

## DEER FARMING — VITAL FOR THE SURVIVAL OF THE ARROW RIVER IRRIGATION SCHEME

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### Abstract

The Arrow River Irrigation Scheme has been in operation since the early 1930s. Farming systems within the scheme have been predominantly sheep with limited cereal cropping. Irrigation has been used mainly to ensure that sufficient hay is made to feed through the long cool winters. The future of the irrigation scheme is in doubt because of high upgrading costs and a large operating deficit that has accumulated. Water charges have been low for many years.

Farmers started diversifying into deer in the early 1990s and a steady expansion has since occurred. Incorporating deer into the farming operation has had a significant impact upon the profitability of the diversified farms. The increased profitability of the diversified farms means that they would be able to meet the higher water charges that would be levied under the Public Works Act.

The use of water by farmers has been, and still is, inefficient. For instance, some have deer on **dryland** despite the availability of irrigated pasture. It is contended that farmers must allocate water to the most profitable use if they are to **maximise** returns and if irrigation schemes are to remain viable financial operations.

Keywords: diversification, water charges.

### INTRODUCTION

The Arrow Basin has a relatively harsh farming environment which is **characterised** by cool, dry winters and hot dry summers. Pasture growth from May to September is low, approximately 5% (450-670 kg DM/ha) of the average annual irrigated yield (Radcliffe & Cossens 1974). Such an extended period of low growth imposes a severe constraint on livestock carrying capacities. Farmers rely heavily upon production in the periods of rapid growth to provide supplementary feed for the winter period. To this end, surplus feed in the late spring/summer period is conserved as hay and autumn pasture surpluses are carried forward into the winter. Most farmers carry three bales of hay per ewe into the winter to maintain stocking rates.

### IRRIGATION IN THE ARROW BASIN

Irrigation schemes were first mooted in the Wakatipu area before 1914. This interest became reality in the late 1920s with construction of the present Arrow Scheme. When it started operating in 1930, 1660 hectares were irrigated. A reduction in irrigable area occurred in 1933 and since then the area under irrigation has remained between 938 and 1300 hectares. In 1979 the Water Resources Council decided that the Arrow River Irrigation Scheme should close because of the high costs of replacing headworks and pipeline (estimated at close to \$3 million in late **1985**), the high operating costs of the scheme and accumulated losses associated with operating the scheme.

As a result of this decision a number of reports have been prepared on the likely effects of scheme closure. These reports have highlighted the fact that irrigation is essential in a high proportion of years, to allow hay to be made in the spring/summer and to overcome the winter feed deficit. Irrigation has been found to increase pasture production in Central Otago to about three times that of **dryland** production. Radcliffe and Cossens (1974) found that mean pasture yield under irrigation in the Arrowtown area was 10,850 kg DM/ha plus or minus 20%.

McGregor and Pittaway (1983) reported that with an adequate irrigation scheme, sheep farms in the Arrow Basin could carry 10.5 s.u./ha compared with an average of 7 s.u./ha without irrigation. In addition to increasing stock carrying capacity, irrigation has led to an intensification of land use in the Basin. This intensification takes the following forms:

1. more profitable stock systems have been increased, eg deer farming.
2. intensive cropping in selected areas, eg market gardening and permanent horticultural crops.

### DIVERSIFICATION INTO DEER

The advent of deer farming has brought the biggest change of landuse in the scheme area in recent times. Specialist deer farmers are few in number but, at present, many sheep farmers are increasing deer numbers (at the expense of sheep).

The movement into deer gathered momentum in the early 1980s. There were few farmers with deer in 1980 (Wall 1980). In 1983, 43% of farmers had deer and by 1985, 60% were farming deer. By 1983, there were approximately 4000 stock units of deer and in 1985, the number had grown to over 6000. The growth is expected to continue and by 1990 it is predicted that there will be over 12,000 stock units of deer (Table 1).

Reasons for the rapid increase in deer numbers are the greater returns than from traditional sheep enterprises, proximity to a source of animals, and a climate that farmers believe favourable for deer production.

Table 1: Land use and stocking summary for irrigation scheme 1983 and 1985 with predictions for 1990 (From McGregor and Pittaway 1985).

|                      | 1983  | 1985  | 1990<br>(with scheme) |
|----------------------|-------|-------|-----------------------|
| Total Farm Area (ha) | 4629  | 4821  | 4821                  |
| Area Irrigated (ha)  | 938   | 938   | 1570                  |
| Total Sheep (su)     | 39916 | 40550 | 41045                 |
| Total Deer (su)      | 3965  | 6330  | 12085                 |
| Total (su)           | 43885 | 46990 | 53150                 |
| Cash Crop (ha)       | 313   | 345   | 330                   |
| Horticulture (ha)    | 64    | 10    | 40                    |
| su/ha                | 9.52  | 9.74  | 11.02                 |

Irrigation provides a suitable pattern of feed supply for deer enterprises (Harbord pers. comm). Expansion of deer numbers has only been slowed by the high prices for hinds. This has meant that breeders have sold stock to capitalise on favourable market returns, while others have been restricted by financial limitations in their ability to expand.

### INTEGRATION OF DEER INTO TRADITIONAL FARMING SYSTEMS

Deer enterprises have started with the purchase of a small number of deer and a limited area being deer fenced. Farmers have treated the deer as a specialist enterprise and little competition with sheep for feed has occurred initially. As the deer enterprises have expanded, deer have replaced sheep. This substitution has resulted in a 15% increase in stocking rate on the deer fenced areas (McGregor & Pittaway 1985).

Increases in carrying capacity have occurred not only where direct substitution has taken place but also on farms where substitution has not yet become an issue (Table 1). The increase in effective stocking rate when deer become integrated into the farming operation is due to three factors:

1. The willingness of farmers to provide supplementary feed over the winter. The

cost of winter feeding with **lucerne** hay and manufactured feeds is small relative to the returns of the deer enterprises.

2. The feed demand, particularly of hinds, is comfortably met by the irrigated pasture supply over the summer. As the feed demand increases with the approach of fawning, most farms have a feed surplus. Irrigation guarantees that there is sufficient feed until mating in the autumn.
3. The lower feed demand of hinds in early spring enables the surplus spring growth to be fed to ewes and **hoggets** or shut for hay.

### IMPORTANCE OF DIVERSIFICATION INTO DEER

Arrow Basin farms, where sheep have been the principal source of income, have been marginally uneconomic over the period 1979 to 1984. Farmers have deferred asset replacement and increased borrowing in order to survive (NZ Meat and Wool Board 1985). The farmers, who have moved to deer are in a much more favourable financial position (Table 2).

Table 2: Cash surplus available before tax and capital replacement for a representative sheep farm and a representative sheep and deer farm (1984/85 financial year). (From McGregor and Pittaway 1985).

|  | Sheep         | Sheep & Deer  |
|--|---------------|---------------|
| Gross Income   | \$85,420      | \$ 103,895    |
| Farm Working Expenses                                  | 50,090        | 51,490        |
| Surplus (Before drawings, capital payments & taxation) | <b>35,330</b> | <b>52,405</b> |

1984/85 was a favourable year for sheep farmers but their returns in **1985/86** are expected to fall by 32% (Davidson & Taylor 1986).

The relatively higher returns from deer may prove to be the factor that determines the survival of the irrigation scheme. The Arrow Basin farmers have been favoured with low water charges for many years (Reid 1977). Charges based on the Public Works Act are much higher than those currently in force; full Public Works Act charges would be **\$196/ha** (\$1985) while farmers paid **\$24.32/ha** in 1985 (MWD, Dunedin, pers comm). The result of such discrepancies is that the scheme has accumulated significant deficits. If the scheme is to continue, **the** water charges will have to increase.

Survival of the Arrow Basin Irrigation Scheme depends upon the farmer's ability to service the scheme costs and farmers with predominantly sheep enterprises, even in more favourable years, cannot meet these charges. The move into deer has been opportune as it affords the opportunity to keep the scheme financially viable.

### EFFICIENCY OF WATER USE

Arrow Basin irrigators have been **criticised** for the inefficient use of water (Reid 1977). It should be noted however, that farmers were provided with cheap water and this did not encourage efficient use.

As many of the farms have only a limited area that can be irrigated, choice of enterprise on that irrigated area is important to profitability. However, only half of the area deer fenced in 1985 was irrigated (McGregor & Pittaway 1985). If water is to be used efficiently, each unit should be applied to where it will generate the highest marginal value product. Increasing physical production from low returning **enterprises** is not in the interests of the farmers, the irrigation scheme or country. Unfortunately the Arrow farmers have not yet fully responded to making the most profitable use of water.

The farmers in Arrow River scheme have similar problems to the farmers in the other Central Otago schemes. They are however, fortunate that the movement into

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deer has provided some of them with the opportunity to meet full irrigation service charges. Their irrigation scheme may survive because of this diversification and its associated financial benefits.

#### References

- Davidson R.M., Taylor N.W. 1966. Impact of current economic policies on agriculture. *Farm Management News* 42: 55-65.
- New Zealand Meat and Wool Board's Economic Service; 1985. *Sheep and Beef Farming Survey 1983-84*. Publication No. 26.
- McGregor M.J., Pittaway S.R. 1963. An economic and financial appraisal of the Arrow River Irrigation Scheme. Farm Management and Rural Valuation Department, Lincoln College.
- McGregor M.J., Pittaway S.F. 1965. A reappraisal of the Arrow River Irrigation Scheme. Farm Management and Rural Valuation Department, Lincoln College.
- Radcliffe J.E., Cossens G.G. 1974. Seasonal distribution of pasture production in New Zealand - III Central Otago. *NZ Journal of Experimental Agriculture* 2: 349.356.
- Reid C.J. 1977. Arrow River irrigation scheme replacement, Detailed feasibility report. Ministry of Works and Development, Dunedin.
- Wall T.J. 1980. The value of Irrigation in the Arrow Basin and on the management of the Arrow River irrigation scheme. Report prepared for the Arrow Basin Irrigation Committee.