



NZGAP

Environment Management System
(EMS) add-on

v1.5 August 2019



Farm Environment Plan (FEP) Template



SOIL



NUTRIENTS



IRRIGATION



WATERWAYS



BIODIVERSITY

Prepared by:	
Date:	
Review Dates:	



Overview

These templates are to be used in conjunction with the EMS Audit Checklist and Guidelines to ensure that all environmental requirements are met

Glossary:

EMS = Environment Management System

FEP = Farm Environment Plan

GMP = Good Management Practice (**Required where applicable**)

BMP = Best Management Practice (**Recommended where applicable**)

Y = Yes (already complete/implemented – provide evidence)

P = Partial (partially complete/implemented – agree and set date for completion)

N = No (not complete/implemented – agree and set target date for completion/implementation)

n/a = Not applicable (justify why n/a)

FEP process for each management area:

1. Assess the environmental risks
2. Identify GMPs (and BMPs if applicable) currently completed/implemented
3. Identify GMPs (and BMPs if applicable) yet to be completed/implemented and set target date for completion/implementation
4. Make progress towards GMP (and BMP if applicable)
5. Actions and improvement will be assessed during your next EMS audit

Relevant Guidelines: (available in “guidelines” section on NZGAP website)

- HortNZ Erosion and Sediment Control Guideline 2014
- HortNZ Code of Practice for Nutrient Management 2014
- Nutrient Management for Vegetable Crops in NZ 2019
- Fertiliser Association Code of Practice for Nutrient Management 2013
- Vegetable Washwater Discharge Code of Practice 2017
- Mahinga kai Guideline for Selwyn farmers 2018



5A Property Plan (Map): Features to be included on the property plan (i.e. map)

Ref	Map Features	Complete? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No' for GMPs. Justify if 'n/a')	Evidence (e.g. map or description)	Level
		Y	P	N	n/a				
1	Property boundaries (currently owned and leased properties)								GMP
2	Land management units (e.g. cropped areas)								GMP
3	Potential critical sources (point and area) for contaminants (e.g. erosion risk, fertiliser storage)								GMP
4	Permanent or intermittent rivers, streams, lakes, ponds, drains and wetlands								GMP
5	Riparian vegetation and barriers/fences adjacent to waterbodies								GMP
6	Any significant areas as defined by the local authority (e.g. significant indigenous biodiversity areas, cultural landscape values management area)								GMP
7	The location of any spring heads, wetlands or spring-fed streams have been identified where required by the local authority								GMP
8	Soil maps and/or descriptions								GMP
9	Flow path of surface water entering and leaving each block/paddock (on cultivated land)								GMP
10	Environmental actions/mitigations								<u>BMP</u>
11	Other features (please specify):								<u>BMP</u>

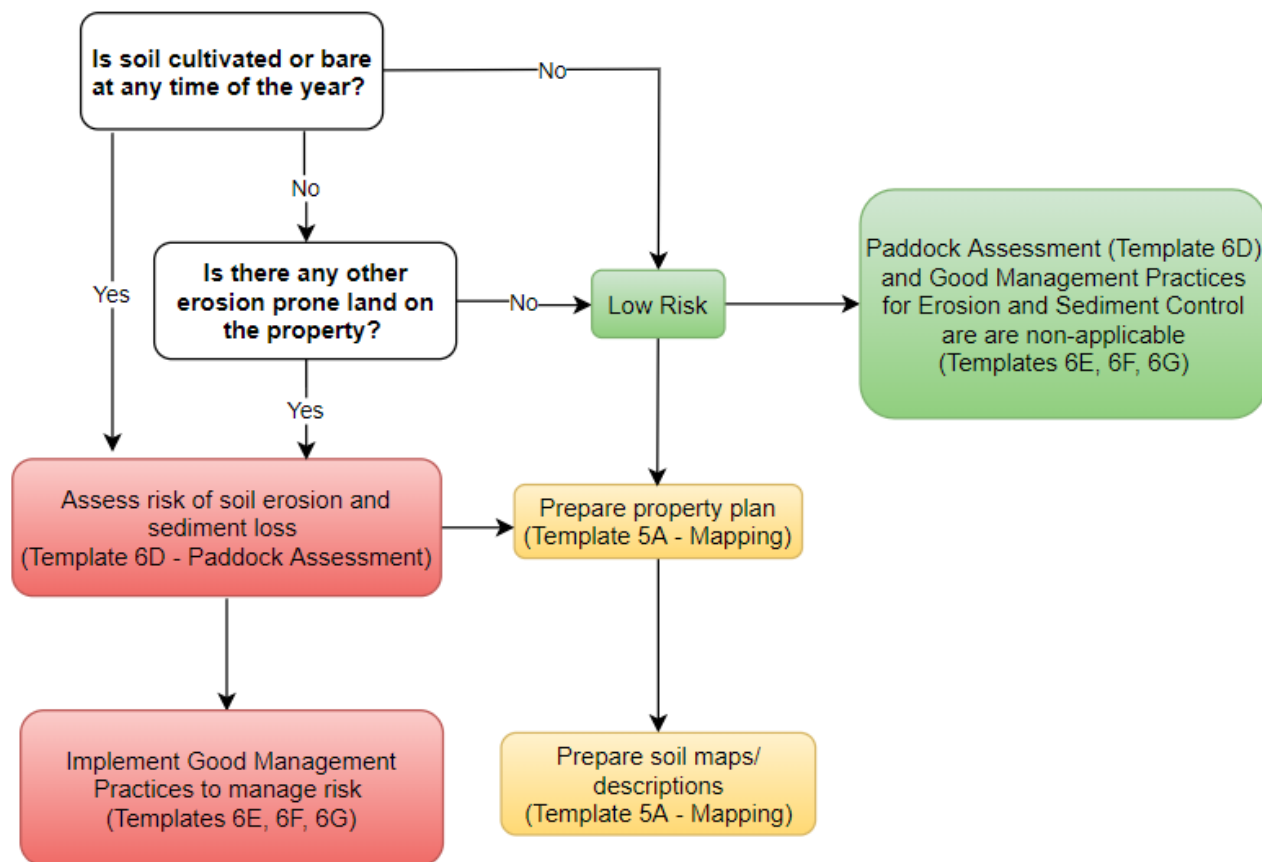
6A SOIL: Soil Quality, Health and Fertility – Assessment

Ref	Good/Best Management Practices	Complete? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	Soil type, structure, texture and profile is assessed								GMP
2	Soil drainage is assessed (poor/moderate/well drained)								GMP
3	Soil nutrient testing is conducted on each paddock every 3 – 5 years (Nitrogen, phosphorus, magnesium, potassium)								GMP
4	Soil testing is completed using a uniform or representative collection pattern (e.g. 'W' pattern)								GMP
5	Soil testing is conducted on each paddock every year when a crop is going to be planted								<u>BMP</u>
6	Soil testing is conducted every year based on GPS mapping								<u>BMP</u>
7	N-Quick test and tool is used to inform decisions on nitrogen applications								<u>BMP</u>
8	Deep N tests are taken to determine the level of residual N that remains in the soil								<u>BMP</u>
9	Soil is assessed for compaction (e.g. using a penetrometer)								<u>BMP</u>
10	Soil pH is monitored								<u>BMP</u>
11	Soil Organic Matter (OM) is monitored								<u>BMP</u>
12	Soil biological activity is monitored								<u>BMP</u>
13	Other (specify):								<u>BMP</u>

6B SOIL: Soil Health and Fertility – Control Measures and Action Plan

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	Choose appropriate crops (<i>for soil, climate, disease, and maximum uptake of nutrients from previous crop</i>)								GMP
2	Use cover crops to enhance soil structure and organic matter, plus absorb excess nutrients								GMP
3	Incorporate crop residues where possible								GMP
4	Cultivate soil when conditions appropriate								GMP
5	Minimise soil tillage as much as practicable								GMP
6	Minimise fallow periods between crops								GMP
7	Use crop rotation								GMP
8	Retire or actively manage marginal land to ensure soil conservation measures are in place								GMP
9	Use controlled trafficking								<u>BMP</u>
10	Adopt new technologies <i>e.g.</i> use of sub-soil aerator will allow roots deeper into soil								<u>BMP</u>
11	Other (specify):								<u>BMP</u>

6C SOIL: Risk of soil erosion and sediment loss – *Property Assessment*



6D. SOIL: Risk of soil erosion and sediment loss – *Paddock Assessment (for cultivated and bare soils)*

Paddocks assessed (names/IDs):									
Description of property slope:		(Note: <1 degree = Low erosion risk, >1 degree = Medium/High erosion risk)							
Ref	Good Management Practices (for individual paddock or summary of all paddocks)	Complete? (Yes, Partial, No, n/a)				Date to be completed (if 'Partial' or 'No')	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence (e.g. map or description)	Level
		Y	P	N	n/a				
1	Identify site specific risks of this paddock (e.g. soil type, slope, proximity to waterways, critical source areas)								GMP
2	Describe paddock management risks (e.g. paddock use, previous use, crop type, crop coverage, cultivation technique)								GMP
3	Assess the risk of soil erosion prior to carrying out all field operations								GMP
4	Identify where surface water is entering paddocks (map or description)								GMP
5	Identify where surface water leaves paddocks (map or description)								GMP
Baseline / Unmitigated Risk Level (i.e. without any GMPs in place):		High / Medium / Low							
Risk Level with current practices in place (Template 6E, 6F, 6G):		High / Medium / Low							
Risk level with GMP in place (Template 6E, 6F, 6G, 10):		High / Medium / Low							
Other identified risks:									



6E. SOIL: Soil erosion and sediment loss - *Implement and maintain measures for stopping or controlling surface water entering the paddock (for cultivated and bare soils)*

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	Interception drains								GMP
2	Correctly sized culverts								GMP
3	Benched headlands								GMP
4	Bunds								GMP
5	Grassed swales (control overland flow through the paddock)								GMP
6	Other (specify):								<u>BMP</u>

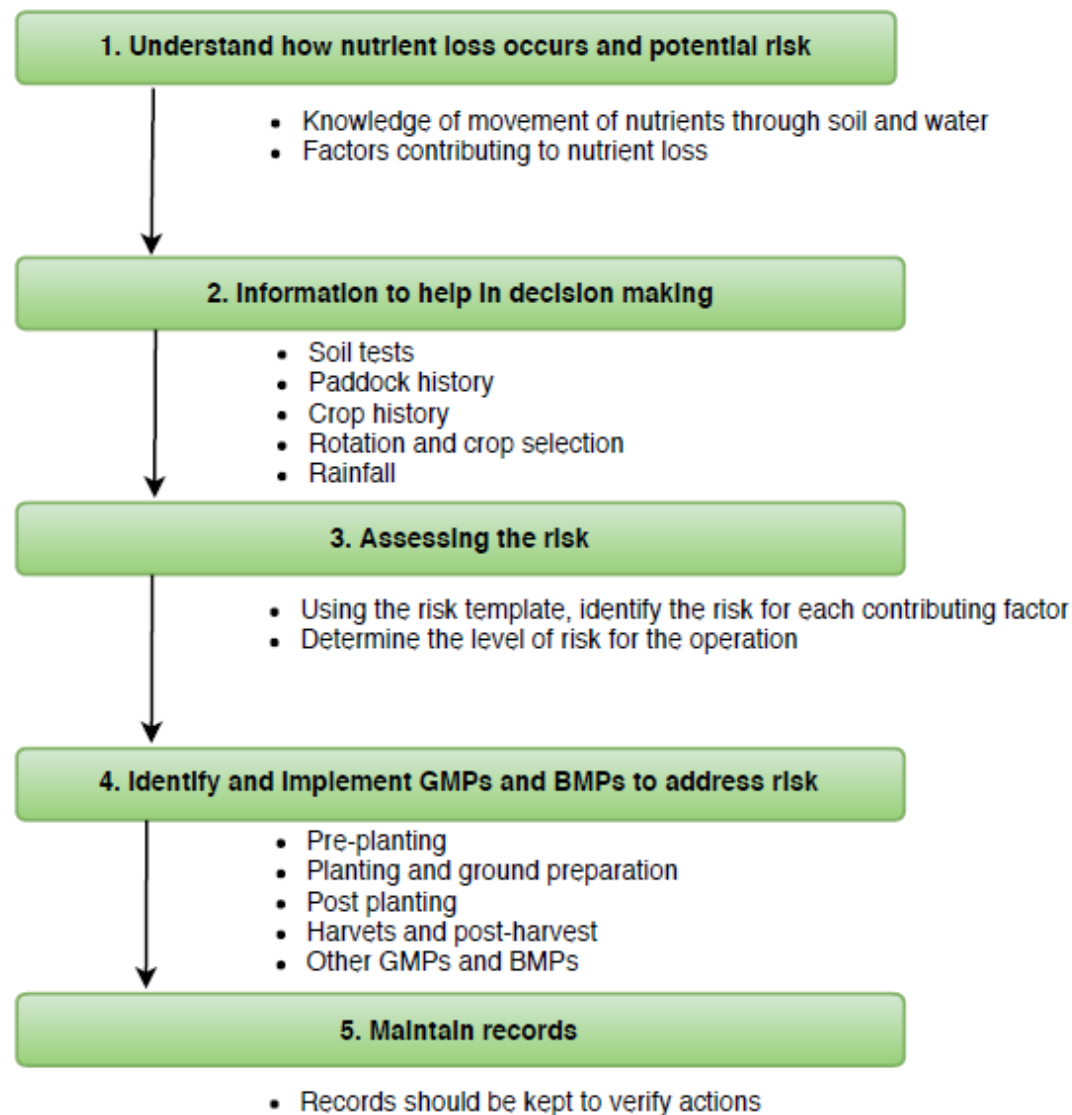
6F. SOIL: Soil erosion and sediment loss - *Implement and maintain erosion control measures to reduce or minimise the risk of soil erosion (for cultivated and bare soils)*

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	Minimise cultivation passes								GMP
2	Break crops / shelter belts (wind erosion)								GMP
3	Using short row lengths (>1 degree slope) (<200m recommended)								GMP
4	Cover crops / break crops (>1 degree slope)								GMP
5	Wheel track ripping / Wheel track dyking (>1 degree slope)								GMP
6	Contour drains (>1 degree slope)								GMP
7	Other (specify):								<u>BMP</u>

6G. SOIL: Soil erosion and sediment loss – *Implement and maintain sediment control measures to manage the water and suspended solids that move off the paddock (for cultivated and bare soils)*

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	Access ways are <u>not</u> at the lowest point of the paddock								GMP
2	Raised access ways / Bunds								GMP
3	Vegetated buffers / Riparian margins / Hedges								GMP
4	Super silt fences								GMP
5	Stabilised drains and discharge points								GMP
6	Decanting earth bunds								GMP
7	Sediment retention ponds								GMP
8	Other (specify):								<u>BMP</u>

7A. NUTRIENTS: Process for addressing risks of Nutrient Loss



7B. NUTRIENTS: Assessing the risk of Nutrient Loss

Ref	Contributing factor	Assessing extent of risk	Level of risk (Low, Med, High)
1	Soil moisture	Applications of N when soils that are saturated - high risk. Applications when soils are not saturated – lower risk <i>Note: It is important to assess the soil moisture status before an application to ensure that the potential for leaching is minimised. Use of foliar applications can reduce the risk</i>	
2	Irrigation	Use of irrigation – high risk <i>Note: Risk can be reduced by ensuring that irrigation is used to maintain soil moisture at target levels and applications of N timed accordingly.</i>	
3	Soil type	Light soils – High risk. Medium soils – Medium risk. Heavy soils – Low risk	
4	Paddock history	Quantities of N applied not based on fertiliser recommendations or assessment of crop residues – high risk. Applications take into account fertiliser recommendations and crop residues to ensure that appropriate levels of N are applied - lower risk	
5	Previous crop planted and residual N in the soil	High residue crop – high risk. Crop failure or lower than anticipated yield – high risk Removal of previous residue – lower risk	
6	Crops being grown	Shallow root vegetables – higher risk	
7	Crop yield and quality	Nitrogen is used to achieve desired yield and quality. Inappropriate or excessive use can create quality issues and increase the risk of leaching – high	
8	Intensity of cropping	Repeated cropping – higher risk	
9	Topography	Sloped ground – higher risk of run off	
10	Plant uptake of nitrogen	Low plant uptake - high risk High plant uptake - lower risk <i>Note: There are a range of factors that contribute to the plant uptake of nitrogen and hence reduce the N in the soil able to be leached – e.g time of years, growth stage, type and form of nitrogen, rooting depth. The combination of factors need to be assessed to determine uptake for each crop.</i>	
11	Timing of nitrogen application	High level of base dressing at planting – high risk Applications split and matched to crop needs – lower risk	
12	Fertiliser application methods	Broadcast application – higher risk Application only to the row – reduced risk . Foliar applications – low risk	
13	Applications of organic manures	Organic manures applied; but not taken into account for N balance – High risk, Taken into account for N balance – Lower risk	
14	Pest and disease	Crop failure or lower than anticipated yield due to pest and disease – high risk	
15	Animals in the rotation	Animals included in the rotation – higher risk. No animals – lower risk	
16	Ground preparation and planting methods	Direct drilling and reduced tillage – lower risk Presence of fines post cultivation – higher risk	
17	Compaction	Compacted soil will prevent roots being able to penetrate and access nitrogen. Compacted soil presents a higher risk.	
Baseline / Unmitigated Risk Level (i.e. without any GMPs in place):		High / Medium / Low	
Risk Level with current practices in place (Template 7C):		High / Medium / Low	
Risk level with GMP in place (Template 7C):		High / Medium / Low	
Other identified risks:			

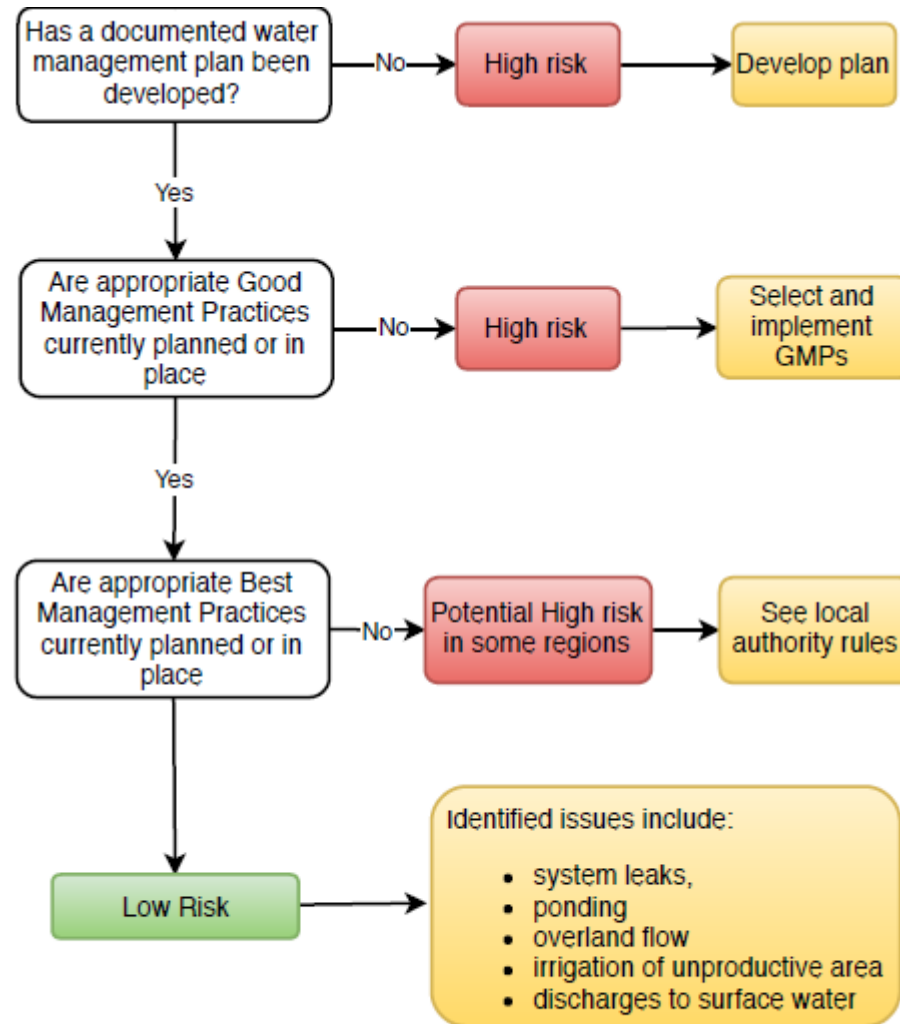
7C. NUTRIENTS: *Implement measures to improve nutrient uptake and minimise nutrient loss*

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
Pre-planting									
1	Plan fertiliser inputs for the crop								GMP
2	Take into account any organic manures used								GMP
3	Take into account any animals in the rotation								GMP
4	Manage applications of nutrients taking into account rainfall, field capacity and soil saturation levels								GMP
5	Obtain advise from a nutrient advisor or agronomist								<u>BMP</u>
Planting									
6	Nutrient applications are informed by available information or fertiliser recommendations								GMP
7	Fertiliser applications are applied relative to the predicted uptake levels of the plant from planting to maturity								GMP
8	Improved fertiliser technology is used where appropriate (e.g. prills/coatings)								<u>BMP</u>
9	Controlled traffic farming technology is used to increase application efficiency								<u>BMP</u>
10	Crop calculators are used if available and practical for local conditions								<u>BMP</u>
11	Other (specify):								<u>BMP</u>

7C. NUTRIENTS (Continued): Implement measures to improve nutrient uptake and minimise nutrient loss

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
Post-planting									
12	Side dressings are used								GMP
13	Operators follow instructions for application, including avoiding spreading into water bodies								GMP
14	GPS is used to monitor operator performance								<u>BMP</u>
15	Nutrient levels are managed (and informed by soil tests) according to rainfall / irrigation, and will match likely yield and quality goals								<u>BMP</u>
16	Leaf tests are conducted								<u>BMP</u>
Harvest/Post-harvest									
17	As much harvestable crop as possible is removed								GMP
18	Crop residues are incorporated where possible								GMP
Other:									
19	Spreadmark accredited contractors are used								<u>BMP</u>
20	AIRCARE™ accredited aerial operators are used if applicable								<u>BMP</u>
21	Machinery is upgraded to be more efficient/accurate								<u>BMP</u>
22	Other (specify):								<u>BMP</u>

8A. WATER and IRRIGATION: Assessing the environmental risk of water use



8B. WATER and IRRIGATION: Water use – *Implement measures to improve water use efficiency and minimise risk of nutrient loss*

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
Pre-planting									
1	Plan irrigation requirements								GMP
2	Develop long-term irrigation plan								GMP
Post-planting									
3	Volumes applied informed by relevant factors (e.g. Plant growth phase / soil type / water holding capacity and climatic conditions)								GMP
4	Water is applied to maintain soil moisture between the wilting point and field capacity where possible								GMP
5	Irrigation applied allows achievement of the yield target for fertiliser applied								GMP
6	Irrigation efficiency is measurable at greater than 80% (>80% of irrigation water is retained in root zone / target area)								<u>BMP</u>
7	Water use is metered								<u>BMP</u>
8	Irrigation scheduling is undertaken using a crop model or tied into a soil moisture monitoring system								<u>BMP</u>
9	On site soil moisture monitoring is conducted								<u>BMP</u>
10	Irrigation is variably applied within the paddock to maximise efficiency								<u>BMP</u>
11	Highly automated irrigation systems that allow more frequent applications of less water are used to maximise efficiency								<u>BMP</u>
Other:									
12	Non-irrigation water is used efficiently (e.g. wash water)								GMP
13	Other (specify)								<u>BMP</u>

9A MAHINGA KAI and BIODIVERSITY: Assessment

(Checklist question 9.4) Mahinga kai species largely relate to indigenous plant, bird and fish species and their ecosystems and habitats. Mahinga kai includes things such as species, natural habitats, materials and practices used for harvesting food, and places where food or resources are, or were, gathered. This includes:

- All waterways, drains (with water), wetlands, and springs
- Native vegetation and riparian areas
- Areas with specific mahinga kai species and their habitats.

Ref	Mahinga kai and biodiversity assessment	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	On-farm mahinga kai values have been identified (e.g. map of native vegetation, waterways, wetlands)								GMP
2	Any key risks to mahinga kai have been identified (e.g. clearance of vegetation, drain maintenance)								GMP
3	Ways to enhance on-farm biodiversity have been identified								GMP
4	Other (specify):								<u>BMP</u>

9A MAHINGA KAI and BIODIVERSITY: Implement measures to protect and enhance Mahinga kai values and biodiversity

Ref	Mahinga kai and biodiversity assessment	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	Mahinga kai values are considered when implementing other environmental actions (e.g. erosion and sediment control, riparian areas)								GMP
2	Native vegetation and/or habitats are protected								GMP
3	Waterway, drain management and vegetation clearance is carried out following good management practice								GMP
4	Planting of native vegetation in shelterbelts or riparian areas								<u>BMP</u>
5	Constructed wetlands developed for treating contaminants (e.g. nutrient run-off) to promote biodiversity and enhance mahinga kai values								<u>BMP</u>
6	Pests are managed according to local authority rules								<u>BMP</u>
7	Other (specify): (e.g. Local council requirements)								<u>BMP</u>

10A ENVIRONMENTAL ACTION PLAN: Other Actions

[illegible]