pests if possible.
- Stop the movement of people and equipment in or near the affected area.
- Wash hands and use appropriate sanitary measures on any clothing or footwear that may have been in contact with affected plant material or soil.
- Do not move or transport affected plant material unless advised by your relevant state government department.
- Report it to the Exotic Plant Pest Hotline.

EXOTIC PLANT PEST HOTLINE
1800 084 881

Keeping records of purchases, certifications and sales will help to quickly identify the source and potential spread of any pest and disease incursion on your property. Always request and record certification before introducing new plants or plant materials, including seeds on to your farm.

WHAT CAN I DO NEXT?

Now that you're aware of these six high-risk pathways through which pests and diseases can spread onto your farm, there are several actions you can take to ensure you're managing them appropriately for your farm, business, or property.

It is very likely that you already have several of these risk-reducing measures in place on your farm business through other quality assurance processes. In **STEP 2** of preparing your farm biosecurity plan, you can identify measures already in place, as well as other opportunities to reduce risks associated with pest entry pathways.

Assess

Review your farm's current biosecurity measures and identify which pathways you are controlling well, and which may require more management.

☐

Optimise

If there are certain pathways requiring more attention, use this booklet as a management guide.

☐

Plan

If you are managing all pathways well, create a farm biosecurity plan for your property.

☐

AUSVEG can support you on developing a developing a biosecurity plan: Contact: info@ausveg.com.au

WHAT CAN I DO NEXT?

As you work through the Farm Biosecurity self-assessment consider the following:

What is the risk?

What is the likelihood of it occurring?

What are the consequences should it occur?

What am I doing now to prepare?

What else can I do to be better prepared?

What is the benefit to my farm business if I apply this measure?

The Farm Biosecurity self-assessment is designed to identify risk mitigation measures already in place on your farm/property and the opportunity to add others. The measures can then be incorporated into existing operating procedures, QA manuals and staff training procedures or used to develop a standalone biosecurity best practice guide for your property.

View the manual online here
ausveg.com.au/knowledge-hub/biosecurity-planning

Useful resources

AUSVEG Knowledge Hub

Links to each of the key vegetable groups in Australia, including a range of information on vegetables categorised under each group, plant diseases and disorders, key pests, management, and control measures, and related technical resources for additional reference.

ausveg.com.au/knowledge-hub/crop-protection

Farm Biosecurity

Information to help producers understand disease, pest and weed risks, what they can do to reduce those risks, and how to go about it. It provides materials to help producers implement biosecurity measures on their property.

farmbiosecurity.com.au

Australian Government Biosecurity

biosecurity.gov.au

SIX STEPS TO FARM BIOSECURITY

Preparing and implementing your property's biosecurity plan

STEP 1

Map your property

Visualise key areas, entry/exit points.

STEP 2

Identify biosecurity risks and mitigating actions

Pests, diseases, weeds and their pathways.

STEP 3

Prioritise

Develop strategies
Quarantine, hygiene, pest monitoring and control.

Prioritise actions
Focus on high-risk areas.

SIX STEPS TO FARM BIOSECURITY

STEP 4

Implement your biosecurity plan

Put the plan into action
Ensure compliance.

Maintain records
Track activities and interventions.

STEP 5

Communicate expectations

Share the plan
Train everyone on procedures and their roles.

Use clear signage
Remind people of protocols.

STEP 6

Review and update your plan

Regular checks, record analysis, adapt as needed. At least annually, or after an incident as a part of business planning.

MAP YOUR PROPERTY

How can pests and diseases spread on your property?

A property map is essential for a Farm Biosecurity Plan, highlighting key features like entry points, the house, sheds, and washdown facilities.

On a map of your property, clearly outline the boundaries and mark the following:

- ☐ **Access Area –** for vehicles and people (staff, visitors, delivery/collection, equipment).
- ☐ **Separation Area –** carparks and vehicle paths used to access different parts of the property.
- ☐ **Farming or Production Area –** this is the zone where staff, vehicles, machinery, equipment operate. This zone cannot be accessed without using appropriate sanitation measures.
- ☐ Additional risk pathways through which pests and diseases may enter *(*refer to the *Six Risk Pathways* on page 3).
- ☐ Best location for gate and other signs to communicate risk reduction measures.
- ☐ **Cleaning and Sanitisation Area –** for people, equipment and machinery.

Property Map example see Figure 1.

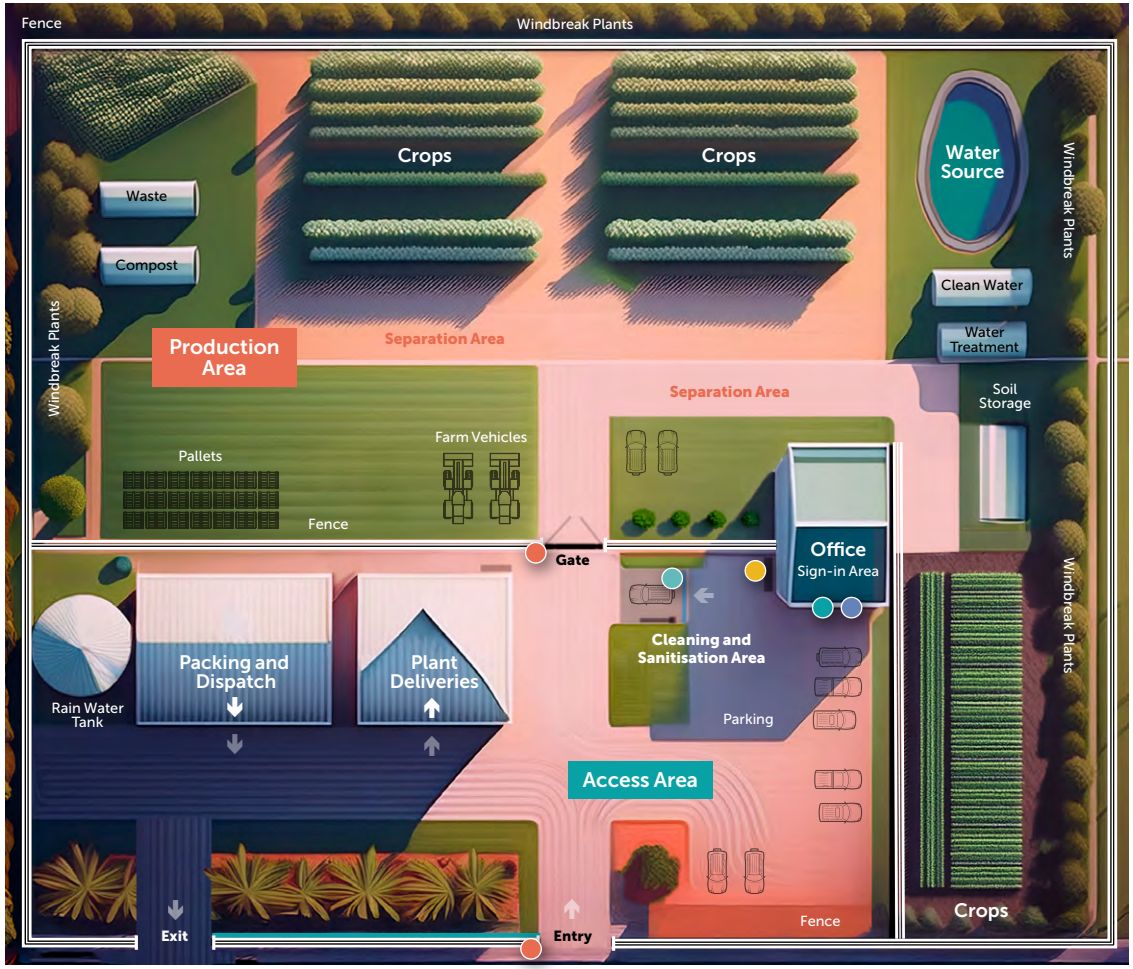


FIGURE 1: PROPERTY MAP EXAMPLE

KEY

Vehicle Washdown Area | Foot Bath | Sign-in Book/App | Change Area | Biosecurity Signage

MAP YOUR PROPERTY

Property Zoning

Zoning your farm into different management areas creates a system on your farm that is tiered and spreads the risk across several points. A three-zone system helps to create separation and recognise the different management required between various areas on the property e.g. visitors accessing the house would have a different risk level to a person accessing fields and production areas.

Zone	What Is It?	Examples	Recommended Biosecurity Action
Cool Zone	Areas where visitors may access property but have minimum to no contact with crops.	Little action required. No need to limit access.	Little action required.
Warm Zone	Area where some people and vehicles may need to access, in order to drop off inputs and/or pick up product.	The Warm Zone is the 'roadway' for essential vehicles that need to come onto farm. This zone may include roads through the farm to sheds. E.g; trucks picking up crop products, dropping off fertiliser, or fuel deliveries.	May not be feasible to limit access. Ensure the area is kept clean and preferably well gravelled. Monitor regularly for weeds and pests.
Hot Zone	This is the area where crop production is located and vehicles, machinery and equipment operate.	The Hot Zone is for vehicles, machinery, and equipment, but they must take appropriate measures before entering. For example, machinery should not be moved in or out of the zone without precautions. Large enterprises or those managing specific diseases may need separate Hot Zones within a property.	Restrict access to this zone. People or vehicles who have a need to enter apply. **Come Clean Go Clean** practices. Visit **dpi.nsw.gov.au/biosecurity/plant/come-clean-go-clean.**

Access for Utility and Service Provider

Plan access for **utility providers** and their **contractors**, and provide suggested routes for the workers to take to gain access. Consider where the poles/utility fixtures are located and associated risks.

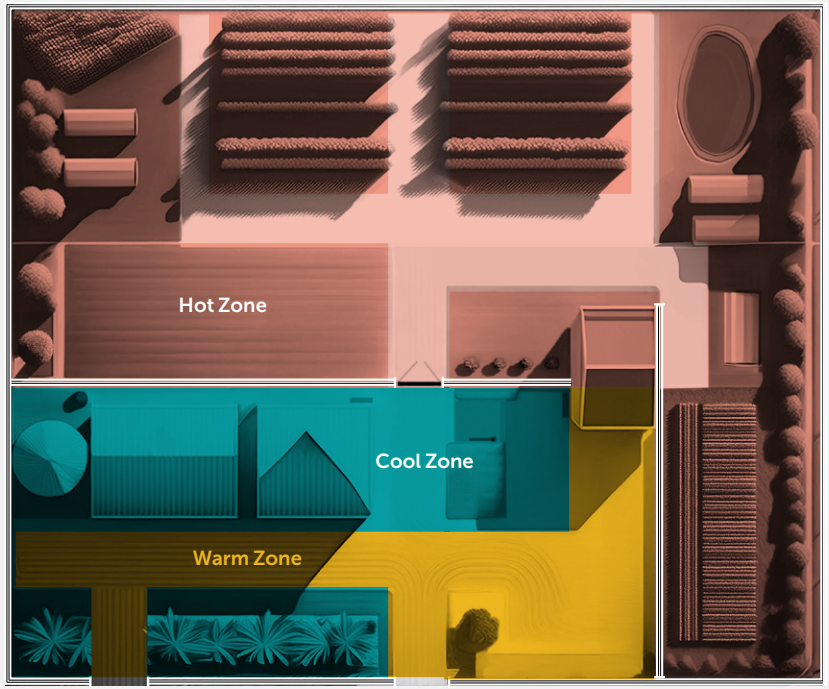


FIGURE 2: PROPERTY ZONING EXAMPLE

Resource availability and cost are key factors in determining what measures you might choose to put in place. It's best to assess all risks before proceeding to ensure that you are targeting the areas that will have highest impact/return on investment. The Farm Biosecurity self-assessment will help do that.

For more details visit farmbiosecurity.com.au/using-property-zoning-to-implement-biosecurity-on-farm.

STEP 2

IDENTIFY BIOSECURITY RISKS & MITIGATING ACTIONS

Vehicles & equipment

GOAL

To reduce the likelihood of vehicles and equipment introducing and spreading pests, diseases and weeds onto the property.

Biosecurity Practice	Example of practice and its importance	Practice in use SELECT ONE OPTION	Priority SELECT ONE OPTION	Actions INSERT EACH ACTION REQUIRED	QA systems/Service provider LIST EXISTING SYSTEMS & OR SERVICE PROVIDER
One main entry point to farm site.	A single-entry point provides an opportunity to inform visitors of procedures and keep track of who is coming onto the property.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Separate car parking from production and packing areas.	Reduces the risk of pests spreading into production areas. Visitors and staff park in designated car park and signs are in place to communicate this.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Cleaning vehicles and equipment before they leave your property minimises the spread of weed seeds, soil-borne diseases and pests.	In place at the point of entry, before vehicle/equipment can come onto the farm, including when moving between farm properties. This washes off any pests that may be carried on the vehicle/equipment.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Requirement to demonstrate vehicles have been washed down before entry.	Receipt from car wash. *Alternative to washdown station on the farm.*	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Farm gate signs displaying contact information for every-one arriving on farm and that biosecurity protocols are in place. This includes all farm visitors, contractors, and staff.	Farm biosecurity signs at each entry point to farm indicate that farm biosecurity practices are in place. Signs can also be used to direct traffic to designated areas. *See also the next point.*	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Use established vehicle paths on farm.	Limiting vehicle movement helps to reduce the risk of spreading pests/ diseases into crop areas.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		

GOAL

To ensure that people entering the farm do not bring or spread plant pests, diseases or weeds, and are aware of the farm's biosecurity requirements.

Staff & farm visitors

Biosecurity Practice	Example of practice and its importance	Practice in use SELECT ONE OPTION	Priority SELECT ONE OPTION	Actions INSERT EACH ACTION REQUIRED	QA systems/Service provider LIST EXISTING SYSTEMS & OR SERVICE PROVIDER
Visitor sign in register.	Check in app or paper visitor register to record who is coming on to the property and when they leave; this can help with tracing if a new pest/disease is found on the farm. This could include asking them if they have recently been to another farm. It is also an opportunity to communicate any farm biosecurity requirements.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Footwear cleaning stations at entry points to production areas for visitors.	This reduces the risk of pests being carried onto and around the farm. Visitors may also carry their own, or change their boots on arrival.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Footwear and tools/ equipment cleaning stations for staff.	Footbaths or sprays at entry point to different farm production areas. E.g. between blocks, and farm properties. Or make kits for staff to carry with them and use. This helps reduce the spread of pests around the farm.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Train staff in farm biosecurity practices (ideally as part of a staff induction process).	This can include some of the measures identified in this checklist such as what to do when coming and going to different parts of the farm; what to look for; how to report.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Provide staff access to tools and resources to disinfect footwear, tools and equipment so that they have what they need to implement best practices.	Provide boot brushes and spray bottles containing disinfectant so that staff can decontaminate footwear and tools between blocks. Resources to help with identification of pests/diseases and what to do if they find them.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Are there items that are not permitted to be brought onsite?	There may be items that are not permitted on site for health, safety or other QA reasons.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		

Farm inputs

GOAL

To ensure that products coming onto the farm are not carrying pests, diseases and weeds on the property.

Biosecurity Practice	Example of practice and its importance	Practice in use SELECT ONE OPTION	Priority SELECT ONE OPTION	Actions INSERT EACH ACTION REQUIRED	QA systems/Service provider LIST EXISTING SYSTEMS & OR SERVICE PROVIDER
Planting material and seeds sourced from reputable suppliers.	Source inputs from suppliers that have good biosecurity practices in place. This reduces the risk of pests being introduced through planting materials.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Planting material inspected upon arrival for plant pests, disease symptoms and weeds.	Record if planting material has pests or disease symptoms, or weeds, or if they are clean. If there are pests, contact the supplier to let them know. Report unusual sightings to the **Exotic Plant Pest hotline: 1800 084 881.** These records help with training in the event of an incursion.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Record source of inputs and when they were ordered and delivered.	Keep records of what is sourced, date of order and delivery, along with pest/disease inspection results – both presence and absence.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Composts, mulches, amendments are sourced from reputable suppliers.	Source inputs from suppliers that have good biosecurity practices in place. This reduces the risk of introducing new pests.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Records maintained for sources of other inputs.	Keep records of supplier certifications, and ingredients of inputs such as mulches and composts.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Inputs delivered and unloaded away from production area.	Inputs are unloaded away from production areas, and drainage is also directed away from production area.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Water is sourced from a clean source or treated. Drainage is away from production areas.	Water can be a source of pathogens (e.g; Pythium, Fusarium, Phytophthora). Regular testing can be conducted to determine this. Records of presence/absence of any pest should be kept.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Inputs such as composts and mulches stored away from production areas and ensure any drainage is also away from the production area.	This reduces the risk of any potential pests/ diseases/weed from entering the production area by wind or water.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		

Waste and weeds

GOAL
Reduce habitat and inoculum sources and potential for spread of pests, diseases, weeds.

Biosecurity Practice	Example of practice and its importance	Practice in use SELECT ONE OPTION	Priority SELECT ONE OPTION	Actions INSERT EACH ACTION REQUIRED	QA systems/Service provider LIST EXISTING SYSTEMS & OR SERVICE PROVIDER
Crops and weeds are monitored regularly for pests.	Regular monitoring helps identify anything unusual early on, and earlier detection means a better chance of reducing the pest impact.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Records kept about monitoring results and the control measures used, and their effectiveness.	Records will help with tracing, development of management options.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Crop waste is cleared and discarded away from product-ion areas, particularly if it is affected by pests.	Crop waste can provide a habitat where pests can build -up to provide more inoculum to infect the crop again.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Weed management is in place (including monitoring and record keeping).	Weeds can impact on crop production in their own right but can also provide a host plant for pests to live and reproduce on, which means there is more inoculum to infect the crop.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Good drainage; direct waste water away from the crop.	Draining water away from the crop means that any potential pests will not enter the production area.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		

Packaging, bins & pallets

GOAL

To ensure that production system components are clean and minimise risk of carry over and spread of pests and diseases.

Biosecurity Practice	Example of practice and its importance	Practice in use SELECT ONE OPTION	Priority SELECT ONE OPTION	Actions INSERT EACH ACTION REQUIRED	QA systems/Service provider LIST EXISTING SYSTEMS & OR SERVICE PROVIDER
Footwear cleaning stations available between different zones on the farm, and between farm properties.	Cleaning footwear between farm zones and properties reduces risk of spreading pests, diseases, and weeds across the farm.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Crates, bins, pallets etc. are washed and disinfected after use.	This reduces carry over of pests/ diseases/weed seeds from previous produce to the next harvest; if crates/bins etc. have come from another property they may carry new pests.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Clean packaging, bins, pallets are stored appropriately away from production areas.	This reduces the risk of contamination from the production area.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Tools and equipment are disinfected after use, and during use as required.	Cleaning tools/equipment between use reduces transmission or diseases and pests.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Ensure good drainage away from production areas to reduce risk of waterborne pests.	Water can be a source of plant pathogens that cause disease.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Packing shed and equipment is cleaned and disinfected on regular basis and also during breaks.	This reduces the risk of build up of pests/diseases.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Irrigation water is treated/ sanitised.	Records of presence/absence of any detection should be kept.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Best practice in own production nursery.	This reduces the risk of introducing pests into the cropping area and ensures starting with a healthy crop.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		

Weather / WIND, RAIN & EXTREME WEATHER EVENTS

GOAL
Manage risks associated with unexpected/extreme weather events.

Biosecurity Practice	Example of practice and its importance	Practice in use SELECT ONE OPTION	Priority SELECT ONE OPTION	Actions INSERT EACH ACTION REQUIRED	QA Systems LIST EXISTING IMPLEMENTED SYSTEMS
Regularly monitor and survey crops.	Regular monitoring helps identify anything unusual early on, and earlier detection means a better chance of reducing the pest impact.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Use traps to aid surveillance.	Traps can reduce labour resource requirements and can be more sensitive and detection pests. Record presence/ absence of pests.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Train staff to be aware of common and exotic plant pests	By knowing what is commonly present, staff will also be able to recognise and report anything that is unusual. This means that there is an earlier opportunity to respond to the pest.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Report usual pests.	Early reporting means that a response is also quicker to control the pest.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		
Record extreme weather events (e.g; flooding, dust storms) and follow-up with inspections on farm for new signs of weeds, diseases etc.	Weather events can present different biosecurity challenges. Understanding what these are means you can be better prepared to reduce the risk.	◯ Yes ◯ No ◯ In progress ◯ N/A	◯ Immediate ◯ Future ◯ N/A		

BIOSECURITY PLAN

PROPERTY DETAILS	
Property Name	
Location/ Address	
Production Type	

Key contact names	
Name	Name
Position	Position
Contact Number	Contact Number

STEP 1 **Map your property** ☐

STEP 2 **Identify biosecurity risks and mitigating actions** ☐

Vehicles and equipment

- ☐ Vehicle and machinery hygiene practices
- ☐ Entry of vehicles and machinery

Staff and farm visitors

- ☐ Visitors and staff
- ☐ Contractors
- ☐ Reporting
- ☐ Training
- ☐ Record keeping

Farm inputs

- ☐ Planting material and seeds
- ☐ Water
- ☐ Growing media, fertiliser and containers

Waste and weeds

- ☐ Produce
- ☐ Waste management
- ☐ Product packaging and containers

Packaging, bins and pallets

- ☐ Packaging hygiene / storing practices
- ☐ Tool and maintenance practices
- ☐ Water management

Weather

- ☐ Crop surveillance
- ☐ Report unusual pests
- ☐ Train staff on pests
- ☐ Use traps for surveillance
- ☐ Record extreme weather and inspect

BIOSECURITY PLAN

STEP 3 Prioritise ☐

Biosecurity Strategies / LIST BELOW

1
2
3
4
5
6
7

STEP 4 Implement ☐

Implementation of Biosecurity action / LIST BELOW

STEP 5 Communicate expectations ☐

Biosecurity plan HAS BEEN COMMUNICATED TO:	**Expectations** HAS BEEN COMMUNICATED TO:
○ Staff	☐ Staff
○ Contactors	☐ Contactors
○ Visitors	☐ Visitors

Notes

STEP 6 Agreement for review and update ☐

Signed Date	**Next Review Date**
Name	**Name**
Position	**Position**

PLANNING NOTES

PLANNING NOTES

AUSVEG

ausveg.com.au

For more information please contact AUSVEG
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