

# An Environmental Management System for Irrigation Schemes in New Zealand

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## Irrigation Scheme Environmental Management System

The Irrigation Scheme Environmental Management System (EMS) has a number of components. A description of the EMS process plus the templates, manuals and worked examples has been published by the Ritso Society (Inc) as "An Environmental Management System for Irrigation Schemes in New Zealand". The templates, manuals and worked examples listed below are all available on [www.ritso.org.nz](http://www.ritso.org.nz) and may be copied or adapted.

### **An Environmental Management System for Irrigation Schemes in New Zealand**

#### **Scheme Sustainability Protocol**

**Preparing Your Farm Plan for Irrigated Land Use: Workshop Manual**  
**Environmental Farm Plan for Irrigated Land Use: Audit Manual (includes audit template)**

**Environmental Farm Plan for Irrigated Land Use: dairy farm template**  
**Environmental Farm Plan for Irrigated Land Use: cropping farm template**

**Environmental Farm Plan for Irrigated Land Use: example of a dairy farm plan**  
**Environmental Farm Plan for Irrigated Land Use: example of a mixed cropping & sheep plan**

**Farm Plan Audit: example of dairy farm audit report**  
**Farm Plan Audit: example of mixed cropping & sheep farm audit report**

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## Foreword

### Irrigation Scheme Environmental Management System

In 2005, The Ritso Society embarked on a project to develop a systematic approach for irrigation schemes in New Zealand to achieve sound on-farm environmental management and demonstrate this to regulatory authorities and the wider community.

The environmental management system that is presented here takes a pro-active and preventative approach, to show that irrigation and intensification of land use can be developed using innovative solutions that both increase economic wealth and maintain high environmental standards.

The Irrigation Scheme Environmental Management System (EMS) has a number of components. It is produced here, in full, as “An Environmental Management System for Irrigation Schemes”. In addition, the templates, manuals and worked examples are all available on [www.ritso.org.nz](http://www.ritso.org.nz) and may be copied or adapted for use in specific schemes.

Other reports prepared as part of this project and available on [www.ritso.org.nz](http://www.ritso.org.nz) are:

**‘Comparison of Piped and Open Channel distribution of Irrigation water supplies’**

**‘Options for efficiency gains through trading within a community irrigation scheme’**

Also on [www.ritso.org.nz](http://www.ritso.org.nz) is the ‘Irrigation Sustainability Resources’ database which contains a bibliography of resources identified for this project. The database can be searched by keyword or browsed by category, such as: Economic (National and On-farm), Environmental, Government and Policy Planning (National & Regional), International, Community and Research Groups and Projects, Social, Technical Irrigation and Farming and Technical Water.

This project has been funded by Central Plains Water Ltd, Ministry of Agriculture and Forestry Sustainable Farming Fund and The Ritso Society.

We trust that the Environmental Management System approach and the various manuals, templates and other resources will be of value to irrigators throughout New Zealand.

**Ross Keeley**  
Chairman  
The Ritso Society  
June 2009



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## Introduction

There is a reasonably well-developed position by the wider community that the net benefit from irrigation is too heavily weighted towards production outcomes especially at the expense of freshwater ecosystems, and that irrigation practice needs to achieve a better balance between water use for production and environmental protection. Introductory material for the Government's Sustainable Water Programme of Action (Sustainable Water Programme of Action "Freshwater for the Future" April 2006) points to issues of increasing demand and inefficiency of use, and undesirable effects on water quality particularly from intensification of land uses including agriculture and horticulture. It notes that while as a country we are not short of water, demands on freshwater in some regions (especially for irrigation) are exceeding what is available and sustainable. There is, therefore, considerable pressure on irrigators and irrigation companies to improve their performance and to demonstrate their positive effects, not only economic, but also social and environmental.

The irrigation industry also appreciates that environmental issues need to be better managed to enable irrigation to be a sustainable practice into the future, and wants to achieve a more balanced public perspective of irrigation. A more pro-active and transparent approach to environmental management by irrigation schemes and provision of information may help to demonstrate that efforts are being made to reduce and better manage negative effects.

This report describes an environmental management system (EMS) process for improving and reporting on the sustainability of irrigation in NZ that has been developed by The Ritso Society Inc., a farming and community group in central Canterbury. This group recognises that irrigation schemes and irrigating farmers need to show that they are maintaining high environmental standards, and believes that where community irrigation schemes provide support for farmers this will help them achieve best practice irrigation including implementation of useful new technology and research findings.

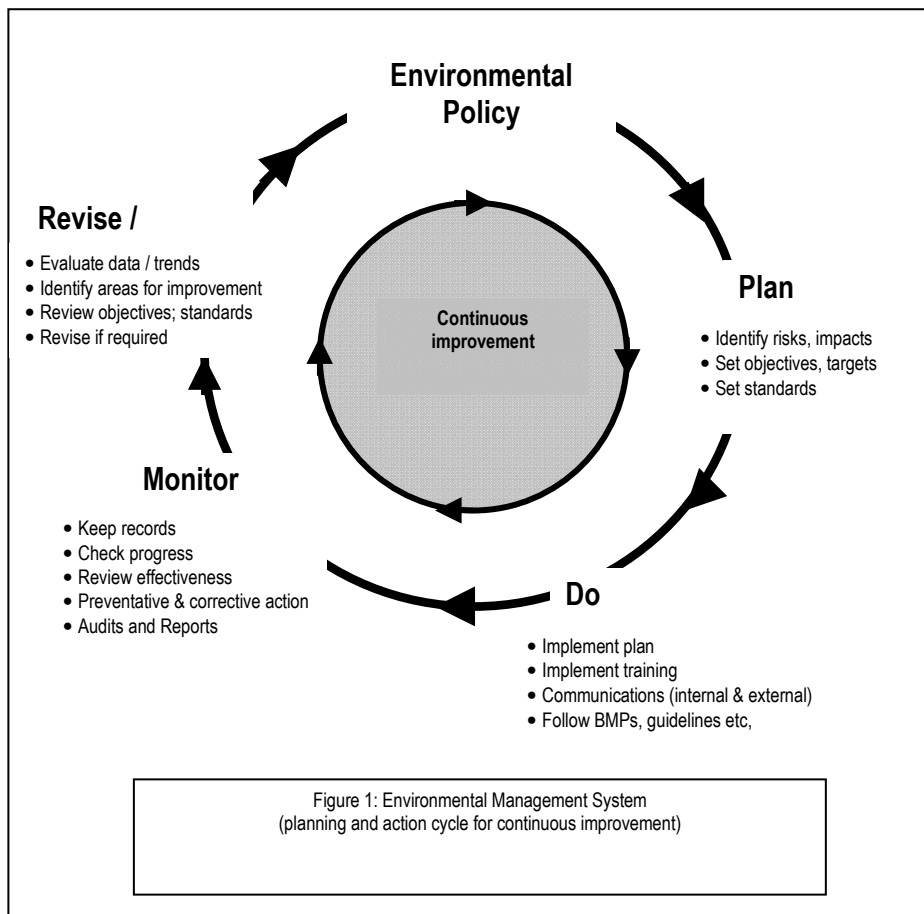
The project was initiated because, although there were recent technical studies on irrigation water use and water management, including quality and quantity aspects, there was no formal process for implementing these at a scheme or farm level. Nor was there a systematic approach for irrigation schemes in New Zealand to demonstrate to regulatory authorities and the wider community how they are achieving sound on-farm and scheme-wide environmental management.

The objective has been to develop a realistic, practical plan for sustainable management of irrigated agriculture, by bringing together the wide range of recent information already available or being developed in relation to 'best practice' technical, environmental and economic aspects of irrigation. The approach is pro-active and preventative and aims to show that irrigation and intensification of land use can occur in ways where both economic wealth is increased and high environmental standards are maintained.

An EMS approach has been used to produce a robust generic methodology that takes a rigorous approach to implementing and documenting sound environmental management at the farm level, coupled with strong leadership by the irrigation scheme management. This includes supporting farm families to improve their knowledge and understanding of the effects of their activities, as well as setting out the reporting, audit and compliance requirements for the scheme's water users.

## Developing the EMS

A case study approach was used to develop an environmental management system that is integrated with sustainability reporting. It is based on an Environmental Management System (EMS) approach which embodies a feedback loop for adaptive management ('learning by doing') (see figure 1). A description of the EMS methodology and its use in NZ and Australian agriculture is in Appendix 1.



For the purposes of this project we have assumed that the irrigation scheme governance and management is through a company structure, and that water users are generally shareholders in the company. We recognise that shareholders may be able to lease their water to non-shareholders, and provide that any duties with respect to environmental management and reporting must also be transferred. However, our concept could equally be applied to other governance structures.

The approach is based on the key responsibilities of the irrigation company being to:

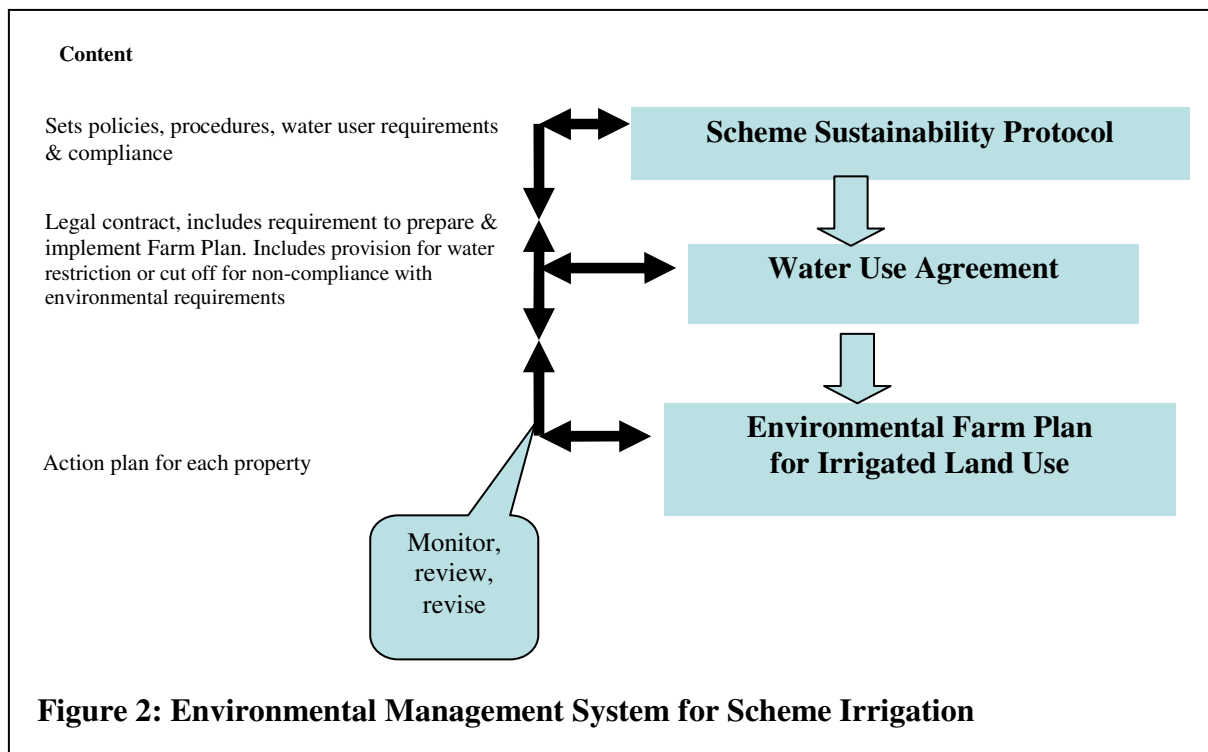
- Ensure that water is available when and where required
- Ensure that the consent conditions are met, including monitoring & reporting requirements
- Ensure that shareholders (water users) understand any requirements to meet environmental bottom lines
- Ensure that water users meet all contractual obligations with the irrigation company.

Other responsibilities that the scheme management could (and perhaps should) take on, for all users:

- Provide information across the whole scheme, where this is practical and cost-effective and not readily available from other sources:
  - Perhaps – ET, rainfall, soil temperature, solar radiation etc
  - Other – e.g. soil water-holding information etc – required to optimise application rates etc
- Ensure skilled advisors are available – especially in development phase
- Require certain design standards or design audits
- Require water users to meet certain requirements e.g. with respect to application efficiency, nutrient management.

### ***‘Warrant of Fitness’***

Although the overall responsibility for environmental performance for an irrigation scheme rests at the governance and management levels of the organisation/s involved, it is the day-to-day actions of the water users in their farming businesses that can have the major impact on the environment. The project identified that an EMS-based Environmental Farm Plan and audited self-management alone were unlikely to be sufficient to tie into regulatory processes and give confidence that the Farm Plan process will be managed and monitored on an ongoing basis. This was confirmed during consultation on the proposed framework and approach. Therefore, we propose a 2 tier approach, linked by a legal agreement that sets out the responsibilities of each party. (Figure 2).



**Figure 2: Environmental Management System for Scheme Irrigation**

We have called our concept a ‘Warrant of Fitness’ (WOF) as it has elements of standards, responsibilities, auditing and compliance. These include:

- Standards to protect water user, wider community & environment
  - Some standards may be national (e.g. codes of practice), others scheme specific (e.g. related to local soils, climate etc.)
- Responsibilities – to meet standards; be audited
- Audits - may be internal and/or external
- Reporting – to identify performance issues and compliance
- Leadership – setting standards & compliance procedures

The WOF recognises the different responsibilities and interrelationships of the scheme managers and water users and creates an integrated programme. It aims to be:

- Flexible, to suit different sector or business needs
- Risk-based, focusing on achieving improvements in on-farm environmental management
- Based on best available science
- Consistent in approach, rigorous, credible.

Key drivers for development of the WOF included:

- Recognition of the need to demonstrate effective environmental management
- Desire to avoid loss of flexibility in decision-making through an imposed regulatory approach
- Preference for a practical, participatory, ‘ground up’ approach

## **Sustainability Protocol**

### ***Approach***

The ‘Sustainability Protocol’ (Appendix 2) sets out the scheme level governance and management policies for environmental responsibility. It incorporates the overarching principles that commit the scheme to responsible environmental action in its ‘Sustainability Policy’. The Protocol then describes how the scheme operator will implement its Sustainability Policy including:

- Scheme governance and management activities and responsibilities, such as
  - Identification of key issues for environmental management
  - the process for preparing, approving and reviewing individual environmental farm plans
  - provision of information and training for water users
  - reporting to users, regulatory authorities and wider community;
- Responsibilities and requirements for individual water users;
- Process for ensuring water user compliance, including enforcement measures.

The Protocol document aims to cover the criteria that are widely used to check that a company is integrating sustainability into its organisational management and operations, including:

- The company has a coherent vision of sustainability
- The company’s key sustainability challenges are clearly stated and prioritised
- The company’s sustainability strategy is clear
- The company’s environmental, social and economic performance data are all reported
- The company uses various forms of assessment including external reviews and stakeholders comments

For irrigation companies sustainability reporting is also a valuable communication tool that can provide balanced information to the wider public regarding environmental impacts and socioeconomic benefits relating to irrigation. It gives the company an opportunity to demonstrate its efforts and investments to improve sustainability and reduce the negative impacts of irrigation.

## ***Review and improvement***

The EMS approach incorporates a feedback loop that provides for ‘continuous improvement’. This provides the basis for the adaptive management - “learning to manage by managing to learn” (Bormann et al, 1993). It recognises that there are inherent uncertainties in our understanding of catchment processes, water user priorities, and the effects of the scheme operation. Knowledge about complex natural systems continues to change, natural systems are themselves dynamic, community expectations and priorities also change. Therefore scheme management systems need to be flexible and able to evolve.

The philosophy of *adaptive management* is followed where policies and practices are continually revised by learning from the outcomes of previous work. The process is iterative and aspects of the management processes are revisited and reviewed. The Scheme Sustainability Protocol sets out the process for learning from information gained through monitoring and management actions and using that learning to make improvements both at scheme level and at farm level. In the implementation of their Scheme Sustainability Protocol, scheme managers would regularly check whether they are satisfied that the scheme is effectively addressing issues and potential areas for improvement are being identified and implemented. The Scheme Sustainability Protocol would be revised as required.

## ***Key Issues for Irrigation Scheme Environmental Management***

The key issues that are addressed in the WOF were identified through consultation with farmers and others with interests in environmental management of irrigation schemes. They may vary from scheme to scheme. The focus areas identified in the case studies for this project cover:

- Kaitiakitanga (guardianship);
- Biodiversity & ecosystem information and management;
- Efficient Water Use;
- Water Quality;
- Water Quantity: flows and levels;
- Local Communities.

The Protocol then proposes a suite of environmental programmes to address the focus areas. Each programme addresses issues identified in more than one key focus area. The proposed programmes that will be implemented are:

- An Environmental Farm Plan programme, including providing training and support, relating to implementation of sustainable irrigated agriculture
- An Environmental Management Fund programme
- Water quality, flow and level monitoring and management
- Community and iwi liaison programmes

## ***Compliance and enforcement***

Monitoring and evaluation includes keeping records of activities and conditions. This is an integral component of an EMS. The Scheme Sustainability Protocol outlines how this will be implemented both at the scheme operation level and with individual water users.

## **Environmental Farm Plan Programme**

At the farm enterprise level, each water user must comply with the scheme resource consents to take and use water and the scheme's own environmental policies and requirements. To achieve this, a scheme would require each water user to prepare and implement an Environmental Farm Plan for their irrigated land use. This plan would be developed, implemented, reviewed and updated in accordance with the scheme's Sustainability Protocol.

The proposed farm plan programme includes:

- Templates for development of individual enterprise Farm Plans for Irrigated Land Use provided by the scheme managers;
- Assistance through workshops and individual support to help water users to prepare their plans;
- Scheme standards for on-farm environmental management;
- Implementation of a formal process for approval, review and audit of the plans;
- Implementation of compliance and enforcement procedures;
- Provision, by the Scheme, of training and education related to sustainable irrigated land use;
- Provision, by the Scheme, of information to assist in managing water use, where there are benefits to providing this scheme-wide (e.g. climate information).

## ***Farm Plan template***

The Farm Plan templates (Appendix 3) are based on development of templates for two proposed schemes (Hunter Downs Irrigation and Central Plains Water) and on experience gained from implementation of farm plans by the North Otago Irrigation Company. It is intended that a scheme would prepare templates to fit with the particular environmental issues and land uses relevant to the scheme area. The templates are then used by individual irrigators to develop their own environmental farm plan.

The templates have been designed to:

- be straight forward, yet effective;
- be suitable for all farming activities;
- promote best practices and aim to make 'best practice' into 'normal practice';
- address issues relevant to irrigated land uses;
- provide the scheme operator with a process to ensure that on-farm environmental effects are being managed.

- be consistent with requirements of other farm plans (e.g. sector specific quality assurance);

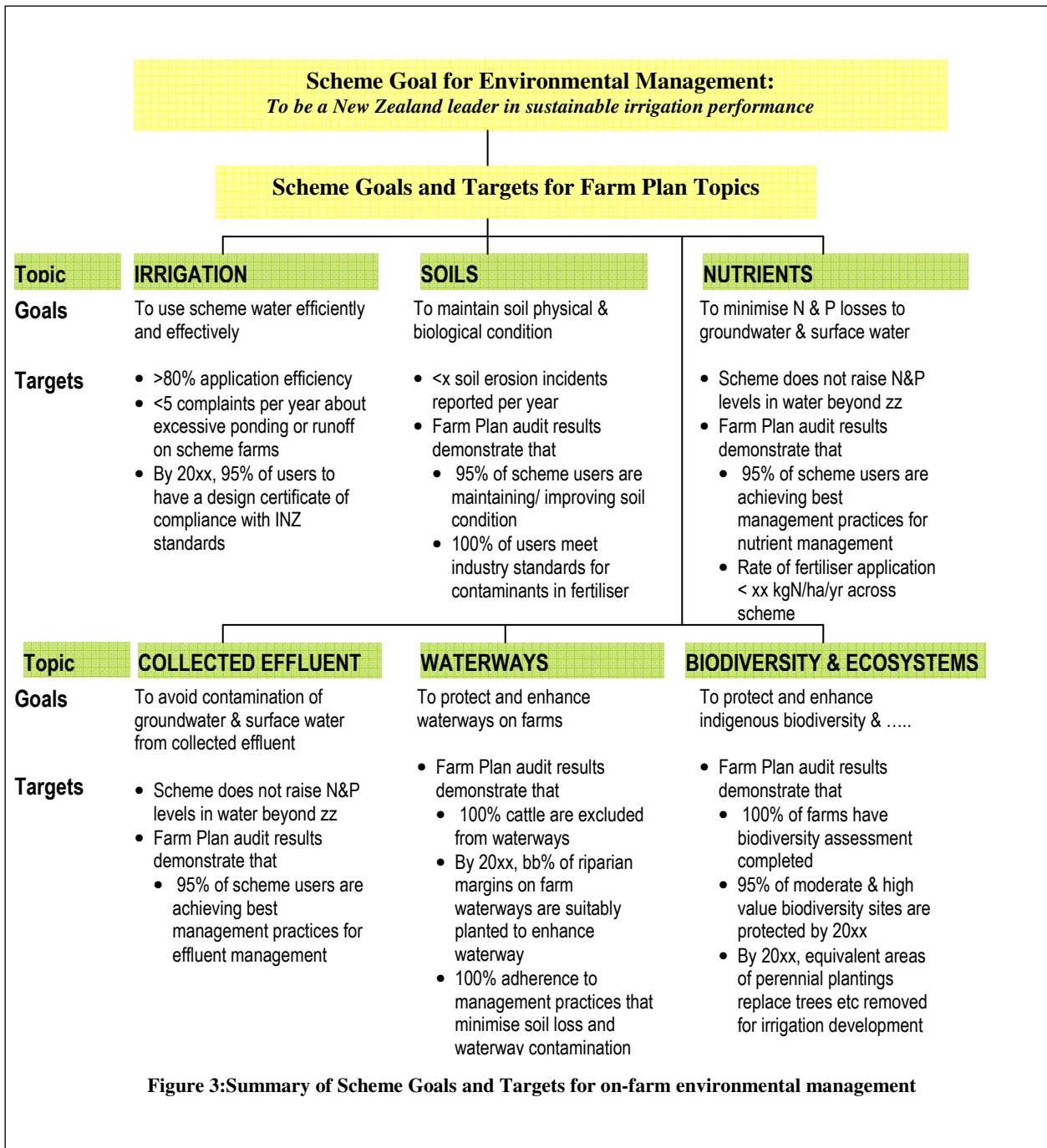
The generic Farm Plan templates provided here for dairy and arable farms cover 6 topics, identified through the case studies as the key environmental management issues related to the on-farm effects of irrigated land use. They are:

- Irrigation management
- Soils management
- Nutrient management
- Collected animal effluent management
- Biodiversity & ecosystem management
- Waterway and riparian management

Each of the management topics has a similar template covering:

- Specific goal and related concerns or impacts
- Objectives
- Targets
- Best management practices (These need to be further defined for each individual farm)
- Assessment and response table and sign-off

For each topic the Farm Plan template sets out the management goal and the key issues or concerns that the water user needs to avoid, remedy or mitigate. It then lists the scheme's objectives and targets. These will often be set to enable the scheme to meet its resource consent conditions. Each user must consider each objective in relation to their specific property (e.g. soil type, slope, irrigation method, irrigated area, land uses) and determine how they will achieve best practice and what monitoring and records they will use to show their achievements. For example soil moisture measurements in a cropping system may be through use of an irrigation consultant who provides a measurement and analysis service, whereas pasture systems for dairy may have permanent soil moisture equipment (e.g. Aquaflex) that is monitored by farm staff. Figure 3 shows possible Scheme Goals and Targets for Farm Plan topics. These goals and targets are then converted into farm level objectives and targets that individual farms need to achieve to enable the Scheme to meet its goals.



The Scheme, through its commitment to provide training and support, would ensure that water users have up-to-date information (e.g. through workshops) so that they can use best practices to achieve both production and environmental goals.

### ***Incorporation of Codes of Practice and Guidelines for Irrigated Land Use***

Because EMS is a process, existing (and new) codes of practice and other best management practice (BMP) guidelines can readily be incorporated. There are many existing codes of practice, quality assurance systems and other guidelines for achieving sound environmental management on-farm through use of appropriate management practices. These have been developed for New Zealand farm systems, generally with extensive consultation.

Some of these are sector or product specific (e.g. pork, dairy, kiwifruit, blackcurrants). Others are general and relate to specific activities such as fertiliser use or waterway management. In developing the farm plan template this project concluded that there are so many of these BMP codes and guidelines that it would refer only to those that are not specific to a particular primary sector, with the exception of the 'Dairying and Cleans Streams Accord'. Growers would be expected to implement their own sector or product specific codes, quality assurance or Best Management Practice systems and documents according to market or processor requirements. The 'Dairying and Cleans Streams Accord' has been included because the focus is on waterways, rather than dairy produce.

Rather than summarise or incorporate material from the various codes and guidelines into the Sustainability Protocol or the Farm Plan templates, this project considered that it is more appropriate to reference or link the source material. This avoids errors and will make it more straightforward to ensure that updates are incorporated as they are produced. The general codes and guidelines that have been included all provide practical approaches to managing key environmental issues. They are:

- Irrigation Design Code of Practice and Irrigation Design Standards (Irrigation NZ)
- Irrigation Evaluation Code of Practice (Irrigation NZ)
- Code of Practice for Nutrient Management
- Spreadmark Code of Practice for the Placement of Fertiliser in New Zealand
- 'GROWSAFE' - Agrichemical Use
- Dairying and Clean Streams Accord
- Region specific waterway and riparian management guides e.g. "Guide to managing waterways on Canterbury farms" & companion guides "Lowland Plains, Streams and Drains" & "Hill Country Streams".

### ***Farm Plan Preparation***

Schemes would use a workshop process to assist water users prepare their initial farm plan. For example, water users in the North Otago Irrigation Company's (NOIC) Downlands scheme attended two workshops, and many were able to complete their plans during the second workshop. Based on the NOIC experience, it would be desirable for a Scheme to provide some individual support in addition to the workshops. Completed plans would be checked and approved by (or on behalf of) the scheme management.

A workshop process to introduce farmers to the environmental farm plan concept and assist them to develop a plan for irrigated land use on their own property has been prepared. A workshop manual 'Preparing your environmental farm plan for irrigated land use' (Appendix 4) sets out the process and activities, and can be modified for a particular scheme. Two examples of completed Farm Plans are shown in Appendix 5.

Farm Plans will need to be updated when management changes are made relating to plan activities. This requires a process for scheme management to check and approve changes to plans. This process would be included in the Scheme Sustainability Protocol, and the water use agreement.

As part of the farm plan, all water users would be required to keep certain records on their farm practices. For example, both implementation and review of nutrient budgets and plans should be demonstrated.

### ***Farm Plan Monitoring and Audit***

Schemes would use both internal review and third party audit processes to monitor Farm Plan performance. Auditing the Farm Plans ensures that appropriate systems are in place to manage the environmental risks associated with irrigated land use. Using an independent external auditor adds credibility to the review process. An Audit Manual has been prepared (Appendix 6) as a guide to the proposed external audit and reporting process. It also provides guidance on skills required to effectively audit the farm plans, and includes a template for the audit of an individual farm plan. Appendix 7 has two worked examples of farm plan audits.

Based on case studies and consultation, an annual review of the plan and its performance is recommended for the first three years that a farm receives scheme water. This is to ensure that water users are provided with support and information and do get their plans implemented. It would also give users, regulatory authorities and the wider community assurance that farms within the scheme are being well-managed to avoid or minimise adverse environmental effects. After 3 years, water users who are achieving all their plan targets may have extended periods between reviews, up to a maximum of 5 years. There could be other incentives that can be provided to recognise environmental management achievements.

### ***Farm Plan Compliance Strategy and Enforcement Procedures***

To ensure that an irrigation scheme can maintain community confidence that Farm Plan requirements are fully implemented, schemes need to be seen as credible and fair in implementing their environmental farm plan programmes.

The compliance process (see Scheme Sustainability Protocol – Appendix 2) identifies the set of actions necessary to achieve compliance by all water users, and to correct or halt situations that endanger the environment. This process would need to be further developed and refined for a specific scheme.

It includes the following elements:

- Promoting compliance (e.g. through providing training, information etc.)
- Inspections and monitoring (e.g. internal and independent third-party audits of Farm Management Plan performance)
- Deterrence (i.e. identification and enforcement of breaches with appropriate penalties to show that there are adverse consequences of non-compliance)

A process for responding to water user non-compliance is set out, with water take restricted or cut off as the penalty, where breaches are not dealt with. The provision for a scheme to restrict or cut-off water would be included in the water use agreement.

### ***Reporting of Farm Plan performance***

Water users would receive a feedback report following any review or audit.

As part of its environmental & other reporting, the Scheme would use farm plan monitoring data to prepare an annual report on Farm Plan performance using aggregated data to demonstrate overall performance. This report would be provided to the Regional Council (as part of the resource consent monitoring), any scheme community liaison groups and others.

## **Environmental Management Fund**

Establishment of a scheme environmental management fund acknowledges that there will be changes and potential adverse effects from this new irrigation development. However, the scheme also provides opportunities to contribute positively to environmental management both on-farm and within the wider scheme area.

The fund to provides a mechanism for all water users to support opportunities to undertake environmental maintenance, restoration and improvement projects or activities either in the scheme area or areas affected by the scheme. The level of funding provided by the water users needs to be an affordable sum that provides an adequate amount over time to address appropriately matters relevant to the scheme. An initial contribution could be in the order of \$5 per hectare per annum.

The Scheme Sustainability Protocol sets out preliminary ideas on the types of projects that could be funded.

## **Water Use Agreement**

The Scheme Sustainability Protocol and the Farm Plans are linked through explicit requirements in the contractual arrangements between the scheme operator and the user for water supply (referred to as the 'water use agreement'). This supply agreement needs to set out the obligations to prepare and implement the farm plan, keep records, and comply with the review, audit and enforcement procedures. It would also include provision for water supply to be reduced or cut off for non-compliance with environmental management provisions.

## **Resource Consent Conditions**

The use of this EMS process can be reflected in a scheme's consent conditions with the processes for consultation and sign off of both the Sustainability Protocol and the template for the Farm Plan being detailed rather than specific controls, such as fertiliser or stock number limitations. This recognises that different farm enterprises and topography require different best management practices to achieve good environmental outcomes.

This project has not attempted to develop possible consent conditions that would ensure that the Scheme Sustainability Protocol and Farm Plans are prepared and implemented as proposed, but did have input into draft conditions proposed by the applicants for Hunter Downs Irrigation scheme ([www.hunterdownsirrigation.co.nz](http://www.hunterdownsirrigation.co.nz)).

## Conclusions

The proposed linked Scheme Sustainability Protocol and Environmental Farm Plan approach provides a systematic approach to environmental management for an irrigation scheme. This approach is based on internationally recognised methodology.

Environmental management arrangements based on an EMS approach and designed specifically for community irrigation schemes have the potential to overcome some limitations that occur in an orthodox rules approach, especially if specific best management practices are defined. The EMS process means that not only are environmental issues recognised, but active planning and management of them must occur.

Use of an integrated Scheme Sustainability Protocol/Farm Plan approach can achieve regulatory compliance and environmental performance that moves beyond compliance through commitment by the scheme management to continuous improvement in environmental performance. This approach encourages a proactive, rather than reactive organisational culture and style of management. With the EMS approach the training and support that is vital, but is often difficult for individual farmers to access, is provided by the Scheme.

By incorporating the Scheme Sustainability Protocol/Farm Plan processes into the consent conditions the regulatory authority can maintain control while providing for innovation and risk management through improving adaptive capacity.

The Farm Plans provide a risk management approach to environmental protection and enhancement on irrigated farms. The templates are designed so that they can be adapted for each farm business. Many of the requirements will have both economic and environmental benefits. This Farm Plan is specific to irrigated agriculture and addresses related management issues. It is not intended to be a 'whole farm' plan, and therefore does not deal with issues such as animal welfare, occupational safety and health, or business planning.

The generic Scheme Sustainability Protocol, Environmental Farm Plan templates, Farm Plan Workshop manual, and Farm Plan Audit Manual provide detailed examples, based on case studies, of the proposed EMS process.



## **Appendix 1: EMS methodology**

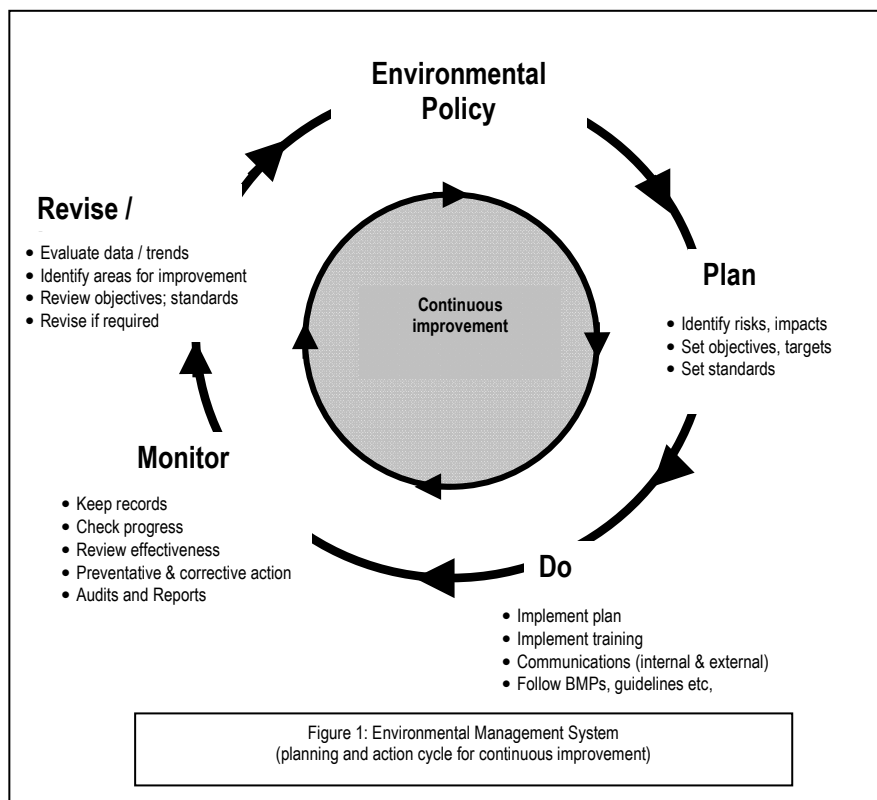


## EMS methodology

An environmental management system (EMS) is a systematic approach that any enterprise can use to identify and manage the effects of its activities on the environment and to continuously improve its business management to achieve efficiencies and better environmental outcomes. An EMS can be integrated with, and build on, other tools such as best management practices (BMP), Codes of Practice, standards, product certification and quality assurance (QA). An EMS sets the organisation's goals for environmental performance and a plan for achieving those goals.

An EMS is an ongoing cycle of planning, implementing, reviewing and improving the actions that an organisation undertakes to manage its impacts on the environment. With an EMS approach the organisation undertakes to meet both its own environmental objectives and, where applicable, externally regulated, environmental obligations. The EMS methodology was developed by business and industry to systematically identify and incorporate environmental management within a particular organisation. Figure 1 shows a schematic diagram of an EMS. It incorporates a cycle of activities comprised of five stages:

1. making a **commitment** to manage one's environmental impacts
2. **planning** for management of the environmental impacts
3. **implementing** a plan to manage the impacts
4. **'checking'** that operations are proceeding according to plan, and
5. **reviewing** the whole process from time to time to ensure that the system and its plan are appropriate and the assumptions on which it is based are correct and changing your actions accordingly.



The EMS management cycle can most easily be summarised as a flexible ‘Plan, Do, Check, Act’ process that an organisation can use to improve and demonstrate their overall environmental performance. Although well-recognised in other industries, the adoption of formal EMS in agriculture is relatively new.

Two internationally recognised EMS programmes are the ISO 14001 Standard (ISO 1997) and the European ‘EMAS’ (Eco-Management and Audit Scheme Regulation) which many European countries require their large manufacturing facilities to implement. EMAS is similar to ISO 14001 but has 2 additional requirements: a baseline environmental assessment and a public environmental performance report.

The Australia and New Zealand Standard for EMS (AS/NZS ISO 14001: 1996) is identical to ISO 14001. EMS is defined as:

*...The part of the overall management system that includes organisational structure, planning activities, responsibilities, practices, procedures and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy (Standards Australia 1996a).*

ISO 14001 is an internationally recognised standard for certification of environmental management. Certification involves a third party audit by an accredited body. The ISO 14001 standard was developed largely by secondary industry and regulators, and has been perceived by small/medium enterprises, including in the agriculture industry sector, that it is ‘too hard’, ‘too complex’ and ‘too expensive’<sup>1</sup>. Despite these views on the use of ISO 14001 by individual farm enterprises and other agricultural industries a number of certifications have been achieved in Australia and New Zealand, especially by groups in order to reduce the certification and audit costs. For example, a North Otago farmer group (NOSLAM) with a range of farm types has achieved ISO 14001 certification. In NSW, Colleambally Irrigation Ltd obtained ISO 14001 certification in order to be able to demonstrate to the public that they are managing scarce resources responsibly.

Irrigation scheme managers do not need to go down the track of becoming ISO 14001 accredited, although they could if it was deemed to be beneficial to their water users in marketing their products.

## **Features of an EMS**

There are number of features that are a required for an effective EMS:

- An environmental policy that sets out the organisation’s commitment to environmental management;
- Planning to implement the environmental policy;
- Implementation and operation of specified objectives and targets;
- Checking and corrective actions to measure and track performance;
- Regular review by ‘top management’ to ensure its ongoing suitability, adequacy and effectiveness;
- Continuous evaluation and improvement.

An EMS may highlight knowledge, training, data, research and resource needs. Minimum requirements are to address all applicable legislation, but moving beyond compliance is

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<sup>1</sup> Carruthers, G. 2005 *Adoption of Environmental Management Systems in Agriculture- an analysis of 40 case studies* A report for the Rural Industries Research and Development Corporation. Publication no 05/032 NSW Department of Primary Industries Canberra Australia 2005.

encouraged by the ‘continual improvement’ concept. If there is a need to meet certain operating requirements (due either to regulatory or customer demand) then the EMS process can be used to achieve these outcomes. By using a process-based approach, an EMS encourages innovation, as it does not focus on pre-determined ways to achieve specific environmental outcomes. Because an EMS is a process standard, it can be used to integrate relevant product and performance standards, including those specified in BMPs and Codes of Practice, where they exist.

### **EMS in New Zealand and Australian Agriculture**

Generally the EMS approaches that have been developed for agriculture in NZ and Australia have been designed as ‘process’ standards that can be readily integrated with other on-farm management processes and records that landholders may already maintain, such as financial accounts, food safety, occupational health and safety, and quality assurance. In fact EMS can help integrate these other processes. EMS approaches may also have product or production-oriented standards that define how a product is produced, or a mix of process and product standards.

In Australia use of EMS in agriculture, both on-farm and in agricultural industries is promoted and supported at government level (‘Australia’s National Framework for Environmental Management Systems in Agriculture’ 2002), whereas in NZ use of EMS has been primarily market driven and developed by the sector concerned. In both countries the use of an EMS process is voluntary.

EMS of various types are increasingly being adopted for agriculture, especially in Australia where the Australian government has recently completed a 3 year \$8.5m EMS National Pilot programme to support primary producers to trial and further develop the potential of EMS in agriculture. Fifteen pilot projects were trialled across a range of regional, industry and supply chain contexts. Some of the industries already have BMPs or codes of practice (e.g. cotton & rice industries for pesticide use) and are looking to move to a more comprehensive EMS approach that could be certified if desired. Some of the issues that arise with implementing EMS at farm enterprise level (e.g. lack of information, training requirements etc) can be more readily addressed with a sector approach or, in this case, by the irrigation scheme.

A number of the farm environment related codes of practice and guidelines developed in New Zealand take the EMS ‘plan, act, review, revise’ approach. For example: the “Code of Practice for Nutrient Management (with emphasis on fertiliser use)” (which supersedes the CoP for Fertiliser Use); the kiwifruit industry “KiwiGreen” and wine grape “Sustainable Winegrowing New Zealand“ program. The North Otago Irrigation Company Ltd (NOIC) has a mandatory Environmental Farm Plan and audit process required by their consent conditions, but this does not appear to be linked in to a scheme environmental policy or plan. Mr Brown will describe the NOIC programme in his evidence.

An EMS process is suitable for a (large) irrigation scheme to use as its approach to environmental management because:

- An irrigation scheme needs to demonstrate commitment to sound environmental management, and have a process for ongoing mitigation and improvement;
- Water users in a large irrigation scheme will be involved in a range of land uses, with different sized enterprises and scales of operation which will require specific environmental management actions to meet overall environmental goals and objectives;

- Some growers will have existing sector or product specific quality assurance programs or product standards to meet and this approach can incorporate these without duplication;
- Significant current investment in R&D is expected to refine or revise best practice information (e.g. nutrient management; riparian management) and provide new technology for farm enterprises (e.g. irrigation scheduling tools), within the next 5 – 10 years;
- The extent of some effects of the scheme development and operation will only be clear post-development when the range of management options can be clarified;
- Training and support to implement on-farm plans can be facilitated at scheme level;
- Scheme management can provide a range of support services including policy development, technical support, regulatory and other reporting.

Typical family farms do not have the management resources to implement complex systems on their own, and even large farms will be seeking management systems that avoid duplication.

With the EMS approach, there are opportunities for farm businesses to be innovative in both their land use enterprises and their environmental management. The EMS approach also provides for a continuous, rather than discrete adoption of new practices and / or technologies.

Table 1 summarises how features in the Scheme Sustainability Protocol and Farm Plans (FP) provide the components of an EMS.

<b>Table 1</b>	
<b>EMS feature</b>	<b>Irrigation Sustainability implementation</b>
<i>Environmental Policy</i>	Protocol <sup>2</sup> section 2 “Sustainability Policy”
<i>Planning for implementation</i>	Protocol identifies key environmental issues, FP <sup>3</sup> process; consultation with liaison groups
<i>Implementation and operation</i>	Protocol sets out: Responsibilities; Focus areas; FP preparation; training; review & audit; compliance
<i>Checking and corrective measures</i>	Internal and external reviews and audits; compliance and enforcement; training
<i>Review</i>	Liaison group inputs; FP template reviews; scope to require users to update plans and best management practices

<sup>2</sup> Scheme Sustainability Protocol

<sup>3</sup> Environmental Farm Plan

## **Appendix 2: Scheme Sustainability Protocol**

## **Appendix 3: Environmental Farm Plan for Irrigated Land Use: templates**



## **Appendix 4: Preparing Your Farm Plan for Irrigated Land Use: Workshop Manual**



## **Appendix 5: Environmental Farm Plan for Irrigated Land Use: examples**



# **Appendix 6: Environmental Farm Plan for Irrigated Land Use: Audit Manual**



## **Appendix 7: Farm Plan Audit: examples**