



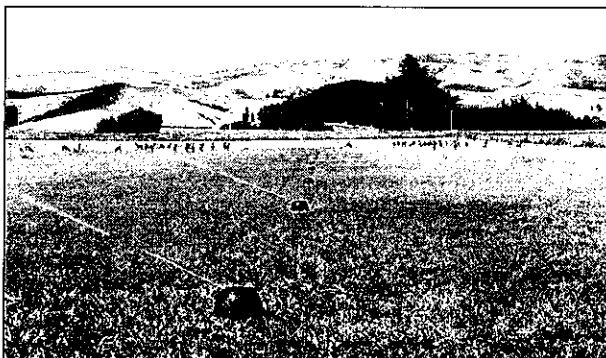
3.2.4 MANUAL MOVE SYSTEMS

K Lines

Application rate	Very low, 3-8 mm/h
Application depth	Fixed at 50-80 mm unless moved twice daily
Distribution uniformity	Poor to average, depending on sprinkler and lane spacing
Labour requirement	Medium-high
Hydrant pressure	Low-medium, 250-350 kPa
Capital investment	Very low
Reliability & service	Appears to be reasonably good, but still quite new
Effective life	Unknown, as has only been used since late 1990's
Enterprises	Best for pasture, limited in other crops
Damage to pasture	Very little
Watering irregular areas	Best in rectangular areas, but some flexibility
Effect of wind	Low-medium, worse at wide sprinkler spacing
Acceptance	Good
Fencing	Best planned to suit, but generally quite flexible
Shifting	Quite easy
Shelter	Can arrange shelter pattern to suit

K Line systems are a relatively new development in irrigation in New Zealand, and their use has expanded rapidly since the year 2000. Their biggest advantage is their low cost compared to other systems, allowing farmers to get into irrigation at relatively low cost. In addition, they are simple and can be installed and maintained by farmers.

Because small sprinklers are used, application rates are very low, with ponding and surface redistribution almost non-existent. Provided appropriate pressure control is employed, this low application rate makes them suitable for operation on most soils and on rolling country at slopes exceeding that acceptable for most other irrigation system types (provided that it is not too steep for moving them).



K Lines are designed to be operated 24 hours per day if required and moved once daily. Used in this way, they apply 50-80 mm of water or more, so soils must be able to accommodate these depths. Rotation times therefore tend to be longer than with other systems. To keep application rates and depths as low as possible, sprinkler spacings are generally wider than standard manufacturers' recommendations, resulting in average to low uniformity. However, the low uniformity is counterbalanced to some extent by good absorption of water into the soil.

They are best used for irrigating pasture and are quite easy to move. Shifting time depends on the number of K Lines on the property.

The performance of these systems over the long term is unknown, although good results have been obtained in most areas since their introduction. Small sprinkler nozzles make them more susceptible to blockages, and small plastic sprinklers running continuously may have increased maintenance requirements.

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Long laterals

Application rate	Low-medium, 7.5-15 mm/h
Application depth	Fixed at 35 mm or higher
Distribution uniformity	Average, depending on operator's shifting pattern
Labour requirement	Medium-high
Hydrant pressure	Medium, 400-500 kPa
Capital investment	Medium
Reliability & service	Average-good
Effective life	Good if well-maintained
Enterprises	Best for pasture, not used much in other crops
Damage to pasture	Very little
Watering irregular areas	Very flexible, often used to water irregular areas
Effect of wind	Minimal problem, can shift to compensate
Acceptance	Very good, quite widely used
Fencing	No problems
Shifting	Easy, but time consuming
Shelter	Can easily arrange shelter pattern to suit

Although long lateral systems have had a major upsurge in use in some areas over recent years, similar systems have been used for several decades. Recent refinements include sprinklers on movable skids and flexible polythene hose.

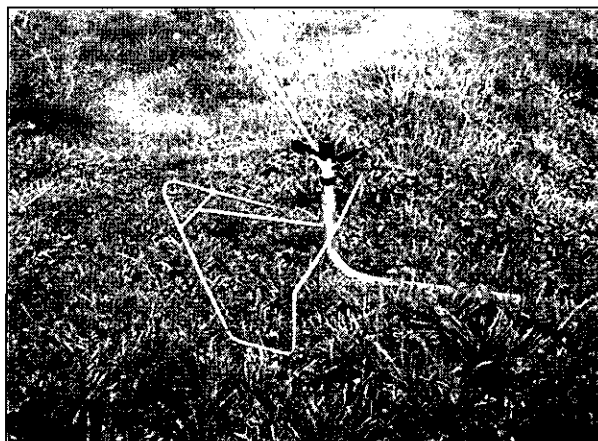
They are widely used as the only means of irrigation on many dairy farms in the North Island. They are also commonly used to fill in odd-shaped areas and corners on farms using travelling irrigators or centre-pivots.

Because sprinklers are operated in isolation, application rates are low, and ponding or surface redistribution tends to be small. This makes them suitable for a wide range of soil types.

To obtain good uniformity, sprinklers should be moved in a regular pattern. Performance is directly affected by where sprinklers are placed, and complacency in this respect is not uncommon. Shifting time is one of the biggest disadvantages of this system, with the larger systems taking several hours to move.

Many long lateral systems have been designed to operate for only ten hours per day, for reasons including convenience, design requirements, utilisation of night rate electricity, and water supply availability. This shorter

operation requires much bigger, higher-cost system components (pumps, pipes, etc) than would be needed for a system that operates for 20-24 hours per day.

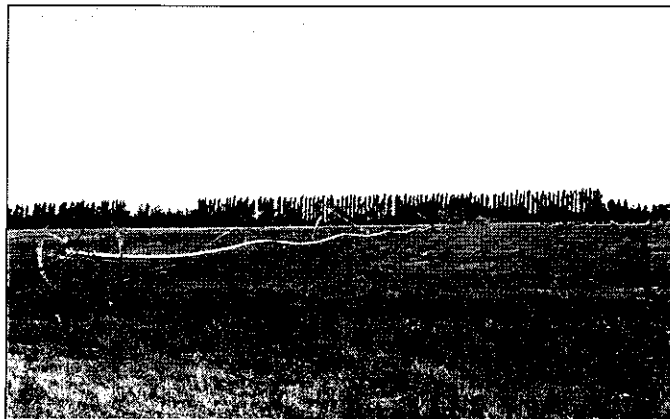


June 2001

Siderolls or power rolls

Application rate	Low-medium, 7.5-15 mm/h
Application depth	Wide range, 5-100 mm
Distribution uniformity	Generally good
Labour requirement	Quite high, 1-3 shifts per day
Hydrant pressure	Medium, 300-500 kPa
Capital investment	Low-medium
Reliability & service	Good
Effective life	Good, except in strong winds
Enterprises	Good for most crops and pasture
Damage to crop	Limited
Watering irregular areas	Not suitable
Effect of wind	Generally adequate for long sets and good management
Acceptance	Adequate, but becoming obsolete
Fencing	Can be a problem
Shifting	Slow unless properly planned
Shelter	Difficult to arrange shelter pattern

These units are now quite uncommon, having been replaced by more labour efficient systems. As with hand shift systems, they can be used efficiently, as their application rates are low and sprinkler distribution uniformity high, if shifted at the recommended spacing. Their biggest problem is the need to shift them two or three times a day if the area to be covered is large.



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Hand shift, skid pans, end tow or angle tow

Application rate	Low-medium, 7.5-15 mm/h
Application depth	Wide range, 5-100 mm
Distribution uniformity	Generally good
Labour requirement	High and demanding, 1-3 shifts per day
Hydrant pressure	Medium, 300-500 kPa
Capital investment	Low
Reliability & service	Good
Effective life	Good
Enterprises	Good for short crops and pasture
Damage to crop	Limited
Watering irregular areas	Average to poor
Effect of wind	Generally adequate
Acceptance	Adequate, but becoming obsolete
Fencing	Can be a small hindrance
Shifting	Quite slow
Shelter	Easy to arrange shelter pattern around layout

These methods, particularly the hand shift systems, are still commonly found in market gardens and small orchards. Capital investment is usually very small, and they serve a useful purpose.

They can be used efficiently, as their application rates are low and sprinkler distribution uniformity high, if shifted at the recommended spacing. Their biggest problem is the need to shift them two or three times a day if the area to be covered is large. Another problem is that, because they have been in use for a long time, any one system may have a range of different sprinkler types and nozzle sizes, resulting in poor uniformity and incorrect operating pressures. It is best to ensure as much uniformity as possible in system components.

They are regarded as very old technology.

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