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Market and Technical Constraints to Water Resource Reallocation from Extensive Irrigated Agriculture - In Northern Victoria.

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The future viability of irrigated agriculture in Northern Victoria will depend on the ability of farmers to pay for irrigation water, irrigation infrastructure refurbishment and environmental protection and management. The reallocation of water from low value to high value enterprises is constrained by both technical and market factors. 50% of water in the region (1 million ML) is used on marginally profitable mixed grazing farms with principally annual irrigated pasture and a small area of cropping. Dairying, horticultural (orchards and vines) and vegetables are potentially more profitable, provided soil and water management is efficient and market demand is not exceeded.

Introduction

The future viability of irrigated agriculture in the Northern Irrigation Region (NIR) of Victoria will depend on the ability of farmers to pay for irrigation water, irrigation infrastructure refurbishment and environmental and resource protection and management. Fifty (50) percent of irrigation water in the region (1 million megalitres) is used on marginally profitable mixed grazing farms with principally annual irrigated pasture and a small area of irrigated cropping. Dairying, horticulture (orchards and vines) and vegetables are potentially more profitable, provided soil and water management is efficient and market demand is not exceeded. Dairying is enjoying a very buoyant period at present, with prices at the farm gate some 20% higher than two years ago. New investment by Goulburn Valley dairy farmers in improved irrigation layout and milking shed upgrades is visibly obvious. The profitability of horticulture depends very much on the tree variety mix in orchards and the wine grape varieties. The Pear industry is facing a potentially serious downturn at present. Vegetable growing is very volatile. Processing tomatoes are currently facing low international prices and many of the small operators have left the industry.

The profitability of farms in the Northern Irrigation Region depends on good technical and financial management by operators who have access to sufficient land, water and financial resources. Many of our natural resource planners believe that normal market forces will result in the movement of land and water resources into the more profitable enterprises, particularly dairying, because dairying is already a large water user and has the greatest potential to use more water. It is happening to some extent, but is it enough to utilise the 1 million ML currently being used on annual pasture beef and sheep mixed farms? The question that must be asked is ... if half of the NIR's water is being used unprofitably, how can the long term viability of the irrigation industry be maintained?

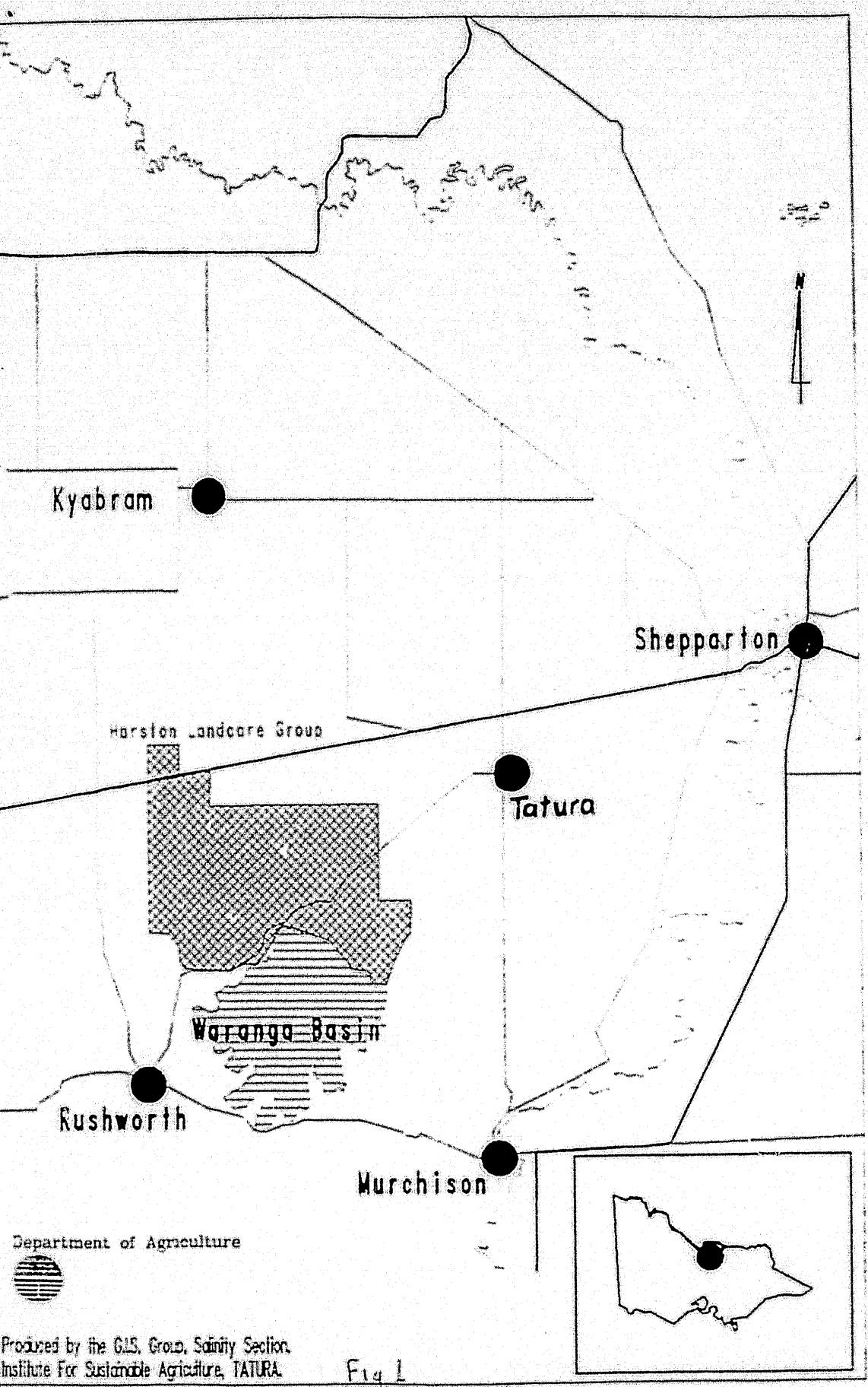

Kyabram
Shepparton
Horsham Landcare Group
Tatura
Warrego Basin
Rushworth
Murchison
Department of Agriculture
Produced by the GIS. Group, Salinity Section,
Institute For Sustainable Agriculture, TATURA.

Fig 1

The Impact of Irrigation in the Region.

In an area with a rainfall of approximately 485mm and evaporation of almost 1400mm per annum, irrigation has provided a significant boost to farm production. When Cobram was settled on the Murray River, the original holding of 52,000 hectares ran 12000 sheep, or 4.3 hectares per sheep. Now that type of land, under irrigation, can carry a dairy cow to the acre or 2.5 per hectare. This represents a 160 fold increase in carrying capacity. The region also produces a wide range of stone and pome fruit, citrus, vines and vegetables. The impact on regional development has been very significant as shown by the growth of thriving cities such as Cobram and Shepparton with significant value adding food processing industries attracting over $200 million of new investment over the last two years. It is therefore vitally important that the region's natural resource assets are protected from environmental degradation due to salinity, waterlogging and increasing stream nutrient loads and that the irrigation infrastructure is maintained in good operational condition. This requires profitable farms.

The Distribution of Farm Profitability

The key to farm profitability is to produce enough of a product, that is in demand, at a price that generates sufficient gross income to exceed all costs, both variable and overhead. The key to long term sustainability is that the gross income must also allow for investment in resource protection, replacement of depreciating assets and the provision of adequate household income on the farm. On many farms in the region, the net household income includes a varying component of non-farm income. This is of great importance to the mixed farms in the region as they are typically too small (av. 80ha) and use insufficient irrigation water to generate enough gross income to cover all costs.

On most farms in the region, water is the most limiting production input. Therefore, those farms which can generate the highest gross margin per megalitre of total water use, using the greatest number of megalitres as possible on that soil for that crop type, will have the greatest chance of meeting all overhead costs and making a profit. Under the current commodity price situation, for the same amount of water used, a dairy farm should generate a higher total farm gross margin than a mixed grazing farm, in spite of dairying variable costs also being high.

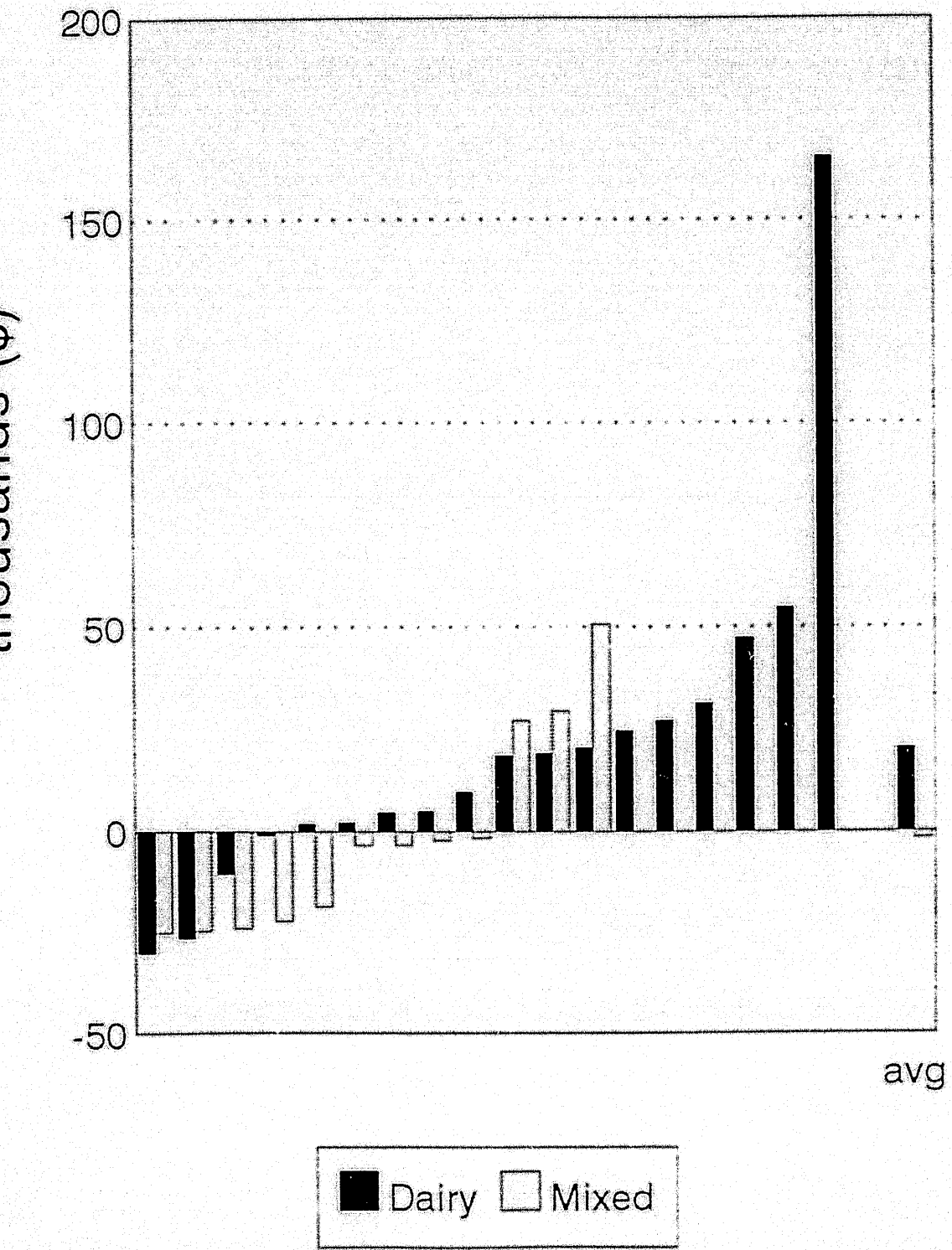
The returns from orcharding enterprises can be higher per ha and ML than dairying and is very dependant on having a fruit variety mix that meets the market requirements. Orchards are mostly small holdings, representing 4% of the total area irrigated in the Shepparton Region, using 4% of the irrigation water and irrigating approximately 8460ha. They generate a very high gross income but also have a very high cost structure. The orcharding area has fluctuated in the range between 6540ha to 9958ha over the last 24 years (Goulburn Valley Regional Study, Dec. 1993). The marketing of horticultural products is very sensitive to supply and demand relationships; a slight oversupply of the variety and the market can crash overnight. The fruit processors are very price sensitive to competition from overseas products.

Economists (Cynthia Mahoney and Olive Monticello) from the Salinity Planning and Economics Research group at ISIA, Tatura and Shepparton, undertook a financial survey of 30 farms (18 dairy and 12 mixed), covering an area

Net Cash Surplus/Deficit

Dairy Vs Mixed 1991/92

Fig 2



of 4478ha in the Harston Catchment, an area to the west of Tatura township (Fig.1). The survey represented 72% of the catchment area and 71% of all farms in the catchment.

The survey showed that dairy farms used 70% more water than mixed farms, yet in terms of total hectares, they have only 9% more land. This is accounted for by dairy farmers having nearly twice as much irrigated perennial pasture than mixed farms.

The survey showed that, of the farms studied, the average dairy farm generated over 4.2 times the gross farm income of mixed farms and 4.6 times the total gross margin (i.e. after allowing for the variable costs of production).

After allowing for overheads, interest and labour, the dairy farms generated a cash surplus of $20,000 compared to a $1700 cash deficit from the mixed farms (Fig.2). Note that four of the dairy farms generated cash deficits. These were properties with low equity. The survey was done for the 91/92 production year and, with a 20% rise in farm-gate milk prices, the current situation shows an even greater difference.

These results indicate that there is an enormous opportunity cost associated with not being a dairy farmer in this catchment (and elsewhere in the region).

If that is the case ... Why haven't all the mixed farmers converted to dairying or sold their irrigation water entitlements to dairy farmers? This action is a major expectation of many water policy makers who sit remote from the operational environment.

What Rationalisation of Resources is Occurring at Present?

Permanent Transferable Water Entitlement (TWE) became available in the NIR in February, 1992. By the end of 1992 calendar year, approximately 3500ML had been transferred within the region and applications for a further 1300ML had been processed (MDBC - Goulburn Valley Regional Study, Dec.1992). Approximately 30% (1400ML) of the permanent transfers was from the high salinity environment of the Pyramid Hill/Tragowel Plains area to the low salinity Shepparton Region/Goulburn Valley. The transfer price ranged from $300 to $400/ML or a regional investment in permanent TWE of $1.5-$1.9 million in six months.

In addition to the above, there was also temporary transfers of 15,117 ML, within and between districts in the NIR. There were 174 individual cases, with the price ranging from $0/ML to marginally less than the delivery price of about $14/ML i.e. a maximum investment in temporary TWE of $200000, but more likely less than $100000. It should be noted that the sale price, permanent or temporary, is a private arrangement and publically available statistics are difficult to access.

The major proportion of the permanent water transfers went to dairy farmers. At the above rate of permanent transfers it would take 208 years to transfer the 1 million megalitres from mixed to dairy farmers (assuming it is necessary for all of it to move).

There is evidence in the region that a small number of mixed farms are converting to dairying. These tend to be the larger mixed farms which may be profitable in their own right now (due to scale of operation and good management) and are capable of attracting investment funds from city business sources or from large scale dryland farming operations, either from within or outside the NIR. This

group also learn or attract the necessary technical skills to operate a dairy farm.

The most common rationalisation of resources is occurring through farm buildup of existing dairy farms. The advantage of buying an existing dairy farm is that the standard of irrigation layout, paddock sub-division and laneways may be more suited to dairying. The disadvantage of buying an existing dairy farm is the cost ($5000-$6000/ha now compared to $3500/ha 2 years ago), and the possible duplication of milking shed facilities. If the irrigation layout is of a poor standard, an additional cost of from $1000 to $2500/ha can be incurred through laser/landforming, internal drainage, re-establishment of pastures and paddock subdivision. The successful implementation of a farm buildup requires a high level of technical and financial management skills.

There is considerable visual evidence in the Shepparton region of the construction of many new, high output, rotary dairies, capable of milking 400 cows in one hour. These typically cost $250000, but can reduce daily milking time of a 400 cow herd by up to 5 hours.

There have been a number of semi green-field establishments of dairy enterprises in the Shepparton region where investors have purchased large mixed farm blocks of 256 ha (the old square mile), purchased the additional water requirements through TWE and established a highly efficient, well layed out, irrigated dairy farm with all the necessary improvements. Such a farm could run 500-700 cows and generate a daily gross income of from $3000-$4270 during the milking season. These operations have a high capacity to service the necessary capital investments.

The need for careful planning is highlighted by the case in the Shepparton region where investors purchased land, started constructing the fixed improvements and purchased a large volume of additional water, only to be informed by the local water supply authority that the existing public supply channel infrastructure was not capable of delivering that volume of water to the property. To do so would have required an investment of several million dollars in new channel construction, at the landholder's expense - poor planning?

The other common method of rationalising the transfer of water to high value dairying is for a dairy farmer to buy out a neighbouring mixed farm block which has a good water allocation. The water can then be transferred internally to the most productive pastures of the combined properties, or the dairy farmer's financial resources can be used to improve the productivity and water use efficiency of the newly purchased property. In this case, there is no duplication of milking shed assets but there may be a need to upgrade existing assets.

What are the Barriers to a Rational Movement of Water Allocations to the Higher Value Irrigated Farm Enterprises?

Technical Constraints -

As highlighted in the green fields example above, but by no means restricted to that type of situation, channel capacity is a major constraint on the movement of additional water allocations into many parts of the NIR. Many supply channels are now running above designed supply levels, with serious implications for future increased repairs and maintenance needs. It has been estimated (MDBC - Goulburn Valley Regional Study) that total deliveries could be increased by a maximum of 10% (less in most districts) if peaks and troughs in demand were

levelled out for a whole season. A possible 5% increase in total annual deliveries over the record 1991/92 year appears to be realistic.

Modelling of irrigation demand shows that the Rodney Irrigation District (west of Shepparton) is one of the areas most capable of accepting an increased water allocation. Unfortunately, until the standard of surface drainage in Rodney is improved substantially, additional water in that district would add to a serious waterlogging and salinity problem. Any increase in permanent water allocation to the Rodney District must be tied to a planned and improved surface drainage program. The planning is well progressed. The implementation has started but the rate will be determined by the level of available funds, both government and landholder.

One of the significant Regional Development Strategies in the Goulburn Valley includes acceleration of the arterial drain network construction. The benefits will occur through an accompanying acceleration of the region's community surface drainage network and farm drainage. This will reduce waterlogging on individual farms and allow transfer of water to the high producing dairy farms, without the risk of environmental damage.

A further potential barrier to the unplanned concentration of water on an expanding dairy industry in the region is the potential for increased nutrient contamination of local water ways and eventually, the Murray River. Current research into dairy effluent management (funded by the National LandCare Program, Healthy Rivers) will result in guidelines to reduce the impact. The research will provide input to the development of the Goulburn/Broken Nutrient Management Strategy currently being developed.

Market Constraints

Many mixed farmers are reluctant to sell their water allocation through fear of not being able to respond to future commodity price upturns - wool and wheat in particular. The demand for TWE from dairy farmers is far greater than the supply available from mixed farms.

Even in the most saline parts of the Kerang Lakes area, farmers are reluctant to sell their water, in case "science" or "the government" fixes salinity in those areas at some time in the future. Neither science nor government have much to offer these individuals that is technically or economically feasible (pipeline to the sea??). Market forces may yet see these individuals "adjusted" out of agriculture.

One consequence of an individual's choosing to sell the farm's water allocation is, that if the water supply is via a small branch or spur channel, the economic viability of that spur channel may be compromised, i.e. the operating and maintenance costs have to spread over fewer megalitres of water. The new water supply authorities will be forced to make a decision as to whether they can afford to maintain supply to a small number of farmers on a low volume spur channel.

There is currently a high level of liaison occurring between the Rural Water Corporation's supply channel refurbishment planners and the Department of Agriculture's irrigation design whole farm planning co-ordinators. This liaison aims to identify, in advance, potential supply channel rationalisation options that could result from the co-ordinated planning of irrigation supply needs. There have been many examples recently where uneconomic spur channels have been eliminated, following liaison between the RWC, farmers and their irrigation design consultants.

The gradual rising annual cost of irrigation water at the farm gate, plus new environmental management costs (surface and sub-surface drainage rates) directly reduces the gross margin/ML of water used. Without a matching increase in commodity prices or yields, farmers could rationally be expected to pay less for TWE. Indications are that the capital cost of purchasing additional water right through TWE has dropped from a range of $300 to $400/ML in 1992 to $150 to $250/ML now. This price makes the sale of water less attractive to mixed farmers because the lump sum gain may not meet their immediate financial needs, plus they have lost their major productive asset,
i.e. the irrigation farm is now a dryland farm. Additionally, their creditors may not permit the separation of the water from the land.

There is anecdotal evidence that many of the dairy farmers who have purchased water right from mixed farmers are doing so to secure their total allocation so that it matches, more closely, the scale of irrigation development, particularly the area of permanent pasture, on their farm. This reduces the risk of production losses in low water allocation years (about 1 in 8). This strategy has been particularly important for the large properties which, historically, had a lower water right per hectare than the small horticulture blocks and 40 ha dairy farms. These larger farms have been totally dependent on a continuation of high water allocation years (> 200% of water right).

In the case discussed above, the TWE water being purchased by the dairy farmers, whilst moving water from mixed farms, is not necessarily additional water for the dairy farms, i.e. the dairy farmers are substituting some "risky" sales water with guaranteed water right. The net impact on revenue for the water supply authorities may be nil and there may be no increase in regional productivity. Clearly, where TWE purchases by dairy farmers is to allow expansion of existing operations, the net regional benefit will increase.

The final market constraint to a rapid transfer of water from mixed to dairy farms is the development capital required to fully benefit from the change. The purchase of land, water and cows, the need for improved, labour efficient irrigation layout and milking sheds, plus the need for additional labour, technical and financial management skills, all consume financial resources and, potentially increase operational risk. Whilst market conditions are buoyant for dairying at present, many of the "old hands" recognise the cyclical nature of all commodities and are cautious in their development strategies.

Conclusions

In order to achieve the aim for long term viability of irrigated agriculture in the Northern Irrigation Region of Victoria, an on-going and accelerating process of structural adjustment must occur.

The goal of achieving more profitable use of irrigation water, particularly that 1 million megalitres currently being used on mixed farms, requires a large capital investment in the land, water, specialised plant, new technology and training and the use of research and investigations to overcome technical constraints to new crop alternatives.

It is unlikely that dairying, alone, can absorb all of the 1 million ML currently being used on mixed farms.

Some of the water moving to large and profitable dairy farms will come from

small, unprofitable dairy farms, as part of the dairy industry's internal adjustment process. The advantage of consolidating existing dairy farms is that production records are readily available and the profit potential is more easily assessed.

The preferred position of many rural community groups is to see the consolidation of land and water packages in the same location. The spread of infrastructure overhead costs would be less of a burden to remaining individuals.

It is essential that new and profitable cropping options become available as alternatives to dairying, for replacing the irrigated annual pasture, mixed farming enterprises. There is a limited role for the expansion of new wine grape vineyards, provided soil management is improved. The expansion of grain legumes to fill processors' (SPC, Ardmona, Campbells, Heinz, Unifoods) slack manufacturing periods is being investigated, both agronomically and economically. The processors are also interested in pursuing the Asian Vegetable market, using land currently used for annual irrigated pasture and cereals.

The final outcome of the process of structural adjustment will see fewer, but smarter, farmers implementing a broad range of farming options. There will be some of the original farmers plus many new operators, including a high proportion of family farmers who were capable of adapting their farming systems. There will be some land retired from irrigation, if not traditional dryland agriculture. Some of the 1 million ML will become available for environmental and recreational flows in the region's rivers and lakes systems. Who pays for that water and how much is payed will continue to provide fuel for debate as many will try to argue that the opportunity cost of the water is zero, i.e. the supply far exceeds the demand (for irrigation).

The final conclusion is that if the major users of land and water in the irrigation regions of Northern Victoria and elsewhere are not profitable, the future of the irrigation sector and all that flows from it will be very uncertain. This would place the massive ($billions) public sector investment in irrigation infrastructure in jeopardy of collapsing, with serious environmental consequences.

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