



3.4.1 GENERAL



Where is irrigation technology heading?

If irrigated agriculture is to be sustained into the future, the best technology available will need to be adopted. Failure to adopt superior technology will result in a gradual reduction in irrigation system performance and in the competitive position that New Zealand agriculture currently holds in the world markets. Having a vision of where irrigation and irrigation technology is heading will allow farmers to better plan for the future.

Where is irrigation technology currently?

Irrigation has effectively been a relatively low-tech industry until recently. In the past, most irrigation products used in New Zealand were developed by trial and error or imported from other countries and adapted to fit New Zealand conditions. The irrigation industry depended on people coming up with good ideas for products and selling them, rather than creating products designed to meet the specific demands of a production system. Rarely was an irrigation system designed to meet specific targets and conditions and irrigation performance measures were almost never used.

What is going to drive changes in the future?

A number of factors will drive change in irrigation industry practices and in the use of technology. The factors that influence change will be:

- Competition for water
- Environmental protection
- Climate change
- Globalisation of economies
- The world food situation
- Expansion of urban land use
- Changing governments and government roles
- Decrease in water availability
- Higher effective cost of water.

The general feeling is that globally, the area under irrigation will drop and the amount of water available for irrigation will also decline. Risk and uncertainty will increase and innovation and flexibility will be more important than ever.

What changes are likely?

Increasing urban populations and the resulting competition for water are major issues.

Competition from the urban sector is going to increase. The urban population needs water for industry, domestic

use and watering parks and gardens. Turf and amenity irrigation has, and will continue to increase at an accelerated rate, both in terms of water use and in terms of irrigation business overall. Water shortages caused by competition will remain and increase. Until the last decade or so, irrigators could get the water they wanted for irrigation. Now other surface water users, both urban and rural, are competing for that water.

Regulation, environment and markets

Local body and central government legislation will strongly influence where irrigation occurs and how it is managed. There will be much greater emphasis on environmental issues such as efficiency, application rates and depths, loss of nutrients and potential groundwater contamination. The Resource Management Act is already influencing what can and cannot be done with irrigation. International markets will ask for information to prove that irrigation water is used in a responsible and environmentally friendly manner.

Monitoring

More use of performance measures to demonstrate that a particular performance level is being met will be required. This will require development of better monitoring equipment and recording systems.

Government input

Large government-funded schemes are and will probably remain a thing of the past. Privately funded schemes will occur in limited numbers, but most of the development will be by individuals directly. Government involvement will be increasingly targeted at better resource management and increased environmental protection. This will involve both the development of new technology and implementation of systems to transfer the best available knowledge to resource users and managers.

Change from drought insurance to necessary farm input with associated expansion

Originally irrigation was used as drought insurance. Droughts are part of a natural cycle and irrigation was used to maintain production during the dry years. Today, irrigation is used routinely as a necessary farm input to provide certainty of crop production and is expected to expand in use. Irrigation is treated as one of the inputs needed to produce specific outputs each year. Because of this change in purpose, reliable water supplies are vital. There will be increasing use of methods and technology to provide reliable water supplies.

Greater need for reliable water but at higher cost

As the required performance standards increase, reliable water supplies will be increasingly needed. To achieve maximum efficiency of water, flexible delivery schedules will also be required so that water can be used when it is needed rather than when it is available. Increasing the efficiency, reliability and flexibility of water supplies will require increasing use of water storage and piped/pressurised delivery systems and new technology for surface water systems. The effective cost of water will rise. In particular, electricity costs will increase more rapidly in rural areas.

Professionally prepared plans with specified performance levels

Irrigation systems will be designed to meet specific performance levels in terms of cost, labour and water-use efficiency. It is likely that properly engineered plans will become standard procedures, a bit like building houses. Suppliers will be forced to consider the irrigation system as a part of a production unit, rather than seeing it as a number of separate products that can be sold. The overall annual cost of a system rather than just up-front capital cost will take increasing importance. The focus will be on maximising profitability and minimising environmental effects.

Design standards

The complexity of irrigation systems is increasing and the training of personnel involved in designing and installing systems has improved. Most people entering the industry as designers now have university qualifications. The number of university trained staff is expected to increase. Designer registration (as in the United States and Australia) will probably be expected, with quality assurance programmes put in place. Independent auditing will also become more common.

Components and systems

More sophisticated systems will be needed to obtain specified performance levels. The requirement of systems

to meet these standards will force component suppliers to meet more stringent specifications. Today, there are systems being installed that are likely to not be up to the standard that may be needed in the near future. In the future, more purpose-designed and built products will have to be available to improve water use efficiency, energy efficiency and labour efficiency. The overall trend will be to substitute purpose-built capital equipment for labour. The trend towards micro-irrigation and sub-surface drip systems will increase.

Crops and soils

Plant varieties will evolve further to be less affected by water stress. Soil type will become less important as new technology allows application of water to be accurately controlled. This will allow expansion of irrigation into non-traditional areas.

Summary

It is certain that irrigation in the future will change a lot. No one knows what crops will be grown or what the environment will be like. Advances in and adoption of new irrigation technology will be absolutely necessary, particularly in terms of how irrigation affects economics, water use and the environment.

There will be an increased need for education and extension for farmers and growers as well as equipment suppliers, designers, consultants and water managers.

Irrigation has made a huge impact on both rural and urban communities and will continue to do so. It is unlikely that there will be any rapid or draconian changes, but the use of technology will need to evolve to meet changes when they occur.

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Should you invest in new technology?

The adoption of new technology is seen as the answer to improving the efficiency of irrigation systems. Although new technology can certainly improve irrigation efficiency, the adoption of the technology is not always a simple process.

Key issues

Before proceeding with new technology, the following questions need to be asked:

- Why do you want this new technology?
- Why are your current methods no longer acceptable?
- What do you expect to gain from the new method?
- Is it worth the trouble to change?
- Is your existing system able to accommodate the new technology?
- Will your staff accept and use the new technology?
- Will you get appropriate backup and service from the suppliers?

New technology is usually considered because an existing system is lacking in some way, or it could benefit from improvements. But careful consideration of the costs and benefits of the technology must be made, as adoption of inappropriate technology could make things worse, not better.

If you are happy with your existing system and can see no advantages in changing, you may decide not to implement any new technology or methods at all.

Investigating new technology

If you are considering implementing new technology, there will usually be several alternative solutions and technologies, some appropriate, some not. So, you need to do your homework. Some suggestions are:

- Do some research.
- Talk to the people selling the technology.
- Talk to other users of the technology.
- Contact independent experts.
- Search the Internet for more information.

Implementing new technology

Once you have made a decision about what to do, you need to implement the technology.

- Make sure that the technology is properly installed.
- If appropriate, test the new technology alongside existing technology, until you are convinced that it will work. For example, with new soil moisture sensors, you may want to compare new sensors with your old system for a season.
- Make sure staff are convinced that the new technology is better. It is important that all staff involved understand why the technology is being adopted, and appropriate training is provided to obtain success.
- Train staff in its use. The biggest cause of poor performance of new technology is the failure to properly train staff in its use.
- Maintain it correctly.

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