Sugarcane Water Quality Risk Framework 2017-2022

Soil management (weighting)	**Relative water quality risk**			
	Lowest risk (A)	**Moderate – Low risk (B)**	**Moderate risk (C)**	**High risk (D)**
	Innovative	Best practice	Minimum standard	**Superseded**
Crop residue cover (40%)	Cane trash blanket is retained, including as fallow cover after final ratoon.		Cane trash blanket is retained on ratoons.	Cane trash blanket is not retained.
Controlled machinery traffic (20%)	Less than 36% of the field is trafficked by machinery every year.		Between 37% and 60% of the field is trafficked by machinery every year.	At least 60% of field is trafficked by machinery every year.
	All machinery wheel spacings matched to row spacing for all operations including harvesters and haul-outs. GPS guidance is used for **all** field operations, **including** harvesters and haul-outs.	All machinery wheel spacings matched to row spacing for all operations including harvesters and haul-outs. GPS guidance is used for all operations **except** harvesters and haul-outs.	Most machinery operates on the same wheel spacing and is matched to row spacing. Harvesters and haul-outs are on different wheel spacings.	Machinery operates on different wheel spacings.
Land management during sugarcane fallow (20%)	Legume or cover crops are planted on **all** fallow land, without tillage. Crop residues are maintained.	Legume or cover crops grown on **all** fallow land, and crop residues are maintained.	Soil cover maintained during the fallow phase. Trash blanket and sprayed cane or growth of a legume/cover crop **when opportunity arises.** Weeds are controlled with knockdown herbicides.	Bare fallow or no fallow.
Preparing land for planting (20%)	Minimum tillage.	Zonal tillage only, less than 60% of area is cultivated.	Up to 5 passes of tillage equipment.	Six or more passes of tillage equipment.
	Plant cane is established after fallow using 1 tillage operation or less.	Zonal tillage after a fallow or break crop. Only the row area is cultivated, inter-rows are left uncultivated.	Plant cane is established after a fallow using zonal tillage or the minimum number of passes required for soil and conditions.	All plant cane blocks are prepared with a fine tilth.

Nutrient management (weighting)	**Relative water quality risk**			
	Lowest risk (A)	**Moderate – Low risk (B)**	**Moderate risk (C)**	**High risk (D)**
	Innovative	Best practice	Minimum standard	**Superseded**
Matching nitrogen (N) supply to crop nitrogen requirements (70%)	Six Easy Steps Nutrient Management program is employed, which includes developing a whole farm nutrient management plan. Nutrient management plans include consideration of yield history and trends in order to estimate optimal amounts of nitrogen required for each major soil type and/or management zone.		Nitrogen fertiliser rate for each plant crop and its subsequent ratoons are derived from soil tests and the Six Easy Steps method. Rates are based on district yield potential with adjustments made according to the soil N mineralisation index (based on organic carbon percentage). Deductions are made for other significant sources of N including from irrigation water, mill mud and legumes.	N fertiliser rate typically exceeds the Six Easy Steps baseline application rate. Non-compliant with regulated method for calculating optimum N rate.
Matching phosphorus (P) supply to crop P requirements (15%)	P fertiliser requirements are determined through soil testing and consideration of extractable phosphorus and the P buffer index. P is not applied unless testing indicates it is necessary.		Phosphorus is regularly or routinely applied as part of plant or ratoon cane blends.	
Application of mill mud or mud/ash (15%)	Do not apply mill mud or ash. OR Mill Mud/ash is deep banded at <50 wet tonnes per hectare.	Mill mud is not applied where soil testing indicates P levels are adequate. Mill mud/ash is applied in a band over the crop row at <70 wet tonnes per hectare.	Broadcast application at rates up to 100 wet tonnes per hectare. For fallow applications, mill mud/ash is incorporated soon after application.	Broadcast application at rates over 100 wet tonnes per hectare.

Pesticide management (weighting)	**Relative water quality risk**			
	Lowest risk (A)	**Moderate – Low risk (B)**	**Moderate risk (C)**	**High risk (D)**
	Innovative	Best practice	Minimum standard	**Superseded**
Use of residual herbicides in ratoons (30%)	Do not use residual herbicides in ratoons.	Overall strategy based on use of knockdown products only in ratoons. Residual herbicide use in ratoons only occurs as strategic response to problem situations.	Residual herbicides are routinely used in ratoon crops, both in response to known weed problems and as a preventative measure.	
Targeting herbicide application (30%)	Residual herbicides are applied in a directed band over the row only. Inter-row spaces are managed with knockdown herbicides. AND Precise weed mapping informs zonal residual herbicide applications. Application occurs only where weed pressure is expected.	Residual herbicides are applied in a directed band over the row only. Inter-row spaces are managed with knockdown herbicides.	Residual herbicides are applied through 100% coverage with conventional boomspray.	
Timing of application (20%)	Residual herbicides are applied more than 3 weeks prior to significant runoff event.		Residual herbicides applied as soon as practical after harvest, with due consideration to current weather conditions and 4 day rainfall forecast.	
Pesticide selection (10%)	Pesticide choice is informed by assessment of control efficacy AND environmental risk, with lower toxicity products selected wherever feasible. Product choice considers the amount of active ingredient applied, its relative toxicity, half-life, solubility, and soil adsorption properties and their interaction with the soils on the farm.		Pesticide product choice is based on efficacy and cost effectiveness of control.	

Pesticide management (weighting)	**Relative water quality risk**			
	Lowest risk (A)	**Moderate – Low risk (B)**	**Moderate risk (C)**	**High risk (D)**
	Innovative	Best practice	Minimum standard	**Superseded**
Managing canegrub (10%)	Control of canegrub is based on monitoring plant damage and risk assessments of likely pressure. An integrated pest management approach and participation in a district monitoring program informs grub management plans. No more than one application per crop cycle unless monitoring indicates economic thresholds are likely to be exceeded. For liquid formulations, coulter slots are completely closed or covered in.		Control of canegrub is based on monitoring plant damage and risk assessments of likely pressure. No more than one application per crop cycle unless monitoring indicates economic thresholds are likely to be exceeded. For liquid formulations, coulter slots are completely closed or covered in.	Insecticides are routinely applied to plant or ratoon crops. Often more than one application to a block over a crop cycle.

Irrigation management (weighting)	**Relative water quality risk**			
	Lowest risk (A)	**Moderate – Low risk (B)**	**Moderate risk (C)**	**High risk (D)**
	Innovative	Best practice	Minimum standard	**Superseded**
Calculating the timing of irrigation (20%)	Irrigation schedule is informed by the use of in-field indicator tools in the *majority* of blocks, and the use of crop growth models to optimise timing.	Irrigation schedule is informed by in-field indicator tools such as gypsum blocks, mini pans or capacitance probes in the *majority* of blocks.	Irrigation schedule is informed by in-field indicator tools such as gypsum blocks, mini pans or capacitance probes in *some* blocks.	Irrigation scheduled on a set cycle.
Calculating the volume of irrigation to apply (35%)	Irrigation applications aim to replace a measured or modelled soil water deficit.		Efforts made to adjust irrigation volume to match estimated crop water requirement at the time.	Fixed cycle and/or fixed duration irrigation events.
Minimising irrigation losses (20%)	Irrigation monitored closely (manual or with in-field advance sensors) and furrows are turned off as they reach completion. Inflow rates are increased in remaining furrows to ensure all/majority of furrows get through.		Irrigation sets are allowed to run until all/majority of furrows are completed.	
Irrigation tailwater capture and re-use (25%)	No irrigation tailwater leaves the farm (tailwater from 100% of farm area is captured). Storages are equipped with adequate pumping capacity and captured tailwater is rapidly re-used in the short term (days/weeks).		The majority of irrigation tailwater is retained on-farm (tailwater from 50-90% of farm is captured).	The majority of irrigation tailwater is not retained on-farm (less than 50% of farm area is captured).
Production indicator: Estimated Crop Water Use Efficiency CWUE = TCH /(gross irrigation + effective* rainfall) – not included in calculations *Assumes 450mm average effective rainfall*	More than 9 tonnes of cane per megalitre per hectare.	7-9 tonnes of cane per megalitre per hectare.	5-7 tonnes of cane per megalitre per hectare.	Less than 5 tonnes of cane per megalitre per hectare.