



Managing Water Quality and Quantity within Limits

March 2013

Draft for review

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Prepared for Irrigation New Zealand

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Irrigation Audited Self-Management: Managing Water Quality and Quantity within Limits

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A description of the Irrigation Audited Self-Management process plus templates, manuals and worked examples have been developed as 'Irrigation Audited Self-Management: A 'How-To' Guide' [\[complete reference\]](#)

Acknowledgements

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However, errors and omissions are ours.

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1 Introduction

There is increased pressure for all land users to manage water and land environmental issues within limits, and report on their performance. Irrigation NZ (INZ) is committed to supporting all irrigators achieve high standards of on-farm environmental performance. Over recent years, mainly to meet resource consent requirements, several irrigation schemes have begun using an audited self-management (ASM) approach that includes individual environmental farm plans and an audit requirement. Primary sector groups and other industry organisations have also implemented environmental performance programmes, particularly in response to pressures from markets and from the general public to demonstrate that primary produce, especially food, meets safety and quality standards and farm practices are environmentally sustainable.

While it is clear that 'one size' won't fit all, it is likely that there are sufficient commonalities among different irrigation schemes, various land uses, and the approaches of different regional councils to mean that there are benefits in developing a generic approach that can be tailored to specific needs. As an organisation that covers many different land use types, INZ also wants to understand and link with industry organisations and others to avoid growers facing duplication of effort, cost, paperwork etc. to meet different requirements (e.g. market and regional council).

Under the National Policy Statement for Freshwater Management 2011¹ (NPS) regional councils must set enforceable water quality and quantity objectives and limits. Once set, these limits must be achieved and monitored. Growers need to have sound on-farm environmental management for both water quantity and water quality and demonstrate this to both regulatory authorities and the wider community in a systematic way. The use of farm environment plans, linked with an appropriate audit process, provides a means of achieving efficient use of water and maintaining water quality within set limits while retaining flexibility for the farm enterprise. This approach is not limited to irrigation schemes and could be used by individual irrigators or other grower collectives such as catchment groups, groups of irrigators or sector groups.

This review and analysis of current and planned sector activities and regional council requirements and expectations has provided input for an updated irrigation audited self-management programme (IASM) that irrigators and others can implement to assist them to meet both freshwater quality and quantity objectives and targets. This system can be linked closely with other environmental management and reporting options available to growers.

¹ Freshwater Management National Policy Statement issued by notice in the Gazette on 12 May 2011 New Zealand Government

2 Scope

This work provides the basis for a national framework to support the consistent and credible implementation of an Audited Self-Management programme for irrigators to meet regional council requirements to meet water quantity and quality limits. It covers:

- a) A stocktake and analysis of:
 - current irrigation sector environmental activities and programmes including experience gained from practical implementation
 - current and future statutory requirements and expectations as outlined in catchment plans or other national/regional instruments
 - current and future industry programmes and interoperability with audited self-management for irrigation (IASM)
- b) Identification of methods to mitigate the identified risks
- c) Use of existing programmes to provide an IASM programme to meet current and anticipated future needs
- d) 'Packaging' the IASM to provide a national framework
- e) Providing a visual representation of the IASM for easy comprehension and uptake.

The outputs include a package of materials that irrigation schemes and other grower collectives can use to develop an IASM programme to meet regional council requirements to manage water quantity and quality to achieve specified limits. These resources include templates for farm environment plans, and examples of policies and procedures protocols for audit, compliance, reporting and corrective action. (See 'IASM How-To Guide'²)

A number of existing packages have provided experience of useful approaches. The updated package builds on these experiences to support and assist irrigators effectively manage water and nutrient use on farm. While the primary target is irrigation schemes and groups of irrigators ('collectives'), the needs of individual irrigators are also considered. Non-irrigators can use the package, too, recognising that many of the issues to be addressed are similar.

There are overlaps between the needs of irrigation schemes to show how irrigators are achieving good environmental management, and sector or other approaches which may also use farm plans, appropriate record-keeping and maybe audits. To avoid duplication of effort by growers and others it is important to maintain strong communication among all parties and develop processes that minimise unnecessary overlaps. However, as the focus of the IASM will be on water quality and quantity management, growers may well use other planning and management tools for some aspects of their business.

The 'IASM How-To Guide' outlines the delivery process for successful and cost effective IASM implementation, considering the capacity and capability within the industry, and consistency and integrity of the delivery process.

² Add reference

3 Why do irrigators need to manage to limits?

3.1 Regulatory Framework

Regional Councils must set enforceable limits on water quality and the amount of water that can be abstracted from our rivers, lakes and aquifers as directed by the National Policy Statement for Freshwater Management 2011. Where water resources are over-allocated (in terms of either quality and/or quantity) methods must be put in place to reduce over-allocation over agreed timeframes.

As major water users, irrigators are seen as a key group who need to ensure efficient water use, and at the same time meet water quality standards. Because many of the impacts of farming on water quality are hard to monitor directly at the individual farm level, growers need to have a method to demonstrate that they are applying water correctly to avoid wastage and that nutrient and other losses are minimised. Growers must show that they recognise both national and local values for water resources and demonstrate that the intrinsic values of fresh water resources are being retained. If irrigators cannot show how they are managing water quantity and quality responsibly to avoid problems, future access to water for irrigation is at risk.

3.2 Why use Audited Self-Management?

Audited Self-Management (ASM) has been strongly endorsed by the Land and Water Forum³ (LaWF) as an important approach for environmental management in the primary sector, with ASM defined as:

'A management programme (individual, industry, or land user collective) which allows for the credible and transparent demonstration (audit) that agreed actions have been implemented (in this instance for water quality and quantity⁴).' LaWF: Second Report 2012⁵ (Glossary)

The LaWF has a wide membership and has drawn on the knowledge, imagination and energy of people across New Zealand over several years, in its efforts to find ways to address water management issues in New Zealand using a shared vision and a common way forward through a stakeholder-led collaborative process.

Therefore, it is appropriate for irrigators to adopt ASM, as defined by LaWF, as a key method for irrigators to address water management issues. Many aspects of current irrigation sector approaches to environmental management can readily be incorporated.

The ASM approach endorsed by LaWF is based in part on their conclusion that (LaWF Third Report⁶ 2012) that *'water quality will be maintained and improved only if individual enterprises adopt good management practices (GMP)'* and *'ASM is a key tool in implementing GMP and can be used across*

³ LaWF –Land and Water Forum - has brought together a wide range of industry groups, environmental and recreational NGOs, iwi, scientists, and other organisations with a stake in freshwater and land management, with active observers from local and central government to assist in developing a common direction for freshwater management in New Zealand and provide advice to the Government.

⁴ 'and quantity' added to LaWF definition.

⁵ Land and Water Forum, 2012. Second Report of the Land and Water Forum: Setting Limits for Water Quality and Quantity, and Freshwater Policy- and Plan-Making Through Collaboration. <http://www.landandwater.org.nz/>

⁶ Land and Water Forum, 2012. Third Report of the Land and Water Forum: Managing Water Quality and Allocating Water. <http://www.landandwater.org.nz/>

most management methods (regulatory and non-regulatory). Different mixes of contaminants, different patterns of land-use (current and historical), and the complexities of natural environments mean that management approaches will need to be tailored to specific catchments.

ASM provides irrigation schemes and catchment groups with a method to allow individual enterprises to determine their good management practices according to land use, irrigation type, farming intensity and the natural environment etc. Often there is no realistic farm level monitoring to check outcomes for water quality issues (e.g. N leaching or P runoff), so a process, such as ASM, is needed to ensure that suitable practices are in place on each property through the audit process and that desired outcomes are being met.

3.3 What is Audited Self-Management for Irrigators?

IASM further defines the LaWF generic description of ASM to describe a method for irrigators and irrigation schemes to demonstrate that agreed actions are being carried out through a process that includes farm management plans and audits. The necessary actions are those required to achieve pre-set management objectives to meet community set goals and corresponding limits for freshwater quality and quantity. IASM recognises that individuals and enterprises must be able to act innovatively and in ways that support economically profitable and efficient operations.

The management objectives for the IASM programme may be set in a number of ways including through a regional plan, resource consent or ZIP⁷, or by an irrigation scheme or a grower collective, such as a catchment or irrigator group. Where practical, measurable targets will also be set (e.g. all cattle out of streams, N load targets, annual irrigation application rate testing).

IASM has an enforceability requirement through the 'audit', with consequences for inaction, although incentives for good performance can be part of the package.

In some cases, IASM may include the transfer of day-to-day RMA compliance responsibilities to users under agreed terms and conditions. For example, a group of individual water users may be given responsibility for sharing a water allocation amongst themselves under agreed terms and conditions rather than through individual allocation and management consent conditions. However, IASM to manage within limits is not just 'implementation of a few checks and balances in order to have greater control over water management'. It must enable progress towards objectives and limits for freshwater management to be monitored and tracked.

Where the management objectives have been set through regional plans and/or resource consents for water, the regional council will be the ultimate enforcement agency. In other situations, such as objectives that are set by an irrigation scheme, or agreed through a negotiated community process (e.g. ZIP), but not necessarily required by the regional council, then these groups would also define or agree on the audit and enforcement process.

IASM provides for linkages with other environmental management programmes (e.g. dairy, arable, horticulture) and business planning tools.

⁷ ZIP – 'Zone Implementation Programme' for Canterbury Water Management Strategy. See: canterburywater.co.nz/

Public confidence in any audited self-management programme is important. The programme needs to be credible to all stakeholders, including individual land users, industry, regulators and the wider community. If the audited self-management process is robust, transparent and accountable and, over time, achieves progress towards community aspirations for water, then trust will be developed.

Another important aspect of this approach is that it also retains flexibility for individual enterprises to determine their own management practices to meet the type and intensity of operation, soil type, topography etc., rather than having generic practices imposed.

The most practical way to improve water quality on-farm is for individual enterprises to adopt recognised 'Good Management Practices'⁸ (GMP). However, appropriate GMPs will be different for different enterprises, different soils, topographies etc., so a method is required to plan, implement, review and update the GMPs in a systematic way across a large number of farms. IASM recognises that GMPs alone may not be sufficient to achieve the necessary limits, in some situations.

The IASM programme must be based on responsibilities for each irrigator, as well as overall responsibilities for the irrigation scheme or irrigator collective. So that progress of each enterprise can be checked, individual irrigators need to record in a management plan that is regularly audited:

- Objectives and targets for water quality and quantity that they must achieve (set by plan, consent, irrigation co or group))
- An assessment of the water quality and quantity risks from their farming system
- Their actions, practices etc. to achieve objectives and targets (specific to property, but a minimum standard or practice may be set (e.g. through a regional rule, consent, or an irrigation company policy))
- Timelines for improvements

As the governance body for the IASM programme, the irrigation company or collective would have an Environmental Plan or Strategy and operational protocols that set out:

- Objectives and targets based on those in a resource consent, regional plan and/or those set through a local community process (e.g. upper Waikato catchment groups, or zone committees (Canterbury))
- Process for preparation and review of individual management plans ('farm environment plans')
- Process for audit /enforcement /reporting
- Process for consultation and communication with stakeholders
- An education and adaptive management programme

⁸ See Appendix 1 for explanation of 'GMP'

4 Using IASM to meet requirements for managing to limits

4.1 Current and likely regional council requirements

Regional Councils are in the process of preparing or revising regional plans to set enforceable quality and quantity limits for fresh water management and methods to avoid or reduce over-allocation in response to the directives of the NPS for Freshwater Management.

The majority of councils have not yet confirmed their programmes to set and achieve limits.

As discussed further in section 5 and Appendix 1, the terms 'Farm Plan', 'Farm Environment Plan' (FEP) and 'Nutrient Management Plan' (NMP) are used to describe a range of different reports, with varying amounts of detail and specificity. For example, some NMPs provide only a limited list of identified environmental risks and management actions, whereas others are very comprehensive and are almost FEPs. In this section we use the terminology NMP or FEP that the particular council uses, but have not analysed all the requirements to determine how comprehensive the particular NMP or FEP is expected to be.

Several councils already require NMPs⁹ in severely degraded catchments, or for N applications over a base minimum. Canterbury, Otago, Horizons and Southland all require FEPs in some situations. However, other councils are also considering NMPs and FEPs as an approach to track progress towards N and P loss limits that they expect to set in the near future.

In the next few years, the following councils expect to require Farm Environment Plans /Nutrient Management Plans at least for intensive farming: Auckland, Waikato, Bay of Plenty, Hawkes Bay, and Southland. In Otago, FEPs will be a supported method, but other options will also be available. FEPs are required through the resource consent conditions for two irrigation schemes. Other councils are still considering how to set and achieve water quality limits.

Figures 1 and 2 provide a summary of where council requirements in 2012, and what is anticipated in 2-3 years. Table 1 in Appendix 2 gives more detail.

⁹ NMP - Nutrient Management Plan. For a description of NMPs see Appendix 1

REGIONAL COUNCIL REQUIREMENTS

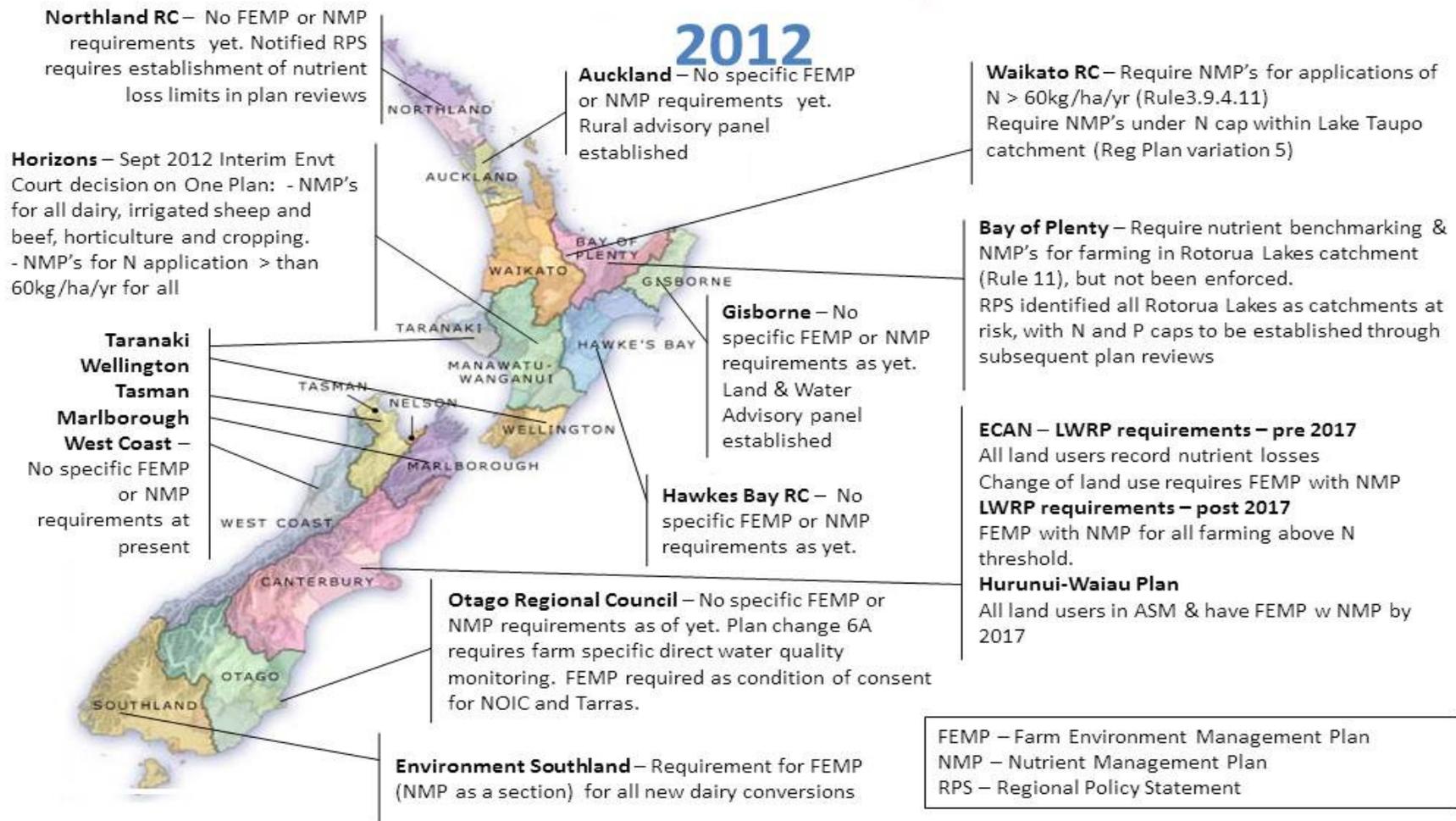


Figure 1: Current Regional Council Requirements for Farm Environment Plans or Nutrient Management Plans

REGIONAL COUNCIL REQUIREMENTS Expected in next few years

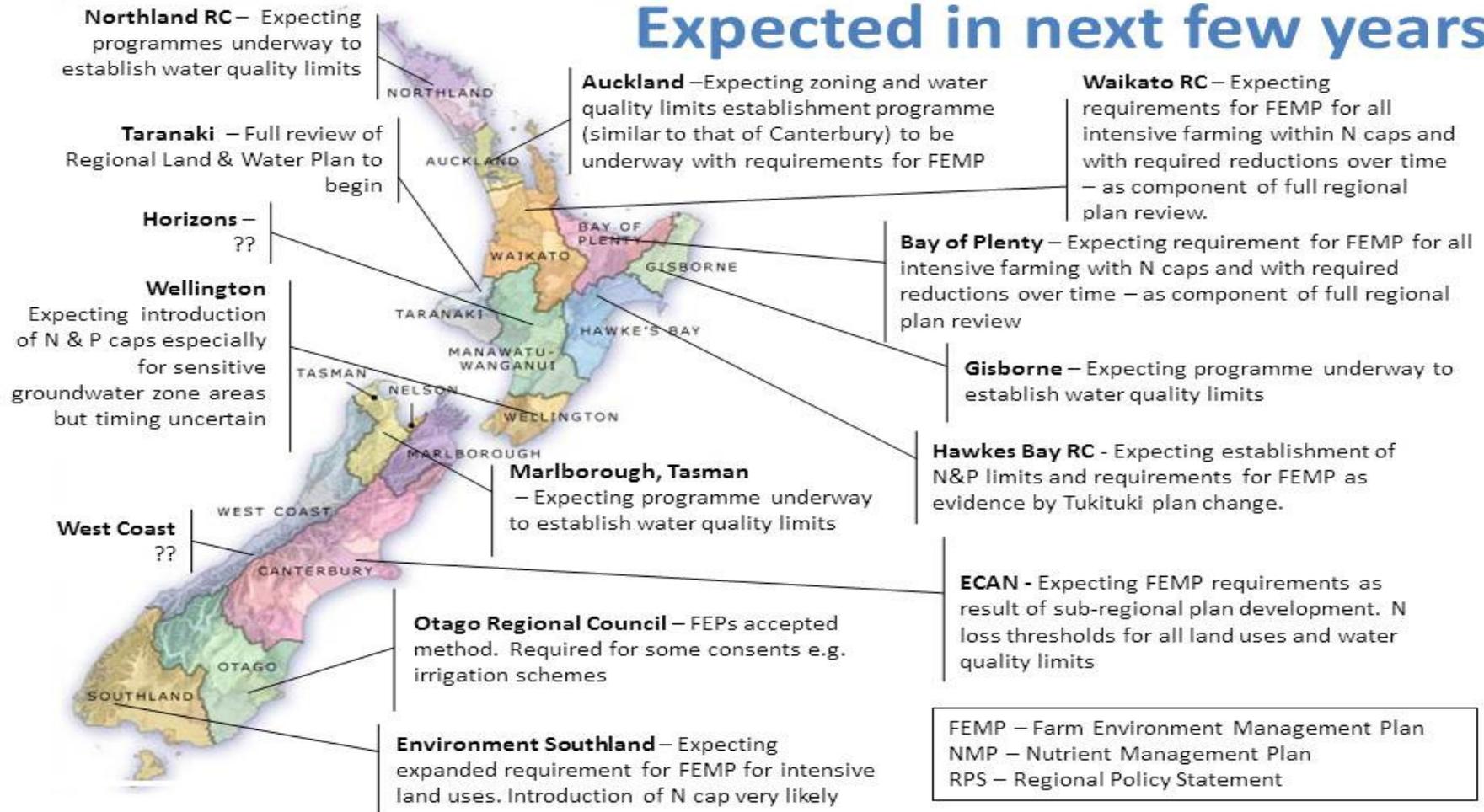


Figure 2: Likely Regional Council Requirements for Farm Environment Plans or Nutrient Management Plans in next few years

Comment and feedback from regional councils indicated that auditable Farm Environment Plans and Nutrient Management Plans are increasingly being viewed as a key tool to achieve widespread on-farm improvements in water quality and quantity management to limits. Councils see the potential for a 'farm plan' process to move beyond compliance and encourage on-going learning and improvements.

Key issues raised included the need for credibility and transparency for all stakeholders. To achieve credibility, councils recognise that the wider community has high expectations that the rural sector will make the changes necessary, and that strict monitoring and enforcement will need to be implemented. In addition, to meet requirements of the NPS, Farm Plans need to be auditable and enforceable.

There will be differences across councils in their approaches to Farm Plans, particularly because of the range of key issues in different regions e.g. Canterbury has a strong irrigation focus, Otago has a focus on water quantity management with the 2021 deadline looming for historic mining rights for water to change to resource consents. Some other councils that have had a long term involvement with farm plans for soil erosion are likely to use that experience and community understanding as a basis for on-farm water quality and quantity management.

4.2 Key features of an IASM approach, including Farm Plans

ASM as an approach has been defined by LaWF (see Appendix 1), but has not yet been well-developed as a concept. To meet the expectations of LaWF that ASM can work as a management tool for achieving on-farm objectives for water quality and quantity including implementation of GMPs, it needs further refinement.

Earlier irrigation environmental management approaches were built as 'environmental management systems' (EMS). EMS is a well-established and well-documented process here and overseas, in agriculture and in other industries (see Appendix 1). EMS uses a continuous improvement cycle of 'Plan, Act, Check, Revise'. For ASM to be credible for regulatory compliance purposes and to achieve on-going improvement, a systematic approach, such as the EMS cycle, is necessary. A diagram of the proposed IASM process for schemes and collectives is shown in Figure 3a. A similar process for individual irrigators is shown in Figure 3b.

Figure 3a: Irrigation Audited Self-Management Process for Schemes and Collectives

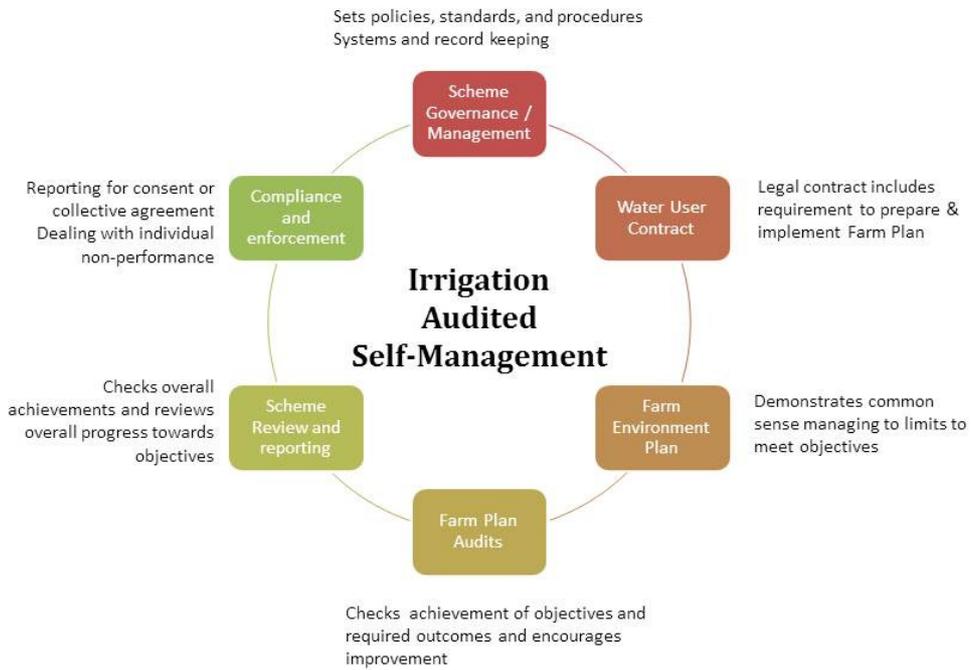
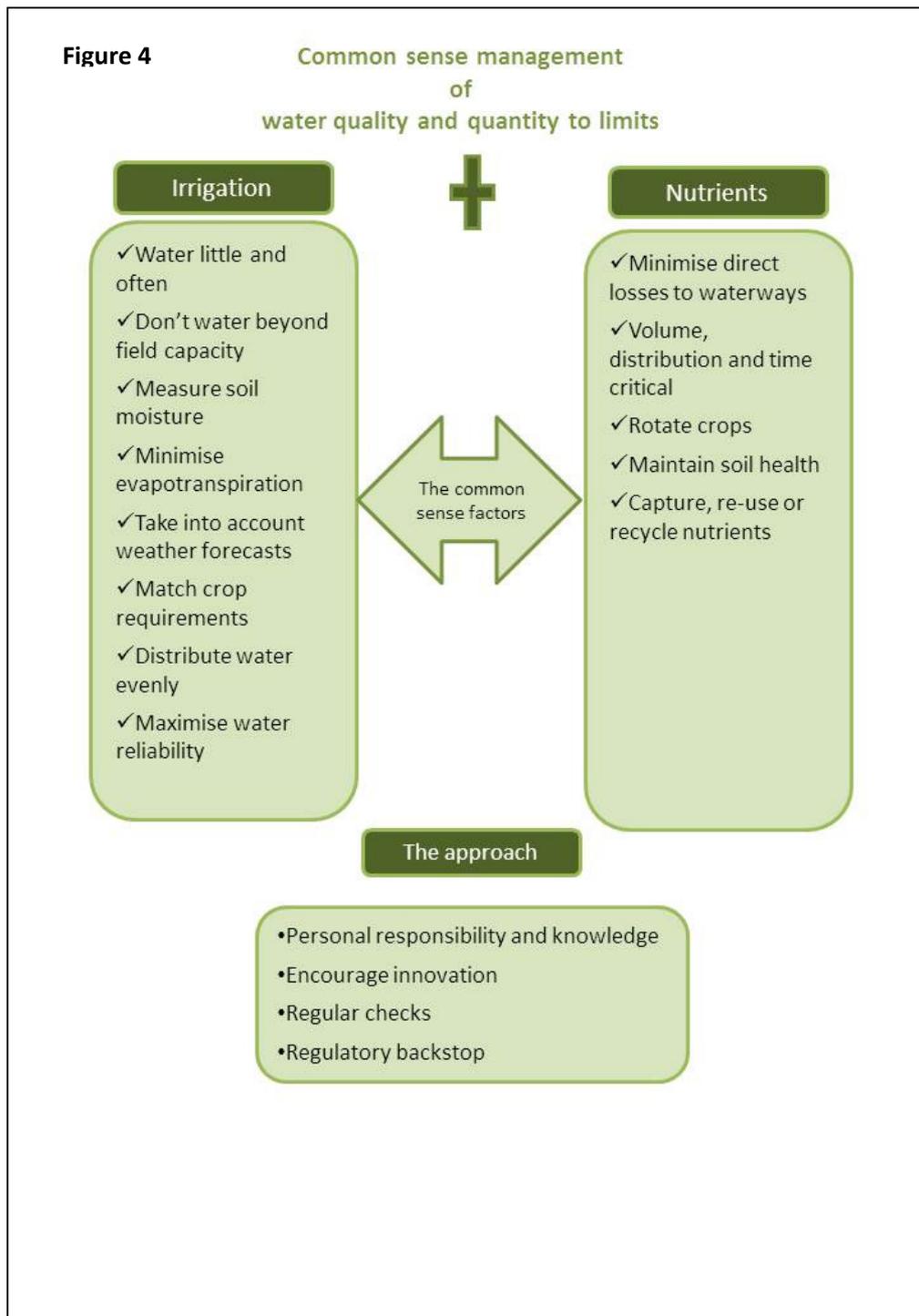


Figure 3b: Irrigation Audited Self-Management Process for Individual Irrigator



IASM puts the personal desire expressed by many growers ‘to improve the farm environment’ into a framework where the results can be demonstrated. It takes an approach that requires and builds personal responsibility and knowledge, encourages innovation, but has regular checks and a regulatory backstop to ensure progress towards water quality and quantity limits.

The key aspects of managing water quality and quantity to limits are practical, common sense actions to manage nutrients carefully to avoid contaminating water, and to apply irrigation water efficiently so that excess water is minimised. Figure 4 outlines some common-sense actions that are incorporated into IASM.



4.2.1 Audit

The audit requirement is essential, as IASM must be able to show that it is achieving, as a minimum, regulatory compliance. The performance of irrigators in managing water quality and quantity to limits will be scrutinised by councils and the community, so progress towards the objectives and targets needs to be tracked. To provide the necessary credibility the audit should cover an assessment of

- the performance against the management objectives and targets, as well as actions
- the overall robustness of the management programme to manage identified risks
- the level of confidence in the nutrient budget results (as minimising nutrient losses is a key requirement)

4.2.2 Farm Environment Plan

The FEP process must minimise paperwork and maximise improving knowledge about water management and implementing actions on the ground. However, many growers will need to keep more detailed records on some aspects of their operations so they can demonstrate that they are achieving their objectives and targets.

Initially each farm needs to complete an assessment of the environmental issues and risks associated with water quality and quantity in relation to their farm operations. This helps to determine the farm policies, appropriate good management practices and actions that need to be implemented to manage within limits for water quality and quantity. The risk assessment would cover the land resource attributes and the farming system. For example: risks and therefore GMPs for irrigation on flat land would be different to those on steeper rolling country, or for arable farming and dairy.

The risk assessment process will be particularly important for irrigation schemes that cover a range of soil types, slopes, farm enterprises and irrigation type as the scheme is unlikely to be able to set generic GMPs suitable for all enterprises.

Features of a Farm Environment Plan for IASM

Each FEP would usually cover a block or blocks of land that are run as a management unit ('a farm') by one or more managers, who may or may not be the land owner/s. Irrigation schemes have an added complication that those with the rights to access water and with contractual responsibilities (often, but not always, shareholders) are not always the 'hands on' managers. Both parties need to be involved in the FEP process. The FEP should be prepared, as far as possible, by the person/s who have responsibility for day-to-day management, with input/approval from the owner/s, if they are different people.

A FEP would need to cover:

- Property and land use information

- Description of different 'land management units'¹⁰ within the farm
- Risk assessment of the effects of farming activities and options for management, including:
 - Irrigation
 - Stock
 - Cultivation
 - Fertilisers
 - Effluent application
- Management objectives / targets for the components of the farming systems that have an impact on water:
 - Irrigation Management
 - Nutrient and Soil Management
 - Waterway and Wetland Management
 - Collected Effluent Management
- Nutrient Management would require an appropriate nutrient budget, as this a key tool for understanding nutrient cycling on farm and managing nutrient loss.
- Practices / Actions / Records / Timelines

Note that these are the key issues for water management and focus on aspects that can be readily audited. Other environmental management topics can be added, if desired, or specifically required by a scheme or resource consent etc. For example: biodiversity, energy etc.

The Farm Plan should include objectives that address specific aspects of water management that are important to Maori. In the FEP most of these matters will require the same on-farm practices that are needed to achieve other community goals for water. However, schemes or collectives should work with local iwi to ensure their objectives are correctly understood and included. Some schemes have iwi liaison committees/groups to assist them.

If the FEP is prepared as part of an irrigation scheme (or other collective) arrangement, then the scheme would want to check and approve the FEP to ensure that the necessary standards are achieved and that the FEP has accurately identified the risks and appropriate actions etc.

An irrigator with an individual consent may be required to contract professional assistance to check the plan or the regulator may provide a check of the FEP's adequacy.

4.2.3 Irrigation schemes and other collectives

Schemes and other collectives can streamline and support a 'managing to limits' programme such as IASM and increase the opportunities for success compared to an individual grower implementing a programme. Family farms typically do not have the management resources to implement complex systems on their own, and even large farms look for management options that avoid duplication.

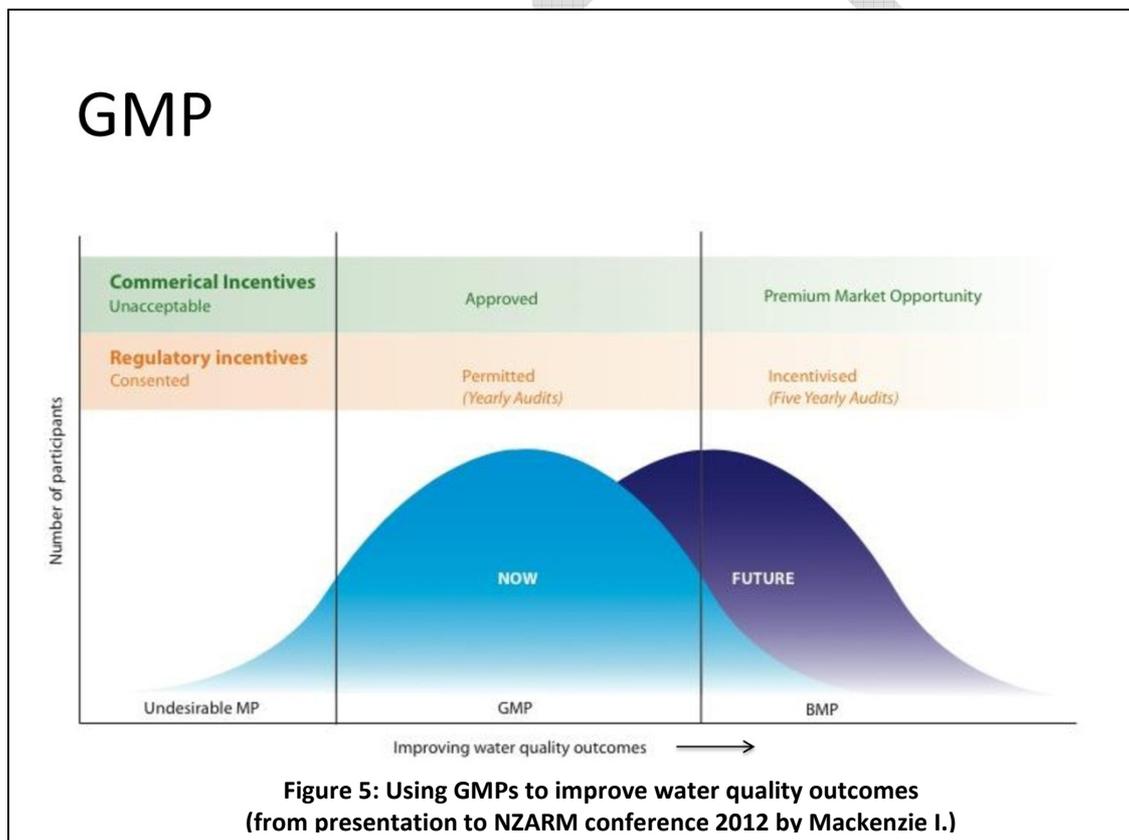
The governance and leadership by a scheme or collective can provide support for individual growers in the form of management, planning, systems, training and other assistance. They can also provide

¹⁰ A land management unit is a homogenous block of land with that responds in a similar way under similar management. These units should align with the blocks used in the nutrient budget

a compliance regime that focuses on achieving improvements, rather than strict enforcement and sanctions.

4.2.4 Incentives and Sanctions

During discussions with various parties the question ‘how do you incentivise audited self-management?’ was raised. This is particularly relevant when there is little real incentive for a landholder to get involved in this type of programme. It is also important when looking to foster continuing improvement in management practices. It is well known that the environmental performance across any group of landowners will follow a ‘bell curve’ distribution. (See Figure 5). Regulatory compliance sets the baseline which all farms have to comply with. Those to the left of the baseline are likely to face sanctions in some form, as they don’t meet the minimum standard. The shift of the bell curve to the right shows how improvements in overall environmental performance can occur over time. Incentivising this movement could come through a range of mechanisms such as financial incentives, easing the consenting pathway and longer consent durations. Developing an incentives scheme is beyond the scope of this study.



4.2.5 Expected outcomes

‘Managing to limits’ sets the framework for the achievement, in due course, of community agreed water quality and quantity outcomes. Achievement of these outcomes will come from a combination of measures, including the control of point source nutrient contributions, catchment scale mitigations, and on-farm environmental management programmes. IASM is a key tool in the case of the latter. If, with time, the water quality and quantity outcomes are not achieved, then a review of

the overall programme will be necessary. Amongst other things this could necessitate a revision of the IASM management objectives.

Ultimately the overall effectiveness of the IASM programme will be judged by a combination of the following factors:

- The extent to which growers buy-in to the programme and actively seek to reduce their environmental footprint;
- Documented evidence of both widespread use of optimal management practices and the achievement of the management objectives and targets; and
- Public confidence in the programme.

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5 Farm Plans in New Zealand

5.1 Farm Plan types

Farm Plans of various sorts, and more particularly Farm Environment Plans, have been widely used throughout New Zealand over many years to provide a record of planning and actions towards a wide range of objectives (e.g. soil conservation works, farm business planning, native biodiversity protection, riparian management), often as part of a grant or subsidy programme.

Some examples and further information on the range of Farm Plans are given in Appendix 1. This wide range of plans means that the term 'Farm Plan' or 'Farm Environment Plan' is often understood differently by different people. A key difference in the various plans is the purpose for which they are prepared.

In the context of an IASM programme the plan is specifically a **'Farm Environment Plan to manage both water quality and quantity to meet regulatory requirements'**. It will either be required by the regional council to meet resource consent or regional plan requirements, or may be an option to avoid an alternative, such as a resource consent application. A key difference between most Farm Plans and one for an ASM programme is that the Plan must be auditable and include provision for corrective actions where required. (i.e. 'auditable' assumes that there are clear objectives that the Plan is aiming to achieve, so that the auditor can make an assessment as to whether or not the farm practices are achieving the objectives.)

5.2 Current 'Farm Plans'

Most of the farming sector organisations have a farm management planning package for their members.

Depending on the purpose for which the package was designed, plans may be voluntary, often starting from natural resource assessment (e.g. Beef and Lamb's Land and Environment Plan) or compulsory if the grower wants to be part of market scheme (Sustainable Wine Growing, NZGAP(HortNZ)). Other plans cover specific issues e.g. Nutrient Management Plans (NZ Fertiliser Association/Ballance/Ravensdown).

Regional Councils also have a wide range of farm plan types, generally linked to grant/subsidy programmes for works for soil conservation, riparian management etc.

Table 1 provides a summary of a number of sector plans, and shows which IASM features they include.

Table 1: Summary of sector farm management plans

Parameters	BLNZ - LEP 1 ¹¹	BLNZ - LEP 2	BLNZ - LEP 3	DairyNZ - SMPP ¹²	Supply Fonterra	HortNZ NZGAP	Morven Glenavy ¹³	Fertiliser Co. NMP ¹⁴
Voluntary / Required	Voluntary	Voluntary	Voluntary	Voluntary	Required	Required for many markets	Required	Voluntary and required
Collective / individual	Individual	Individual	Individual	Individual with collective reporting	Individual with collective reporting	Individual	Individual as part of collective	Individual
Blocks / land management units	No	Yes	Yes	Yes as part of nutrient budget	Yes as part of nutrient budget	No	Yes	Yes
Risk assessment and options	Limited	Limited	Limited	Limited	No	No	Limited	Limited
Management objectives and targets	No	No	No	Yes – set at catchment scale	No	No	Yes	No
Nutrient budget	No	Yes	Yes	Yes	Yes	No – currently but likely	Yes	Yes
Management practices / actions	Yes	Yes	Yes	Yes	Limited	No currently Likely – criteria to achieve	Yes	Limited
Monitoring and review	No	Limited	Limited	Yes	Yes	Yes – against criteria	Yes	Limited
Built in audit process	No	No	No	No	Yes	Yes – against criteria	Yes	No

¹¹ BLZ LEP 1,2,3: Beef and Lamb New Zealand: Land and Environment Plan Levels 1, 2 & 3

¹² SMPP: Sustainable Milk Production Plan

¹³ Morven Glenavy Ikawai Irrigation Co Ltd

¹⁴ NMP: Nutrient Management Plan

5.3 Farm Environment Plans as a management tool

Farm Environment Plans are used for a wide range of management purposes. Some are single purpose, others cover several aspects. These include:

- Risk / business planning / business management tool
- Plan for determining and securing grant funding (e.g. soil conservation plan)
- Plan to meet market requirements(e.g. food safety) / secure niche markets (e.g. food or fibre quality)
- Plan to meet regulatory requirements (e.g. consents to take/use water)
- Plan as part of voluntary programme to demonstrate sound environmental practices to wider community

Concern about duplication of plans and particularly audits is widespread. However, in many cases the IASM plan would be complementary, or a sub-set of other farm plan types. Figure 6 shows how the IASM plan for water quality and quantity incorporates only some of the features of a 'whole farm plan'. The IASM process provides for some or all objectives and targets in the FEP to be covered by a separate auditable plan (see IASM 'How-To' Guide).

In the development of the IASM 'How-To' Guide useful features and implementation experiences from this review have been incorporated. Some of the key aspects that have been identified as important for IASM are:

- Keep it simple
- Electronic, as far as practical, but recognise many growers prefer to work on hard copy
- Need to have clearly identified purpose (e.g. to reduce xx by yy across collective area)
- Need to be able to report i.e. demonstrate that action is being taken to address issues
- If using process to collect large amounts of grower data, need to be sure of quality and purpose for collection
- All those in scheme/collective should have a farm environment plan, even for a small block. Everyone needs to be included. If 'low risk' can minimise audit requirements. Some small blocks can have high risk activities
- Need a process to update plans with changes in managers/owners
- Support from grower leaders
- Need a governance framework
- Incorporate both sanctions and incentives

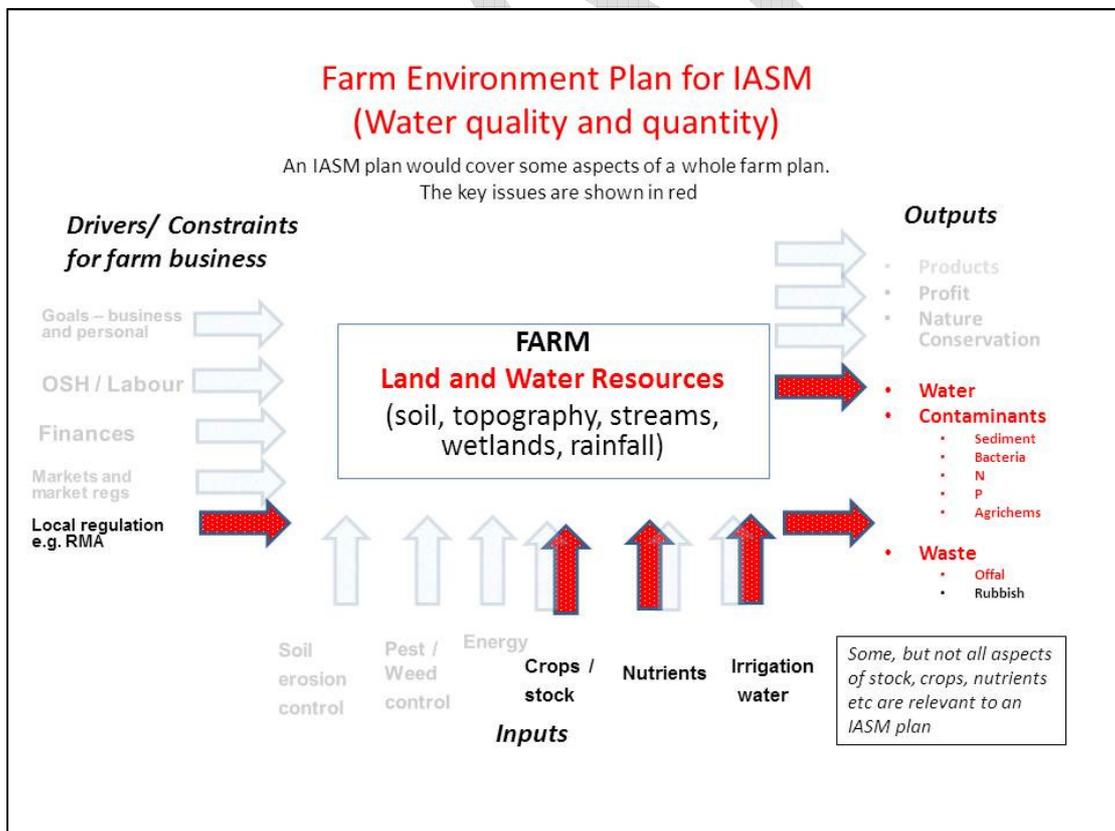
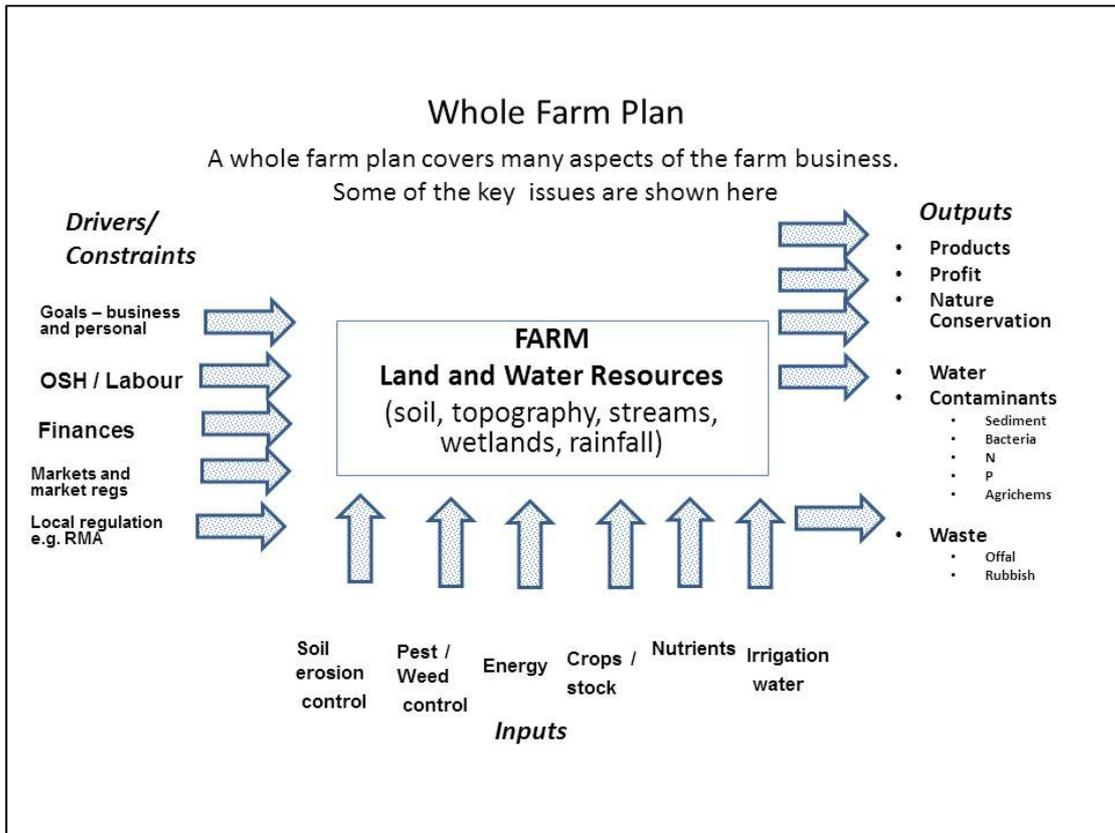


Figure 6: Elements of an IASM farm plan compared with key elements of a Whole Farm Plan

6 Risks associated with an IASM approach

The key to an effective environmental policy and procedure framework is the identification of risks and the organisational response to the management of these risks. As part of this review process, an assessment of the risks associated with the IASM approach was undertaken. The analysis is based on the following assumptions:

1. That the IASM approach is an effective way of managing the environmental aspects of a farming operation
2. That the IASM approach is part of a package which includes supporting measures including information/awareness programmes
3. That the IASM approach is underpinned by regulatory provisions

The risks associated with an IASM approach can be divided into 4 key areas.

- Risks relating to programme credibility
- Risks around the 'buy-in' and commitment to the process by growers, primary sector groups and regional councils
- Risks around the set-up of the programme
- Risks around the operation of the programme

To varying degrees, failure in any one of these risk areas will undermine the effectiveness of the IASM programme.

The source of these risks are many and varied recognising that IASM as a process has a number of potential failure points. It is also complicated by the fact that IASM is a process that covers collectives but involves a large number of individual enterprises each with its own unique farming system and management structure, and a large number of individual managers each with their own management style.

The risk management strategies suggested are considered necessary in order to minimise the prospects of failure and to maximise the effectiveness of the IASM process as a process for effectively managing the environmental aspects of a farming operation.

The risk management strategies suggested fall into seven categories.

- **Communication** - Good communications at all levels is critical to the success of the process, and will be assisted by clear understanding of different roles and responsibilities. This includes communication between:
 - the regional council and the collective body
 - the collective body and individual landowners
 - the industry support sectors and growers
 - IASM programme managers and the general public.
- **Skills, knowledge and training** - The training requirement includes training personnel to assist growers with the preparation and on-going implementation of their plans, programme governance training, training of auditors, and training for growers. The aim must be to build enough capability and capacity within the industry in order to effectively implement IASM programmes.
- **Support** – Support for growers as they transition into the IASM process. Support includes providing advice on options, working through issues as they arising on-farm, and follow-through when action is required.
- **Process** – Includes the full IASM set up including scheme protocols, Farm Environmental Plan, audit and compliance processes

- **Governance** – Good governance is critical to the success of the programme. The governance body (i.e. the collective entity) must have good systems and processes in place for management and oversight purposes and provide clear guidance on roles and responsibilities.
- **Purpose** – While the primary purpose for IASM is for the management of environmental effects from on-farm activities it has other purposes particularly as a risk management tool. Broadening the scope of IASM use will enhance its effectiveness.
- **Format** – Ease of use will be a key factor when it comes to the uptake of the IASM by growers. Central to ease of use is linking the programme through an electronic format, but recognising the need for paper-based options. Streamlining recording and minimising duplication and overlaps between various reporting requirements will assist gain grower support.

The full results from the risk assessment are presented in Table 2 below.

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Table 2: Risk Assessment and Possible Risk Management Strategies

Risk (What can happen?)	Source (How / why might it happen?)	Potential Risk Management Strategies
<p>Lack or loss of public confidence in IASM approach (i.e. the approach is seen as a 'whitewash' and loses its credibility). Any loss of confidence and credibility in the approach could ultimately undermine its effectiveness by increasing tensions between land users and the wider public.</p>	<p>A lack of public confidence in the approach could occur for a variety of reasons including:</p> <ul style="list-style-type: none"> • Poor communication, reporting and feedback on progress made through IASM. (i.e. the public are not kept informed of progress made.) • Key on-farm environmental issues are not addressed even though an IASM approach is in place. 	<p>Potential risk management strategies include:</p> <ul style="list-style-type: none"> • The development and implementation of a communications Plan • Regular review and feedback to the community • Inadequacies in FEPs picked up through farm plan approval process and/or audit process.
<p>Limited grower buy-in and support for the IASM concept. Plans are prepared but are not fully backed by growers.</p>	<p>Limited grower buy-in and support for the IASM concept could occur for a variety of reasons including:</p> <ul style="list-style-type: none"> • Plans are prepared by consultants, with little input / buy-in from grower • Reasons for introduction of concept are not clearly explained. Concept seen solely as an academic exercise to keep the regional council happy. • Limited support provided for growers during the implementation phase. • Benefits of concept poorly articulated. • Goals / outcomes / appropriate practices not clear • Expectation that a generic programme is acceptable. • Negative media coverage of poor audit results (c.f. publicity re effluent compliance) 	<p>Potential risk management strategies include:</p> <ul style="list-style-type: none"> • Providing information to growers that clearly and consistently sets out expectations and responsibilities under the programme. • Training of consultants • Inclusion of support structure for growers during the implementation phase. • Providing flexibility within approach to recognise different farming systems, management approaches, and individual aspirations. • Obtaining grower feedback
<p>Limited buy-in and support for the concept from industry organisations particularly where a generic process is imposed upon growers</p>	<p>Limited buy-in and support from industry organisations for the IASM concept could occur for a variety of reasons including:</p> <ul style="list-style-type: none"> • IASM concept is seen to be in direct conflict and/or competition with already prepared or proposed industry schemes. • Pressure upon industry sectors from grower levy payers to resist the implementation of the IASM approach. • Industry organisations have limited involvement in the development of the IASM concept. • Growers 'blame' scheme/sector for increased rules and paperwork. 	<p>Potential risk management strategies include:</p> <ul style="list-style-type: none"> • Reasons and benefits of IASM approach clearly explained to industry organisation. • IASM concept set up to avoid duplication and to link in with existing industry schemes as far as possible. (e.g. Supply Fonterra could supply nutrient component of IASM)

Risk (What can happen?)	Source (How / why might it happen?)	Potential Risk Management Strategies
IASM approach by default leads to a culture of 'achieving compliance alone' is all that needs to be achieved.	<p>The promotion of IASM as an approach could result in a 'compliance achievement only' culture for a variety of reasons including:</p> <ul style="list-style-type: none"> • There being little or no incentive for growers to be involved beyond the minimum standards. • A strong focus of the audits becoming 'compliance' checks without a learning and adaptive management component. • The benefits of adopting an adaptive management approach are undersold. 	<p>Potential risk management strategies include:</p> <ul style="list-style-type: none"> • Strong educational component built into programme • The setting of clear and measurable targets within IASM programme which provide 'stretch.' • Promotion of the multiple benefits of IASM approach. • Incentivise continuous improvement aspects of the programme.
The system becomes overly bureaucratic adding to costs and detracting from its main function of affecting change on the ground.	<p>The system adopted could become overly bureaucratic for a variety of reasons including:</p> <ul style="list-style-type: none"> • Poorly defined allocation of responsibilities and inadequate controls. • Poor governance and/or management by scheme or collective. • Reporting requirements that seek information that is beyond that is essential for regional councils to fulfil their functions. • Regional Councils can't 'let go' sufficient control to give IASM opportunity to work. • Poor performance by some IASM programmes means that Regional Councils increase control over all IASM programmes 	<p>Potential risk management strategies include:</p> <ul style="list-style-type: none"> • Regional Council sets up multi-stakeholder management group to oversee programmes in region. The nature of these groups might vary from region to region reflecting regional differences. In Canterbury for example the Zone Committees may be the appropriate groups. • Upfront agreement between the regional council and collective entity on nature of programme. • The establishment of clear governance and overall management procedures. • Introduction of industry and regional council supported support programme for those IASM programmes which are under performing
Significant grower frustrations and negativity develop towards the process	<p>Frustration and negativity towards the process from growers could develop for a variety of reasons including:</p> <ul style="list-style-type: none"> • Lack of or poor communication with programme governance body. • Unnecessary changes to the mode of operation of the IASM programme. • A failure to follow due process through the operation of the IASM programme. (i.e. due process steps are not followed) • Inconsistencies in the approaches adopted between farms in the programme. • Duplication – growers are asked to provide the same data for more 	<p>Potential risk management strategies include:</p> <ul style="list-style-type: none"> • IASM programme protocols that clearly set out roles and responsibilities as well as the mode of operation. • Clear and regular communications between IASM programme management and growers. • Regular liaison between industry bodies and regional councils to minimise duplication and maximise overall programme effectiveness. • IASM focuses on managing water quality and quantity to limits

Risk (What can happen?)	Source (How / why might it happen?)	Potential Risk Management Strategies
	than one IASM programme.	
On-farm improvements are not recognised in the short term as contributing to improved environmental outcomes	<p>The contribution of on-farm improvements may not be recognised in the short term for a variety of reasons including:</p> <ul style="list-style-type: none"> • A lack of understanding of the impacts of lag times. (i.e. on-farm nutrient losses may take several years to reflect in improved environmental outcomes) • Unrealistic expectations 	<p>Potential risk management strategies include:</p> <ul style="list-style-type: none"> • Establishment of ASM programme multi-stakeholder monitoring and review groups to review progress against all sources of monitoring information (e.g. water quality data, on-farm audit results etc.) and ensure goals are realistic. These groups should meet at least once per year.
Management strategies as set out in the plans are inadequate to manage environmental risks associated with key on-farm activities and/or to meet the management objectives and targets.	<p>There are a variety of reasons why the management strategies as set out in the plans could be inadequate including:</p> <ul style="list-style-type: none"> • Insufficient guidance in the management objectives and targets to clearly direct a 'high standard of environmental management.' • An underestimation of what is required to manage the identified environmental risks. • Insufficient editing of FEP template and/or personalisation for particular property. 	<p>Potential risk management strategies include:</p> <ul style="list-style-type: none"> • Include as part of the IASM programme protocols the requirement for FEP approval. A peer review panel should also be provided to hear and make judgement on any disputes on the content of the FEP submitted for approval. • Provision of a support and/or advice system for growers preparing FEPs • The provision of clear guidelines for growers on FEP preparation and requirements.
Management strategies as set out in the farm plans are not implemented at all or only partially implemented.	<p>There are a range of reasons why the strategies as set out in the farm plans may not be implemented. These include;</p> <ul style="list-style-type: none"> • Apathy towards the process • Lack of ownership of plan content. (i.e. plans prepared by consultant with little grower input) • Lack of management skills to implement plan • Financial pressures • A lack of awareness of the issues and/or management options. • Seasonal differences – some management strategies may not be required some seasons because of seasonal factors. 	<p>Potential risk management strategies include:</p> <ul style="list-style-type: none"> • The inclusion of clear audit and compliance procedures within the IASM programme protocols. • Information/awareness support programmes. (e.g. know your soils, and irrigation efficiency field days) • Property specific FEPS which clearly reflect individual's aspirations while providing an outline of how the management objectives and targets will be met.

Risk (What can happen?)	Source (How / why might it happen?)	Potential Risk Management Strategies
<p>Plans are not updated when farm activities change or when new owners or managers come onto the property. Farm plans are farm operation and manager specific, the risk lies in the farm plans not fairly reflecting new ownership and/or management aspirations.</p>	<p>There are a variety of reasons why plans may not be updated when required including:</p> <ul style="list-style-type: none"> • There are no or inadequate procedures and controls in place covering what happens when changes in activities and/or management personnel occur. 	<p>Potential risk management strategies include:</p> <ul style="list-style-type: none"> • The inclusion of provision within the IASM programme protocols requiring FEP updates if there is a significant change to the farming operation or to on-farm management practices or if a new manager is appointed. • The inclusion of provision within the IASM programme protocols requiring grower members to notify IASM programme managers when there is a change of management on farm.
<p>Audit process doesn't pick up on non-compliance and/or inadequate follow through on non-compliance.</p>	<p>A failure of the audit process to pick up on non-compliance could occur for a variety of reasons including:</p> <ul style="list-style-type: none"> • A potential failure of the audit process and/or a failure to follow through on non-compliance identified through the audit process. • Inadequately trained auditors 	<p>Potential risk management strategies include:</p> <ul style="list-style-type: none"> • All farms must be audited by an external auditor at least once every three years. • All issues of non-compliance identified by the auditor must be addressed by scheme/collective/individual. • Scheme/collective has 'complaints' process so others can advise of possible non-compliances • High risk properties will be dealt with as a matter of priority. • Ideally the Irrigation scheme or Irrigation collective will provide support to the grower to develop an Action Plan to address issues identified. Actions plans will include specific timeframes for action. • Enforcement action will ultimately be taken in the event that other actions fail. • Auditors are required to be 'accredited' by regional council

Risk (What can happen?)	Source (How / why might it happen?)	Potential Risk Management Strategies
Lack of overall IASM programme governance and management oversight.	A lack of overall IASM programme governance and management oversight could occur for a variety of reasons including: <ul style="list-style-type: none"> • Insufficient governance controls. • Lack of scheme/collective commitment to the process 	Potential risk management strategies include: <ul style="list-style-type: none"> • The provision of IASM programme governance and management oversight training. • On-going support of IASM programmes • Introduction of a regular IASM programme effectiveness check.

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7 Conclusions

Managing to limits

- The world has changed, and managing to limits for water quality and quantity means that growers will need to demonstrate compliance to a greater extent than has been required in the past.
- Throughout New Zealand, regional councils are in the process of setting objectives and limits for freshwater management and determining approaches to achieving them. The approach taken by each council is likely to vary, reflecting local differences.

Audited Self-Management

- ASM (Audited Self-Management) as an approach has been endorsed by Land and Water Forum for groups and individuals to achieve and demonstrate on-farm results.
- An Irrigation Audited Self-Management (IASM) programme can provide a package for irrigation schemes, collectives and individuals to manage water quality and quantity within limits and meet new regulatory requirements.
- IASM is a suitable approach, but not the only one. To avoid duplication IASM should continue to be developed as a programme that can be linked with other plans.
- A collective approach has advantages over individuals being left to work on their own, such as: efficiencies in a group working together; greater opportunity to support on-going improvements; easier to demonstrate progress to the wider community.

ASM for Irrigation (IASM)

- Existing Farm Plans are many and varied, and have different purposes and styles
- The elements required for water quality and quantity management and compliance are a sub-set of 'whole farm plans', but are not necessarily included in all types of Farm Plans.
- Some plans (e.g. farm business plan) may be best used as source of information for an IASM farm plan. Others, especially those that are audited, may provide an alternative option, as long as they cover the necessary water quality and quantity issues, even though the current purpose of the plan is not for RMA compliance (e.g. NZGAP).
- Duplication and overlap of plans and audits may not be a major issue. Most plans are voluntary (e.g. Beef and Lamb's Land Environment Plan, Sustainable Milk Production Plan) and are not formally audited. An IASM Farm Plan would be complementary to a plan such as 'Supply Fonterra' which could be used as a component of the IASM FEP. With plans like NZGAP, that are audited, the same auditor should be able to cover a section on RMA water management requirements. The IASM process can be sufficiently flexible to link with other plans and avoid duplication.
- An IASM on-farm programme should consider those areas of farming activity which potentially have an impact on water quality and water quantity including: irrigation, stock, fertiliser, cultivation, waterways and wetlands, and effluent management.
- Based on these areas of farming activity, an IASM programme should include as a minimum, management objectives and targets for irrigation, nutrients, and waterway/wetland

management. The farm plan would be part of a package which includes supporting measures including information programmes.

- The IASM Farm Plans need to reflect the uniqueness of individual properties
- Good Management Practices alone may not be enough to achieve targets and further measures may be required in some situations.
- The Farm Plan template will need to be adapted for each scheme / group etc and for specific regional council requirements.
- Farm Environment Plans are only part of the IASM package. Other aspects of the package (e.g. governance frameworks, information, training) will also need to occur so that the system has a higher likelihood of success.
- IASM must provide clarity about what is to be audited and what against.
- The IASM process should encourage a culture of continuous improvement.
- IASM Farm Plans should be electronic, but need on-farm support. There are risks that a checklist/tick box approach may not be sufficiently robust.
- Maori cultural issues need to be better understood by many schemes and incorporated into on-farm objectives and targets, for example, through consultation with local iwi at the scheme governance and management level during scheme/collective policy development and design of farm plan template.
- IASM has to play a tangible part in achieving outcomes, but need to note the likely lag effects in downstream water quality outcomes (e.g. in estuaries). Both demonstrating that practices have changed and robust catchment water quality monitoring will be required.
- Both incentives and sanctions should be included.

8 Appendices

Appendix 1: Terminology and Definitions

Audited Self-Management and Environmental Management Systems

'Environmental Management System' (EMS) and 'Audited self-management' (ASM) are two terms that commonly used to describe processes that can be used to manage water quality and quantity on-farm. The terms are used in slightly different ways by different authors and different groups.

Audited self-management

Audited self-management (ASM) is a term that has been recently adopted for water management in NZ. The Land and Water Forum (LaWF) in their second¹⁵ and third¹⁶ reports (2012) report settled upon the following definition for ASM for water quality, although it is equally applicable to water quantity:

'A management programme (individual, industry, or land user collective) which allows for the credible and transparent demonstration (audit) that agreed actions have been implemented (in this instance for water quality).' LaWF report 2 2012 (Glossary)

The first LaWF report¹⁷ (2010) (paragraphs 103/4) described ASM more narrowly:

"Used in conjunction with GMP, audited self- management (ASM) is an established audit system designed to verify adherence to GMP requirements, particularly where certification leads to market benefits. Used with regulatory compliance, ASM schemes transfer day-to-day resource management responsibilities to users under agreed terms, and subject to transparent audit. Commonly, an auditor approved by the regulator (a regional council) is engaged to undertake a compliance audit, which is then accepted by the regulator as proof of regulatory compliance by the consent holder."

ASM involves groups or schemes developing their own policies, procedures and plans to achieve environmental outcomes that have been agreed with the regulator with third party (independent) auditing of environmental systems and performance i.e. the group accepts responsibility for the environmental aspects of their operations.

The LaWF Report (paragraph 106), states that in order for ASM to work effectively within a regulatory compliance framework, ASM needs to provide:

¹⁵ Land and Water Forum, 2012. Second Report of the Land and Water Forum: Setting Limits for Water Quality and Quantity, and Freshwater Policy- and Plan-Making Through Collaboration. <http://www.landandwater.org.nz/>

¹⁶ Land and Water Forum, 2012. Third Report of the Land and Water Forum: Managing Water Quality and Allocating Water. <http://www.landandwater.org.nz/>

¹⁷ Land and Water Forum. 2010. Report of the Land and Water Forum: A Fresh Start for Fresh Water. <http://www.landandwater.org.nz/>

- robust and accessible data
- clearly defined roles, responsibilities, and consequences
- accessible and transparent governance
- open and regular communication between parties.

What is clear from the literature is that, while there is general agreement on what ASM entails, there is also a fair degree of latitude within the definition. This is highlighted by Willis¹⁸ in evidence to the Hurunui-Waiiau Regional Plan Hearing (2012). In this he describes two types of ASM:

- a) Industry schemes e.g. Dairying and Clean Streams Accord that provide a goal and range of services to industry participants. Accountability for performance rests with governing body
- b) ASM schemes that have property specific obligations, to achieve a collective goal. Individual properties are accountable for performance towards goal (and may be sanctioned for non-performance).

Willis sees type (a) providing tools and support that will help to achieve type (b) plans.

Carruthers¹⁹ (2011), considered that, based on LaWF first report, ASM as a concept needed further development to achieve LaWF's aspirations for the approach.

Environmental Management Systems (EMS)

Another term that has been used in relation to audited farm environment plan processes for irrigation is 'Environmental Management System' (EMS). For example, 'An Environmental Management System for Irrigation Schemes in New Zealand (2009)²⁰', describes an EMS process that also fits the definition of ASM.

An **Environmental Management System (EMS)** is defined as:

"An environmental management process implemented by an operator to assess, avoid and/or mitigate risks to the environment arising from their farming activities.

It is a 'tool' that enables a farming operation of any size or type to control the impact of its activities, on the natural environment.

¹⁸ Statement of evidence of Gerard Matthew Willis on Proposed Hurunui and Waiiau River Regional Plan on behalf of Fonterra Co-operative Group Ltd and Dairy NZ (submitters to Canterbury Regional Council) Oct 2012

¹⁹ Carruthers G, 2011. Auditing and critical review in environment management systems in agriculture; is there value for similar approaches in New Zealand's proposals for audited self management? In: *Adding to the knowledge base for the nutrient manager*. (Eds L.D. Currie and C L. Christensen). <http://flrc.massey.ac.nz/publications.html>. Occasional Report No. 24. Fertilizer and Lime Research Centre, Massey University, Palmerston North, New Zealand. 22 pages.

²⁰ Mulcock et al. 2009. An Environmental Management System for Irrigation Schemes in New Zealand. For The Ritso Society Inc. (www.ritso.org.nz)

An EMS approach may be used to demonstrate to markets and regulators adherence to good management practices, agreed standards, or agreed management objectives.”

An Environmental Management System (EMS):

- Serves as a tool to improve environmental performance
- Provides a systematic way of managing an organisation’s environmental affairs
- Is the aspect of the organization’s overall management structure that addresses immediate and long-term impacts of its products, services and processes on the environment
- Gives order and consistency for organizations to address environmental concerns through the allocation of resources, assignment of responsibility and ongoing evaluation of practices, procedures and processes
- Focuses on continual improvement of the system

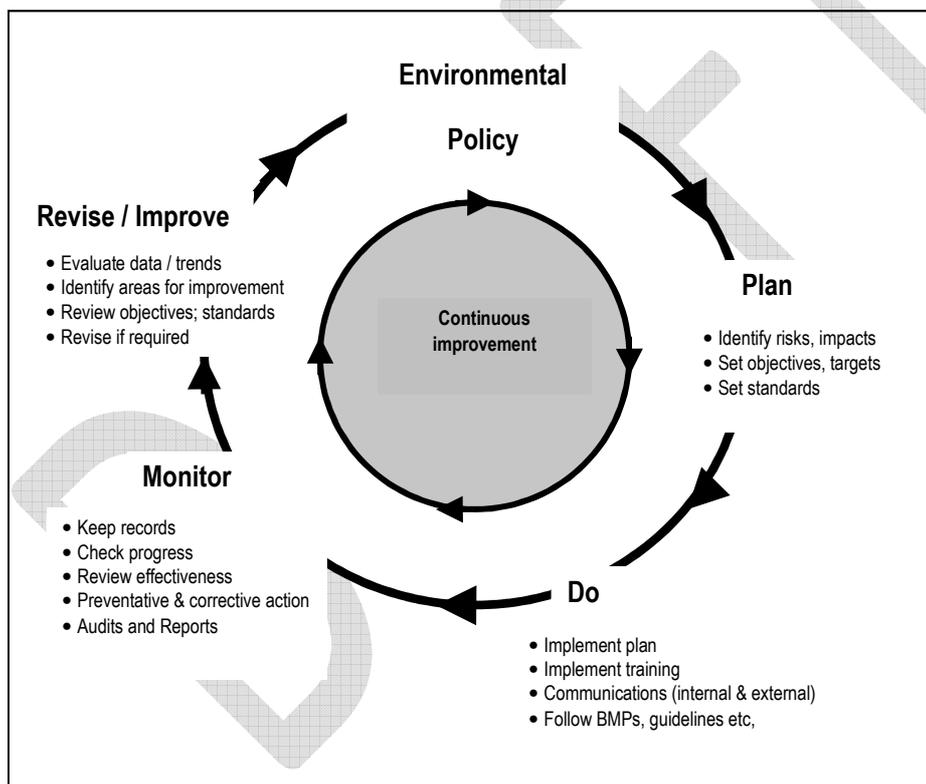


Figure 7 : Environmental Management System (planning and action cycle for continuous improvement)

The ‘Environmental Management System’ (EMS) approach is based on the ‘Plan, Do, Check, Revise’ cycle of management and continuous improvement (Fig 7). This process is well-documented and has been adopted in agriculture across Australia and New Zealand to demonstrate their environmental stewardship and obtain marketing advantages by communicating their sustainable production initiatives. A critical factor in EMS for agriculture is an audit process, often external, to provide proof

that natural resources are being carefully managed. EMS typically includes a risk assessment of environmental issues.

It is important to note that an ASM process is not necessarily an EMS. However, an EMS process can be effectively used to underpin an ASM arrangement.

Farm Plans

The term 'Farm Plan' is used in New Zealand and overseas for a wide range of planning documents developed by, or for, growers for use within their business. Some plans are internal to the business and others are available to a limited audience or even publicly available.

Farm plans types can be grouped into three broad categories:

1. Whole farm plans
2. Farm environment plans (may be single issue)
3. Nutrient management plans (may also be a component of a whole farm, or farm environment plan) Checklist plans

The reasons for having a farm plan are varied and the purpose of the plan usually determines the type of plan. Some of the drivers for farm plans are:

- Risk / business planning / business management tool
- Plan for determining and securing grant funding (e.g. soil conservation plan)
- Plan to meet market requirements (e.g. food safety) / secure niche markets (e.g. food or fibre quality)
- Plan to meet regulatory requirements (e.g. consents to take/use water)
- Plan as part of voluntary programme to demonstrate sound environmental practices to wider community

The farm plans reviewed in this study were mostly based on the premise that having a good understanding of the resource was a good starting point.

In order to identify the elements that are required for water quality and water quantity management, it is useful to clarify how these plans differ.

Whole Farm Plan

A 'Whole Farm Plan' or 'Whole Property Plan' is the most extensive type of farm planning document. The purpose is to review and tabulate full range of resources, goals and aspirations, financial and other constraints and develop a programme for the farm and farm family to achieve their aspirations over time. It is often prepared as part of strategic planning for succession planning or property

development. They may include detailed personal information on family aspirations and financial matters.

Farm Environment Plan

'Farm Environment Plans' typically cover a sub-set of the Whole Farm Plan and focus on the land and water resources. The Farm Environment Plan concept is not new with various forms having been promoted by agencies and used by growers for various purposes for many years. Blaschke and Ngapo (2003)²¹ and Brown (2006)²² described the types of farm environment plans that have been used in NZ.

The early use of farm plans in NZ was centred around soil conservation. The plans described the land resource and land capability and issues, then set out a works programme, such as tree planting etc. These plans were usually associated with, and a condition of, grant funding.

Farm plans range in complexity and sophistication from the simplest, which provide a list of recommended environmental works to be completed, to the most complex which model the effects on the whole farm business and the viability of activities implemented to address environmental issues.

Brown (2006) notes that good results are reported from a number of regions from many years of farm planning activities, despite the lack of a direct evaluation of the farm planning process and positive environmental outcomes. He also notes that, where success has been reported, the farm plan itself has only been the start of the process. Other factors include on-going commitment and support and the development of close working relationships between the councils and their landholder clients.

Other types of farm plans include forestry oriented environmental farm plan, riparian plans, comprehensive farm plans. See Blaschke and Ngapo for more detail.

Farm Environment Plans generally meet the following criteria:

- Individual farm scale – impact of farm activities on an environmental issue/s
- Historically, often single issue focussed (soil erosion, riparian management), but some take a farm/environmental system approach to address multiple issues
- Implementation based on land user's objectives, resources and timescale
- Generally include a significant works component
- Often prepared by agency staff in consultation with landowner

The variation between the different environmental farm plans makes them difficult to categorise. The range of examples can be differentiated according to the environmental management issue they

²¹ Blaschke P and Ngapo N. 2003. Review of New Zealand Environmental Farm Plans. Prepared for Ministry for the Environment

²² Brown IC. 2006. A Review of the Effectiveness of Environmental Farm Plan and Integrated Catchment Management Programmes. Prepared for Ministry of Agriculture and Forestry.

target. (e.g. erosion, riparian, biodiversity, pests or soil health); issue scope (single issue plans, single plus secondary issues, or multiple issues); targeted farming type; comprehensiveness; structured framework and content (traditional, checklist based, multi-report or single document); method of issue assessment; the manner in which they are prepared (do it yourself, workshops and groups or consultancy); inclusion of management agreements and the degree of monitoring that is used.

This means that there is a wide variation in understanding and expectations around a Farm Environment Plan. However, as the term has already been used to describe land user plans for managing environmental issues arising from irrigated land use, there appears to be little reason to change the terminology. It seems inevitable that whatever details are added (e.g. Farm Environmental Management Plan for Irrigated Land Use'), they will be referred to as 'Farm Plans'. Therefore the term 'Farm Environment Plan' and 'Farm Plan' for short, as suggested as appropriate.

Nutrient Budget

A **nutrient budget** provides an assessment of the nutrient outputs (production, runoff, leaching losses etc.) and nutrient inputs (fertiliser, feed supplements, effluent etc.) within a particular farm system. Nutrient budgets assist with understanding nutrient use and movements within a farm and evaluating management scenarios to optimise production and reduce losses from the farm system.

Nutrient budget models such as OVERSEER, are used calculate and estimate these nutrient flows and produce the nutrient budget report. The nutrient budget helps inform fertiliser and other nutrient management recommendations. The nutrient budget report can also be used to make a judgment on the potential for risk of environmental impact through nutrient losses such as run-off and leaching, and greenhouse gas emissions.

A nutrient budget is an important component of a nutrient management plan, but is not, itself, a nutrient management plan, as it does not set targets to be achieved.

Nutrient Management Plan

A nutrient management plan is *"a written plan that describes how the major plant nutrients (nitrogen, phosphorus, sulphur and potassium, and any others of importance to specialist crops) will be managed. It aims to optimise production and maximise profit value from nutrient inputs while holding or minimising any adverse effects on the environment."* (Nutrient Management Code of Practice²³)

Nutrient management plans vary in size and scope but normally include a nutrient budget and identify actions to minimise losses of N and P (including via effluent, soil, surface and ground water, stock and crops etc). Edmeades et al²⁴ (2011) note that *'It has been estimated that a full NMP report*

²³ Code of Practice for Nutrient Management (2007) The Fertiliser Association of New Zealand (formerly The New Zealand Fertiliser Manufacturers' Research Association)

²⁴ Edmeades et al. (2011) Setting the standard for nutrient management plans. In: *Adding to the knowledge base for the nutrient manager*. (Eds L.D. Currie and C L. Christensen).

of the type envisaged would take about 2 days to compile, in addition to the 2-6 hrs required for the farm visit. The NMP must be farm specific to be relevant – individual farm visits are essential.’ They note that the credibility inherent in a full NMP approach could be undermined if short cuts are taken and NMPs are not robust and credible.

Nutrient management plans are generally single purpose plans (i.e. to manage on-farm nutrients) but the boundaries between NMPs and FEPs are a rather ‘hazy’ particularly when riparian and irrigation actions are included with mitigation measures within the NMP. This compounds the confusions around the understanding and use of the terminology.

Mladenov (pers. comm.) notes that the intention of the NMP process is to be iterative and follow a farm, tracking progress towards limits through monitoring and assessing the management actions undertaken to achieve the identified nutrient management goals and objectives.

Figure: Nutrient Management Plan in the context of nutrient budget and FEP

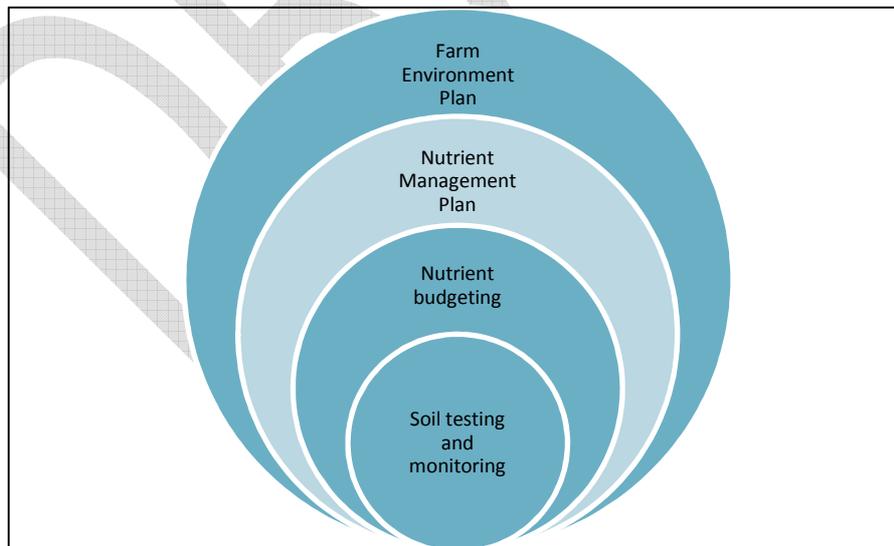


Figure: Nutrient Management Plan in the context of nutrient budget and FEP

Good Management Practices

Good Management Practices (GMPs) is a term used to describe practical measures that are recognised as appropriate e.g. in codes of practice, guidelines, manuals and user guides (e.g. Code of Practice for Nutrient Management, Irrigation Design Code of Practice, many riparian management guidelines) as being acceptable for agreed situations to reduce or minimise an adverse environmental effect. For example, GMPs for N fertiliser application are set out in Code of Practice Nutrient Management; standards for riparian fencing and planting are described in various guidelines for different regions.

GMPs are particularly important where appropriateness of a practice in any one situation is strongly influenced by a wide range of factors (e.g. the changing nature of the operation, land and soil type, land use, weather, season, regulatory and market influences, and financial considerations). Therefore some degree of modification of a generic practice (e.g. soil moisture monitoring for irrigation scheduling) is required to suit the specific nature of the operation and/or local circumstances.

GMPs also important where there is diffuse pollution such as runoff or leaching which is difficult to monitor accurately and/or to determine sources of problems. As GMPs need to be specific to the particular natural environment and land use enterprise they cannot be readily detailed at regional or catchment level.

Achieving 'Good Management Practices' (GMPs) on-farm would be an integral part of an IASM programme. Where GMPs need to be adopted part of an IASM programme, they must be incorporated within a framework, such as a management plan that sets out the purpose of the GMP (i.e. what is the objective for the practice) and shows that the particular practice is appropriate (e.g. for that soil type, land use etc). The audit would assess whether the practices have been implemented.

Appendix 2: Regional Council requirements

Regional Council Requirements for Farm Environment Plan and Nutrient Management Plans

The following tables provides a summary by region of the requirements now, and expected requirements in about two years' time for Farm Environmental Management Plans.

Region	2012	In 2-3 years
Northland	No specific FEP or NMP requirements as yet. New RPS notified requiring establishment of nutrient loss limits through subsequent plan reviews	Expecting programmes underway to establish water quality limits
Auckland	No specific FEP or NMP requirements as yet. Rural advisory panel established	Expecting zoning and water quality limits establishment programme (similar to that of Canterbury) to be underway with requirements for FEP.
Waikato	Requirement for NMPs for any applications of N greater than 60kg/ha/yr (Rule3.9.4.11) Requirement for NMPs under N cap within Lake Taupo catchment (Reg Plan variation 5)	Expecting requirements for FEP for all intensive farming within N caps and with required reductions over time – as component of full regional plan review.
Bay of Plenty	Requirement for establishment of nutrient benchmarking and NMPs for farming in Rotorua Lakes catchment (Rule 11), but has not been enforced. RPS has identified all Rotorua Lakes as catchments at risk, with N and P caps to be established through subsequent plan reviews	Expecting requirement for FEP for all intensive farming with N caps and with required reductions over time – as component of full regional plan review.
Gisborne	No specific FEP or NMP requirements as yet. Land & Water Advisory panel established	Expecting programme underway to establish water quality limits.
Hawke's Bay	No specific FEP or NMP requirements as of yet.	Expecting establishment of N&P limits and requirements for FEP as evidence by Tukituki plan change.
Manawatu / Wanganui	Sept 2012 Interim Environment Court decision on One Plan requires NMP's for all dairy, irrigated sheep and beef, horticulture and cropping. Requirement for NMP's for any application of N greater than 60kg/ha/yr for all of the region	
Taranaki	No FEP or NMP requirements	Full review of Regional Land & Water Plan to begin
Wellington	No specific FEP or NMP requirement as of yet.	Expecting the introduction of N & P caps especially for sensitive

		groundwater zone areas but timing uncertain.
Tasman/Nelson	No specific FEP or NMP requirements as of yet.	Expecting programmes underway to establish water quality limits
Marlborough	No specific FEP or NMP requirements as of yet.	Expecting programmes underway to establish water quality limits
West Coast	No specific FEP or NMP requirements as of yet. Lake Brunner protocols: Soil testing protocols and application of P fert with water solubility of less than 10%	
Canterbury	LWRP requirements – pre 2017 <ul style="list-style-type: none"> Existing land users record nutrient losses Existing land users – Lake Zone – require FEP (NMP as section) according to schedule 7. Change of land use – requirements for FEP (NMP as section) LWRP requirements – post 2017 <ul style="list-style-type: none"> Requirement for FEP (NMP as section) for all farming activities above N threshold. Hurunui-Waiiau Plan <ul style="list-style-type: none"> All land users must be part of ASM programme and have FEP (NMP as a section) by 2017 	Expecting FEP requirements as result of sub-regional plan development. N loss thresholds for all land uses and water quality limits.
Otago	No specific FEP or NMP requirements as of yet. Plan change 6A requires farm specific direct water quality monitoring. FEP required as condition of consent for NOIC.	??
Southland	Requirement for FEP (NMP as a section) for all new dairy conversions	Expecting expanded requirement for FEP for intensive land uses. Introduction of N cap very likely.