

MANAGING ON-FARM BIOSECURITY RISKS IN WET WEATHER EVENTS

FLOOD RISK PATHWAYS

Intense (A) or prolonged rainfall (B), and runoff and overflow from drains, rivers, creeks and dams (C^{1,2}) can create the potential for damage to crops through flooding, ponding and soil saturation (D). Impacts on existing crops can be direct and immediate where plants and soil are submerged for periods of time or washed away by fast-moving water (E). Other biosecurity and agronomic challenges may take longer to reveal themselves.

Flood waters can carry biological, chemical and physical hazards that could present biosecurity risks to your farm.

When water moves onto (F) and around your farm (G) it can carry biological, chemical and physical hazards that can contaminate production areas (H,I), water sources and processing facilities. While some of these may be a food safety risk, they can also present a biosecurity risk to your farm resulting in pest, disease and weed infestations.

Water that inundates your property can contain:

- Microbial and environmental pathogens, bacteria, viruses and parasites from agricultural, industrial, residential and sewerage treatment areas.
- Chemical contaminants from industrial, residential and agricultural sites such as chemical residues, heavy metals, toxins (e.g. blue-green algae) and petroleum products.
- Soil and sediment carrying weed propagules (e.g. seeds, spores), soil borne disease-causing pathogens, other microbes and heavy metals. Pathogens can be transferred onto crops by water splash of contaminated water and soil (J). Weed seeds and soilborne contaminants can also be transferred by mud carried on vehicles, machinery and equipment (K).

Water sources, both surface (dams & waterways) and surface water can spread biosecurity risks when contaminated water is used for irrigation, spraying or product processing.

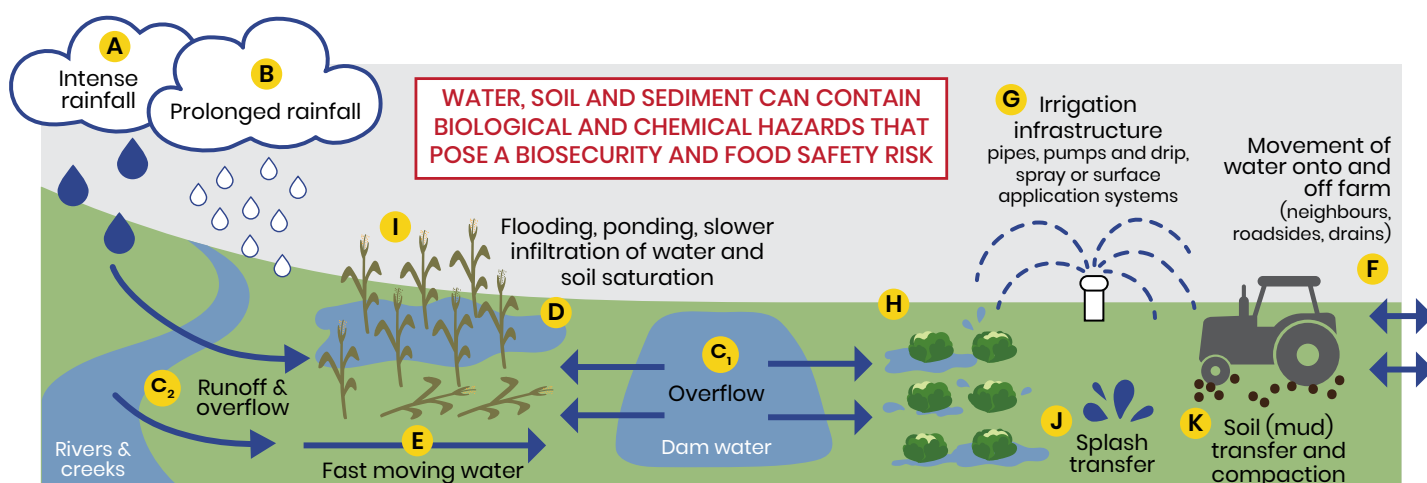


Figure 1. Water & sediment pathways can introduce biosecurity risks onto and around your farm during extreme wet weather. Letters are referenced in the main text.



PREPARING FOR EVENTS

Preparation can minimise short and long-term biosecurity risks caused by extreme wet weather events. Reducing the risks coming onto the farm is the first line of defence.

Preparation can help to ensure post-event management options can be swiftly implemented to avoid further spread of contaminants around the farm:

- Have a *Farm Biosecurity Action Plan* in place.
- Plan your farm layout and location of infrastructure to ensure local planning requirements are met, especially in relation to developments in declared flood zones.
- Identify and mark flood prone areas on a farm map and ensure all staff are aware of high-risk areas.
- Design infrastructure drainage systems to capture clean water from rainfall into storage tanks for reuse. Ensure gutters are clean and operational.
- Design drainage to direct excess surface and subsurface water from production areas.
- Manage soils to maintain good structure and promote effective drainage. Proactively avoid and address compaction.
- Ensure dam walls, drains, pipes, pumps and culverts are free of rubbish, sediment and weeds, and are operational.
- Store clean vehicles, machinery and equipment on high ground.
- Locate storage and stockpiling areas on high, ground and drain into a capture dam, especially organic composts and fertilisers. Cover if possible.
- Avoid organic material spoilage that may later harbour disease-causing-microbes and pathogens. Transport harvest and/or produce off-farm.
- Pumps are permanently housed or can be removed to avoid water and sediment inundation.
- Hot and humid conditions leading into an event will require vigilant monitoring for pest and disease issues that may be exacerbated under such conditions. Treat preventatively where possible and proactively upon detection.

POST-EVENT OPTIONS

The following managements may be considered after extreme rainfall inundations or during prolonged wet weather. Concentrate on good hygiene practices and be vigilant about monitoring to ensure early detection and management of potential biosecurity risks.

Movement of water, soil and sediment onto your farm may bring pest, disease and weeds you have not seen before on your farm. You may require assistance of your farm advisors or have plant and pest samples tested (see [Useful Resources](#) on the following page).

- Identify flood affected areas on a farm map so that all staff are aware of high-risk biosecurity areas.
- Implement hygiene practices that require footwear, tools, vehicles and machinery to be thoroughly cleaned prior to moving between affected areas on the farm, or outside the property boundary.
- Production areas should not be planted for at least 30-60 days after water recedes or when soil testing detects no harmful foodborne pathogens (Singh SP, 2023). Replanting with fresh produce (i.e., leafy vegetables) should be avoided. Crops with that will be cooked or processed are recommended at this time.
- Use as reputable laboratory (see [Useful Resources](#)) to test water sources for microbial, chemical, toxin and heavy metal contamination. The laboratory can assess surface and groundwater quality for washing of farm produce against requirements of the *Australian New Zealand Food Standards Code*, and for irrigation, against parameters of the *Water Quality for Irrigation and General Water Uses: Guidelines* (2023).
- Wash and rinse all infrastructure and equipment with built-up organic material or sediment. This includes flushing of pipes and pumps. Ensure dirty water is captured, contained and treated or disposed of appropriately.
- Regularly monitor crops and all vegetation areas for irregular plant growth and discolouration, pest and weed infestation. Flooding can cause major nutrient loss from productive soils which can be mistaken for disease symptoms. Testing or talking with advisors and neighbours will help to determine the cause.
- Stay alert for weed species that may germinate. Be vigilant around water storage and irrigation areas. Implement your integrated pest and disease management program.



Photo: istock/GomezDavid

USEFUL RESOURCES

ANZECC & ARMCANZ (2000) *Australian and New Zealand Guidelines for Fresh & Marine Water Quality* (2000), Commonwealth of Australia, Canberra.

ANZG (2023). *Water Quality for Irrigation and General Water Uses: Guidelines*. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand governments and Australian state and territory governments, Canberra.

<https://www.waterquality.gov.au/anz-guidelines/guideline-values/default/primary-industries>

Australia New Zealand Food Standards Code
<https://www.foodstandards.gov.au/food-standards-code>

AUSVEG (2021) *DIY Biosecurity, Farm Biosecurity Action Plan for the vegetable and potato industries*, Glen Iris, Victoria.

<https://ausveg.com.au/app/uploads/2017/05/Biosecurity-R-1.pdf>

AUSVEG (2021) *Pest and disease preparedness: How to protect your farm*, Glen Iris, Victoria.
https://ausveg.com.au/app/uploads/2021/12/Final-pdf-standard-pest-and-disease-preparedness_compressed.pdf

AUSVEG (2024) *Plant Disease and Insect Pest Sampling Kit Guide*, AUSVEG, Glen Iris, Victoria.

NSW Department of Primary Industries: Plant health diagnostics services (PHDS) <https://www.dpi.nsw.gov.au/about-us/services/laboratory-services/plant-health>

- Crop diagnostics
- Insect and mite identification
- Soil-borne pathogen monitoring
- Water testing

Southern Cross University: Environmental Analysis Laboratory (EAL) <https://www.scu.edu.au/environmental-analysis-laboratory---eal/>

- Plant diagnostic and nutrient testing
- Agricultural nutrient soil testing
- Compost & potting mix testing
- Water & other liquids testing
- General soils and solids testing
- Contamination testing

Singh, Sukhvinder Pal (2023), *Flooding adversely affects fresh produce safety*, *Microbiology Australia* 44(4) 185-189 <https://doi.org/10.1071/MA23054>

Exotic Plant Pest Hotline: 1800 084 881

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