

AMURI IRRIGATION CO

AIC's ENVIRONMENTAL COLLECTIVE

How, What, Where and When



Why, What, How, Where & When


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- **Why are we doing this?** The legal context;
- **What are we doing?** AIC's Environmental Collective;
- **How are we doing it?** ASM, Nutrient Budgets, FEPs & FEP Auditing;
- **Where are we doing it?** The spatial context; and
- **When will it be done?** Progress to date.




Why?

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- Rule 10.1 HWRRP and AIC's irrigation consent (2015) sets the legal basis for AIC's engagement with farmers in relation to GMP.
 - AIC prepared an Irrigation Scheme Management Plan (Rule 10.1 (a) (iii)) which also meets AIC's consent conditions.
 - Schedule 2 of the HWRRP defines the content of an ISMP.
 - ECan approved AIC's ISMP in 2014/15 and reviewed 2016/17.
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What are we doing?

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- Established an Environmental Collective with a membership of both AIC shareholders (consented) and non-shareholders (permitted).
 - Members must adhere to the requirements of the ISMP.
 - Must have an acceptable FEP in place within 6 months of joining Collective.
 - All FEPs will be audited and re-audited to the standards set out in ECan's Certified FEP Auditor Manual.
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How are we doing it? AMURI IRRIGATION CO

- ZIP identified Audited Self Management (ASM) processes as essential for delivering GMP for water quality.
- ISMP objectives delivered by the Governance Structure of the Environmental Collective.
- AIC runs the Collective and it is directed by a Committee of member farmers. It is not run by ECan and individual results are not reported to ECan.
- Environmental Collective is audited by an external body in accordance with principles of ISO9001 and 14001 Quality and Environmental Management Systems.
- First external audit completed November 2016 by Irricon Resource Solutions.
- Annual summary report, includes summary results of FEP Audits and external systems audit.

How are we doing it? AMURI IRRIGATION CO

Farm Environment Plans (FEPs) are the principle mechanism for the delivery of the ISMP objectives.

A FEP is a tool for farmers to:

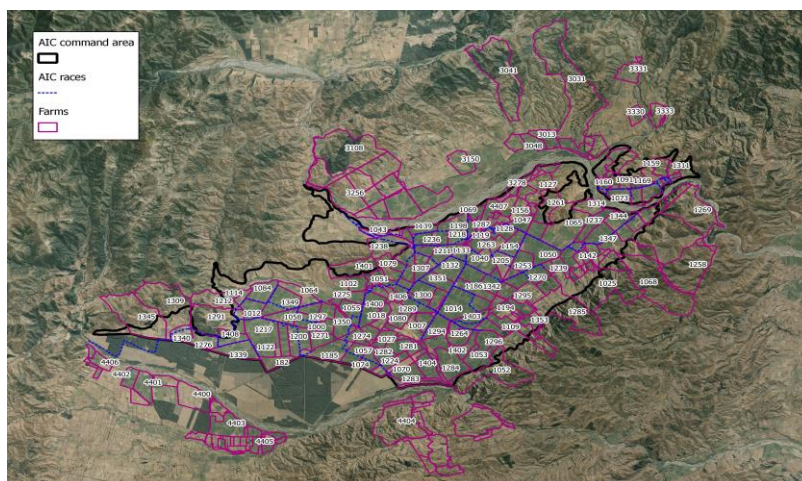
- Recognise key on-farm environmental risks that relate to water quality and can influence biodiversity; and
- Set out a programme to manage those risks through the implementation of Good Management Practice (GMP).

How are we doing it? AMURI IRRIGATION CO

FEP Audits:

- Evaluate the appropriateness of the FEP;
- Confirm the progress with delivery of actions;
- Assess the level of confidence that the GMP standards are being met or are on target to being met as either high, medium or low confidence for six management areas; and
- Using the confidence levels for the six management areas, grade the farm 'A' to 'D'.

Where are we doing it? AMURI IRRIGATION CO



When will it be done? AMURI IRRIGATION CO

Collective Membership: 157 farms, 137 shareholder, 20 non-shareholder.

All farms with FEPs by mid-2017 – 88% in place now. 19 FEPs for new shareholders or non-shareholders being prepared.

Two rounds of first audits completed: 53 in 2015/16 and 38 in 2016/17. Of the remaining 66 most will have first audit by mid-2018.

12 Second audits for first round of C and D grade completed 2016/17.

Planning about 120 audits 2017/18 and similar number 2018/19.

Key Points AMURI IRRIGATION CO

- AIC's Environmental Collective has been designed to meet requirements of Rule 10.1 and Schedule 2 of HWRRP and AIC's resource consent conditions.
- ECan approved ISMP sets out the rules, objectives, governance and non-compliance procedure for the Collective.
- It is an ASM scheme with the aim of getting members to GMP or better.
- The majority of larger irrigators in the Amuri Basin (both AIC shareholders and independents) are members.
- Well on track to implement FEPs and FEP Audits according targets set out in ISMP and to standards laid down by ECan.
- First Quality and Environmental Systems Audit and annual summary report completed.

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GOOD MANAGEMENT PRACTICE (GMP)

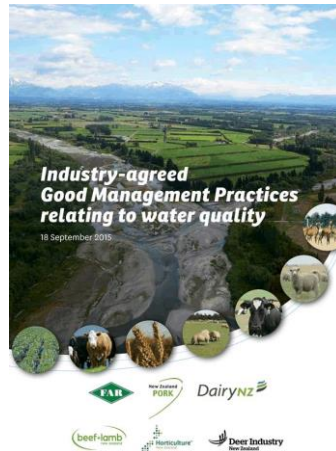
*WHAT DOES IT MEAN FOR FARMERS IN THE AIC
ENVIRONMENTAL COLLECTIVE?*

Aims

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- What is GMP and how are standards are defined?
- How have these have been interpreted and used to improve performance on-farm through FEPs and FEP Audits?
- More than just a number – it is a process of continual learning and improvement.
- HWRRP model is different to LWRP model.

Industry Agreed GMP



Six Management Areas AMURI IRRIGATION CO

These are defined in Table 3 of ISMP:

- **Irrigation;**
- **Nutrients;**
- Collected Animal Effluent;
- Waterways and Riparian;
- Soils; and
- Hotspots (not an industry agreed standard).



Table 3 Irrigation Management GMP

Industry Agreed GMP	AIC EMS:			Commentary and Specific Management Area (MA) Risks or Expected Outcomes
	Overall Objective	Outcome on farm	FEP / FEP Audit Targets	
<p>Manage the amount and timing of irrigation inputs to meet plant demands and minimise risks of leaching and runoff.</p> <p>Design, calibrate and operate irrigation systems to minimise the amount of water needed to meet production objectives.</p> <p>Maintain accurate and auditable records of annual farm inputs, outputs and management practices.</p>	<p>At least 80% application efficiency, meaning 80% of water delivered to the farm is stored in the crop root zone.</p>	<p>Efficient use of irrigation water, reducing risks of leaching, ponding and surface run-off, to avoid losses of nutrients, sediment and faecal contamination to water.</p>	<p>T1: New irrigation systems are designed and installed in accordance with industry best practice standards.</p> <p>T2: The farm's irrigation system is capable of meeting the 80% target.</p> <p>T3: Irrigation systems are calibrated, maintained and operated to meet optimum performance for that particular system.</p> <p>T4: All irrigation applications (scheduling) are justified by objective monitoring of crop needs and /or soil moisture status.</p> <p>T5: Staff involved in the operation of irrigation systems are suitably trained, and keep accurate and auditable records.</p>	<p>MA1: While some operators with more sophisticated spray systems will be able to meet the target relatively easily others will need to undertake investment in new equipment which will need to be planned and budgeted for over a longer period. Achieving the 80% efficiency target for the scheme will therefore need to be achieved progressively.</p> <p>MA2: The scheme piping upgrade will greatly accelerate the conversion of the last remaining borderdyke to spray irrigation and it is expected that by 2019 the three irrigation schemes operated by AIC will be all spray irrigation.</p> <p>MA4: Irrigation on sloping land is associated with potential run-off risks and this needs to be considered in FEPs.</p> <p>MA3: Not applicable.</p>

Irrigation Efficiency

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- Very difficult to measure objectively on farm.
- We can't say this farm is X% efficient with certainty.
- ***But, it is more than just the number***, it is about engagement with the farmer and helping the farmer understand irrigation efficiency and the benefits for his business and the environment.
- A series of Targets, on-farm evaluation and discussions with the farmer to indicate if the farm is likely to be 80% efficient.
- AIC looking at how piping of the scheme and detailed measurement of water use can be used to provide a more objective measure to ***complement*** this approach.

Irrigation Targets

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- T1: New irrigation systems are designed and installed in accordance with industry best practice standards.
- T2: The farm's irrigation system is capable of meeting the 80% target.
- T3: Irrigation systems are calibrated, maintained and operated to meet optimum performance for that particular system.
- T4: All irrigation applications (scheduling) are justified by objective monitoring of crop needs and /or soil moisture status.
- T5: Staff involved in the operation of irrigation systems are suitably trained, and keep accurate and auditable records.

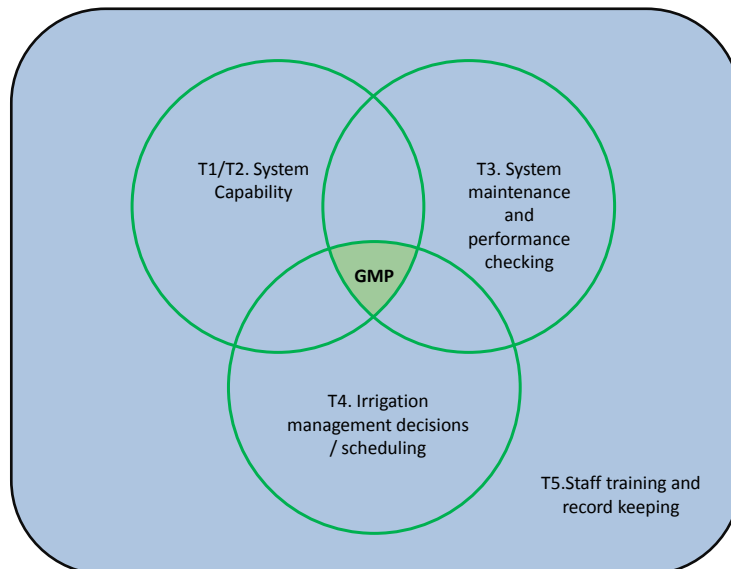


Table 3 Nutrient Management GMP

Nutrients GMP	Overall Objective	Outcome on farm	FEP / FEP Audit Targets	Commentary and Specific Management Area (MA) Risks or Expected Outcomes
<p>Manage the amount and timing of fertiliser inputs, taking account of all sources of nutrients, to match plant requirements and minimise risk of losses.</p> <p>Store and load fertiliser to minimise risk of spillage, leaching and loss into water bodies.</p> <p>Equipment for spreading fertilisers is well maintained and calibrated.</p> <p>Monitor soil phosphorous levels and maintain them at or below the agronomic optimum for the farm system.</p> <p>Maintain accurate and auditable records of annual farm inputs, outputs and practices.</p>	<p>Maximising the efficient use of nutrients, from all sources, for plant growth while minimising the losses of nitrogen and phosphorous to water.</p>	<p>Nutrient loss to waterways will be reduced.</p> <p>Industry benchmarks for nitrogen and phosphorous loss rates will be achieved or bettered.</p>	<p>T1: Nitrogen losses are at or below GMP loss rates for the property.</p> <p>T2: Phosphorous and sediment losses from farming activities are minimised.</p> <p>T3: The amount and rate of fertiliser applied does not exceed crop requirements and takes account of the availability of nutrients from all sources.</p>	<p>Achieving this objective will require farmers to have the skills and tools to understand nutrient flows on the farm and identify practices that lead to inefficiencies and losses. 'Overseer' generated nutrient budget reports will be required for all farms and will be used as a tool to help achieve more efficient use and management of nutrients.</p> <p>When reliable benchmarking tools are available, the ECan GMP nutrient management portal, these will be used to help farmers achieve or better GMP loss rates for nitrogen. Where losses are more than benchmark standards then farmers would need to identify how nutrient losses will be reduced to meet or better the industry standard within an agreed timeframe.</p> <p>MA3 and 4: Sloping land brings particular run-off risks and associated loss of sediment and P to waterways. This needs to be carefully considered in FEPs.</p>

T1: GMP N Loss

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T1: Nitrogen losses are at or below GMP loss rates for the property. But:

- HWRRP does not require use of a MGM Portal N loss figure to determine GMP.
- T1 is determined by analysis of an Overseer nutrient budget for the property.
- The emphasis is not on a comparison of two whole farm N loss figures – Overseer vs. Portal to determine if the farm is at GMP or not.

T1: More than Just a Number AMURI IRRIGATION CO


T1 is assessed by an analysis of the Overseer nutrient budget for the farm and with the farmer to:

- Understand nutrient flows on the farm;
- Understand the concept of N surpluses;
- Identify high N loss blocks;
- Assess why those blocks are losing more; and
- Identify what can be done to reduce N loss and use nutrients more efficiently, which is good for the farmer's business and the environment.


T1: More than just a Number AMURI IRRIGATION CO

- The analysis of the farm's nutrient management is done regardless of the average N loss for the farm – high or low;
- It is not a Pass / Fail test.
- The emphasis is on helping the farmer understand nutrient flows on the farm to improve nutrient use efficiency for the benefit of his business and the environment, and in the process getting to GMP or better.

More than just a Number AMURI IRRIGATION CO

- Our ISMP states that we will use GMP Portal when these are available and *reliable*.
 - But, this will be used to help benchmark the farm and as part of the process of understanding nutrient flows and increasing nutrient use efficiency.
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More than just a Number AMURI IRRIGATION CO

- A Portal generated number will not be used as the sole determinant of GMP.
 - To do so would be counterproductive.
 - Numbers need to be used as part of the process of getting farmers to GMP or better, not as the means of defining GMP.
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Its All About Efficiency AMURI IRRIGATION CO


*“Delivering an Improved Environment Through
Greater Resource Use Efficiency”*

A focus on efficiency of resource use, both water and nutrients, enables engagement with the farmer and the ability to identify win-win scenarios – good for business and good for the environment.



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AIC ENVIRONMENTAL COLLECTIVE AUDIT RESULTS 2015/17 & 2016/17



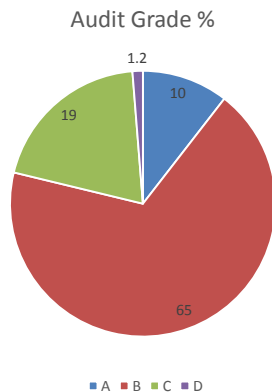
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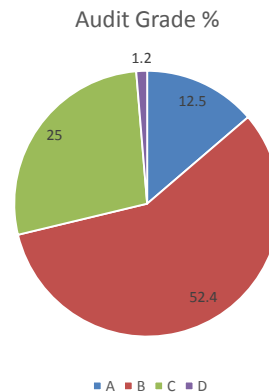
- Present the results of two rounds of first audits 2015/16 and preliminary results 2016/17 (excluding 14 beef and sheep farms).
- Identify the areas where farmers are at or close to GMP and areas in need of improvement.
- Present the results of first round of re-audits 2015/16 'C' and 'D' Grades and assess progress.
- Consider data management issues and limitations.
- Consider the transaction costs of implementing Rule 10.1 for AIC's Collective Members.

Comparison of Audit Results

Audit Results 2015/16

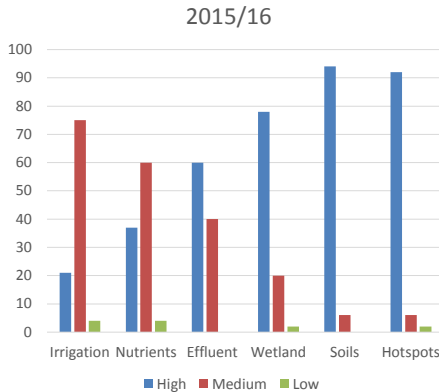


Audit Results 2016/17

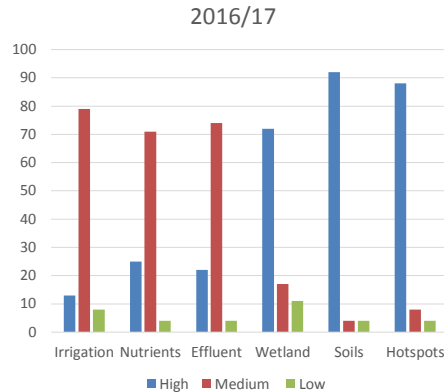


Comparison of Audit Results

Confidence Level / Management Area



Confidence Level / Management Area



Re-audit Results C & D Grade

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- 2015/16: 10 'C' Grade & 3 'D' Grade
- At re-audit all 'C' Grade progressed to 'B'
- At re-audit two 'D' Grade progressed to 'B' and one to 'C'
- Significant change in attitude for almost all low scoring farmers at re-audit.
- Changing attitude difficult to quantify – but important to understand in order to help farmers make progress and deliver change.
- Needs 'qualitative' study to complement 'quantitative' results.
- Its not just about the numbers.

Data Management

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- Data management system put together in very short timescale in order to meet ambitious delivery commitments.
- ECan templates for FEPs and FEP Audits were not available at the time – these are still not finalised.
- Focus was on recording audit grade results and confidence levels for each management area – this is what is required for reporting.
- No common irrigation scheme wide system – each scheme develops own system with no one system offering ideal package.

Data Management Limitations

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AIC currently using '*No.8 Data Management Systems*':

- FEPs on 3 different templates all held as pdf files;
- Audit Template Excel spreadsheet with linked files to extract basic data;
- Audit reports converted to pdf files used for reporting to farmer and held on AIC server;
- Overseer reports held as xml files on AIC server;
- GIS data held on AIC Q-GIS system; and
- Farmer information held on master contacts Excel spreadsheet.

This makes data handling and management: ***difficult, complex and fragile***, but relatively cheap and easy to fix.

Audits 2017/18		
Category	Number	Notes
Shareholder 1 st	34	All beef / sheep farms
Non-shareholder 1 st	20	Currently 20 – any new members 2017 will be audited 2018/19
2015/16 'B' Grade	34	
2016/17 'D' Grade	2	
2016/17 'C' Grade	11	
System Change	20	Estimated
Total	121	This is more than twice the number of audits processed previously, is 77% of total membership and presents a major resourcing and data management challenge.

Transaction Costs

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What are the transaction costs of implementing Rule 10.1 / RC Conditions for members of AIC's Environmental Collective in 2017/18?

Note: transaction costs exclude capital and management costs on farm to deliver actions.

Cost Centre	\$	Notes
FEP Preparation	20,000	20 FEPs in preparation
Overseer Budgets	133,000	Industry / individual farmer cost.
Contract Auditing / Support	74,000	75% audits to be contracted out.
AIC Management & Support	148,000	
Systems Development	20000	Irrigation efficiency and data systems development.
Farmer Workshops	4000	Irrigation and nutrient budgeting
Total	399,000	
\$ / Member	2493	