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*Farm business analysis 05*

〔 New South Wales Department of Agriculture 〕

South West Region

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# **Economic Information Series**

## ***Berriquin Farming***

John Lacy

Philip Penman

Jim Kennedy

LEETON, SEPTEMBER, 1979.

## FOREWORD

Due to the rapidly changing circumstances facing primary producers today, it is essential that information to assist farm business management and decision making, be made available as quickly as possible.

This publication concerning current costs and returns for rice growing farms in the Berriquin Irrigation District, is another published in the Economic Information Series issued from time to time by Economists of the South West Agricultural Region of New South Wales. This issue is titled *Berriquin Farming*, which is concerned with the present economics of rice growing and the prospects of farm build-up within the Berriquin Irrigation District. The aim of this Series is to present economic information and analysis applicable to specific regional problems in a form readily usable to primary producers, Departmental officers, researchers and others.

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*M.I.A. Mixed Farming.*

*Development Costs for M.I.A. Wine Grapes (1976)*

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*Development Costs for M.I.A. Citrus (1978)*

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# BERRIQUIN FARMING

## CONTENTS

	PAGE
INTRODUCTION	1
FARM SIZE AND TYPE	2
WATER	4
THE WATER ALLOCATION SYSTEM	4
WATER CHARGES	4
WATER AVAILABILITY AND USAGE	4
RICE PRODUCTION	6
THE TYPICAL FARM	8
(1) INTRODUCTION	8
(2) FARM SIZE AND PROGRAMME	8
(3) WATER	9
(4) ENTERPRISE BUDGETS	10
(5) FINANCIAL SUMMARY	16
PROPERTY TURNOVER	20
ACQUISITION OF ADDITIONAL BLOCK	22
(1) FARMING PROGRAMME	22
(2) EXTRA CAPITAL REQUIRED	22
(3) COSTS AND RETURNS	23
(4) EQUITY AND DEBT SERVICING	24
(5) LOWER PRICES - SECOND THOUGHTS	25
ANNEX 1 - TRACTOR COSTS	27
ANNEX 2 - LOCATION MAP	

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## FARMING IN THE BERRIQUIN IRRIGATION DISTRICT

JOHN LACY\* - PHILIP PENMAN\*\* - JIM KENNEDY\*\*\*

### INTRODUCTION +

The Riverine Plain was first settled by squatters in the 1840's. With the extension of grazing, and cropping in this semi arid area, subdivision of these large pastoral leases began, culminating in major subdivisions for wheat and lamb production shortly after the 1914-18 war. Creation of farms as small as 250 hectares was occurring by the 1920's.

Drought and the general economic depression of the 1930's placed the whole subdivision in jeopardy, forcing many people to abandon their farms. These problems of unemployment, drought and to some extent, the generally small farm size, brought government decision to develop irrigation projects in the region. The Berriquin Irrigation District was constituted in March, 1934. Around 1935, work commenced on construction of the Hume Weir on the Murray River, the Yarrawonga Weir on the Murray River and the Stevens Weir on the Edward River, and subsequently, works commenced for construction of channels to form the Berriquin Irrigation District. Most major works were completed shortly before the 1939-45 war.

The Berriquin Irrigation District received its first water in 1939 when it consisted of approximately 800 farms. The original intent was to supply a small amount of water to each existing dryland farm to improve production, and permit conservation of fodder against dry seasons. It was not intended to alter the nature of agricultural production which was basically wool, lambs and wheat. Permanent plantings of fruit trees and vines, and the growing of rice, were originally prohibited in the enabling legislation, as these industries were in difficulty. The exclusion of rice growing has, over the years, been relaxed to a considerable extent. Further subdivision of original holdings, and some extensions to the District, have brought the number of holdings up to about 1,330.

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- + Based on "Notes on the Berriquin Irrigation District", prepared by Water Resources Commission, Finley.  
\* District Agronomist, Department of Agriculture, Finley.  
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\*\*\* Formerly Economist, Department of Agriculture, currently attached to Ricegrowers' Co-operative Mills Limited.

It is important to note the clear distinction between an Irrigation Area and an Irrigation District. In the settlement of Irrigation Areas, the Crown compulsorily resumed areas of land and resettled it. It decided on farm sizes, and controls subsequent dealings in land within the area. Farms within an Irrigation Area are fully irrigated, in that enough water is available to permit irrigation of the whole property. This is generally not the case in Irrigation Districts, where original land tenure is not disturbed, and limited quantities of water are supplied for supplementary irrigation of existing properties. Within Irrigation Areas farms set apart are usually all of the same size, and allocated to new settlers of similar means. This is not the case in Irrigation Districts where farm settlement and subdivision is more the result of private enterprise. Two important features of these Districts are the fact that water is limited to an allocation per farm, and that there are relatively few facilities for surface drainage.

The Berriquin Irrigation District extends between the towns of Mulwala, Barooga, Tocumwal, Berrigan, Jerilderie and Deniliquin, with Finley close to its geographic centre (see map at Annex 2). It covers approximately 350,000 hectares. Finley is the administrative centre for the Water Resources Commission. Annual rainfall varies across the District, but long term averages approximate 406 mm per year, of which nearly two thirds usually falls from May to October, when evaporation is lowest. The location and distribution of soil types has been largely the result of prior stream formations. Although a variety of soil types occur in the district, the most common are red-brown soils with 12 to 15 centimetres of loam overlying clayey sub soils.

#### FARM SIZE AND TYPE

So far as possible, individual holdings have been aggregated where multiple ownership or management occurs, although precise details are not always documented i.e. whenever the word "farm" is used it implies one or more holdings under either the same ownership and/or management.

There are about 992 farms within the Berriquin Irrigation District. However, these 992 farms are comprised of some 1,330 separate holdings within the District. There are 40 holdings within the District which have no water rights attached, so it may be concluded that the District contains about 1,290 holdings capable of some irrigation.

Analysis of farms indicates the following categories:

- (a) non-commercial (excluding dairies, there are 83 farms of less than 100 ha. comprising 9% of total farms).
- (b) farms having a dairy licence (there are 108 dairies, 4 of which are permitted to grow rice, comprising 11% of total farms).
- (c) rice growing farms (in 1978/79, there were 400 farms on which rice growing was permitted, comprising 40% of total farms).

(d) the remainder, mixed farms undertaking cereal crop and livestock production (there are 401 farms in this category, comprising 40% of total farms).

Most of the farms are "mixed" in the sense that they carry on a range of enterprises. These four categories simply serve to differentiate among farms. Most indulge in production of irrigated pastures for either dairying, or raising of meat cattle and lambs. Frequently this is associated with winter cereal cropping, and in some cases, rice production. Vegetables are also an industry of increasing importance.

The following Table 1 indicates the current size distribution for all farms, and then for dairies and farms where rice production is permitted.

TABLE 1

BERRIQUIN IRRIGATION DISTRICT  
FARM SIZE DISTRIBUTION

SIZE (Hectares)	ALL FARMS		DAIRIES		RICE PERMITTED	
	No.	%	No.	%	No.	%
1- 49.9	43	4.3	2	1.8	0	-
50- 99.9	65	6.5	23	21.3	4	1.0
100-149.9	85	8.6	18	16.7	12	3.0
150-199.9	100	10.1	19	17.6	25	6.2
200-249.9	197	19.9	26	24.1	72	18.0
250-299.9	140	14.1	7	6.5	65	16.3
300-349.9	76	7.7	1	0.9	49	12.2
350-399.9	67	6.8	5	4.7	30	7.5
400-449.9	42	4.2	3	2.8	24	6.0
450-499.9	40	4.0	2	1.8	24	6.0
500-549.9	38	3.8	0	-	26	6.5
550-over	99	10.0	2	1.8	69	17.3
	<u>992</u>	<u>100.0</u>	<u>108</u>	<u>100.0</u>	<u>400</u>	<u>100.0</u>

N.B. Four of the dairies (3 farm size 400-449.9 ha. and 1 farm size 150-199.9 ha.) also possess rice growing permits.

The most common size range for all farms (19.9%) and for rice permitted farms (18%) is from 200-249.9 hectares. However, in terms of farms permitted to grow rice, this size range is closely followed by the range 550 hectares and over (17.3%), although only representing 10% of all farms. This illustrates a growing tendency for farmers to acquire additional areas of land. Over half of the rice farms fell in the size range of either 200-299.9 hectares or 550 hectares and over, which sizes cover 51% of all farms. Dairies show a concentration towards smaller sizes, with 80% of all dairies being between 50 and 199.9 hectares. The results of the above Table have been graphed in Figure 1.

BERRIQUIN IRRIGATION DISTRICT - Distribution of Farm Size

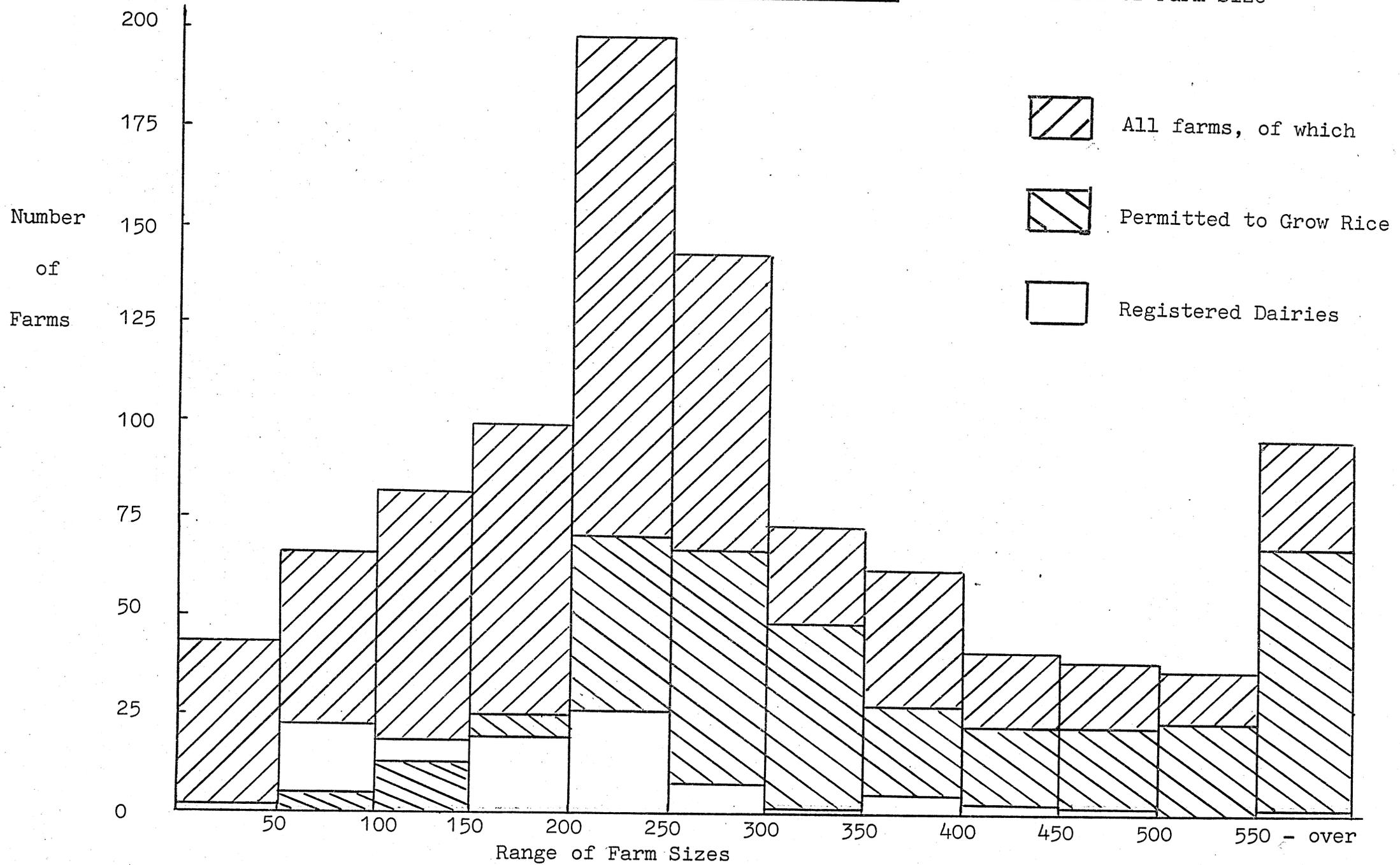


FIGURE 1

## WATER

### THE WATER ALLOCATION SYSTEM

The amount of water available to each farm is limited. Subdivision and expansion of the District means that all available water is fully committed. Although most farms are capable of being fully irrigated, it is not possible to water the whole of the property at the one time. Water is not available all year round. The irrigation season normally extends from August to mid-May each year.

For convenience of water allocation, the Water Resources Commission attaches a Permanent Allotment to each holding. This is the maximum amount of water it expects to be able to deliver to the farm in less favourable seasons when there are no excess flows in the Murray River. Naturally in years of below normal flow, deliveries could be considerably less than this. Part of this amount is termed a Water Right, which is the minimum amount of water that the Commission will attempt to deliver in dry years of very low river flow. The amount of water described as the Water Right must be paid for each season, whether used or not.

Farms of up to 80 hectares receive 1.25 Water Rights for each 0.8 ha. Farms of over 80 ha. have 1.25 further Water Rights for each 1.6 ha., with an absolute maximum of 250 Water Rights per farm. The Commission based its calculations around a "typical" farm of 243 ha. This would have 250 Water Rights, i.e. 250 megalitres.

The Permanent Allotment has been calculated as 2.2 times the Water Right, expressed as megalitres. For the typical 243 ha. farm, the Permanent Allotment has thus been 550 megalitres.

On Dartmouth Dam being declared operational the Permanent Allotment will be 2.42 times the Water Right. The Permanent Allotment for the typical 243 ha. farm will then be 605 megalitres.

### WATER CHARGES

Costing of water for budgeting purposes has been difficult. At time of writing, no announcement had been made of charges for the 1979/80 irrigation season. In view of inflation and Water Resources Commission cost pressures over the last couple of seasons, we have made an arbitrary allowance for an increase, using an average cost for water used on this farming programming, of \$3.22 per megalitre.

### WATER AVAILABILITY AND USAGE

Levels in Hume Reservoir in late winter and early spring following winter rain and snow melt have been the most important factors determining water supplies for the Berriquin Irrigation District in any one year. Once the water spills, water is off allocation until levels recede.

Most commonly, water is available "off allocation" from the opening of the season in August and may continue until the end of January. However, this availability is extremely variable, depending upon the weather. Off allocation periods have varied from as short as only two weeks for the whole season, up to the whole period of the irrigation season.

This water variability makes it difficult for farmers to respond to quick changes in the water supply situation because of the time involved in organizing crop or livestock production e.g. land preparation. In dry years water supply restrictions limit crop areas and farm profitability. Last season, allocations were increased to 160%, and off allocation water was available until the end of November which provided virtually unlimited water.

Some idea of water usage can be gained from Water Resources Commission Reports. Table 2 presents details for the last two available watering seasons, both of which were high water usage seasons.

TABLE 2

BERRIQUIN IRRIGATION DISTRICT  
IRRIGATION WATER USAGE \*

CROP	1977/8 SEASON		1978/9 SEASON	
	Ha.	Megalitres	Ha.	Megalitres
Rice	10,882	174,509	17,946	248,367
Winter Pasture (Sub & Rye)	58,951	202,566	60,298	177,189
Summer Pasture	14,925	96,189	12,841	88,488
Winter Cereal	42,366	105,189	25,919	32,790
Coarse Grains	1,187	9,340	3,214	24,458
Oilseeds	2,010	11,979	3,397	19,815
Vegetables	1,958	12,907	2,089	12,619
Lucerne	2,310	8,997	1,316	4,649
Summer Fodder Crops	1,098	3,467	907	3,387
Stock, domestic	-	4,719	-	3,517
Miscellaneous	85	178	87	742
TOTALS	135,772	630,040	128,014	616,021

\* Source: Annual Reports, Water Resources Commission

Total deliveries have varied from 720,000 ML to less than 300,000 ML. The allocation of water among crops is derived from watering cards completed by farmers, and is generally recognised as not highly accurate. However, it serves as a broad guide to show that pastures, rice, and cereals are the major users of irrigation water. As the numbers of farms permitted to grow rice, and individual maximum farm rice area expand, water usage on rice is becoming of much greater significance.

## RICE PRODUCTION

The number of farms permitted to grow rice, and the area that each can grow, is strictly limited each year by the Water Resources Commission, to levels generally requested by the Rice Industry Co-ordination Committee. This Committee includes the Ricegrowers' Association, the Rice Marketing Board, and the Ricegrowers' Co-operative Mills.

Within Berriquin Irrigation District, the maximum area allowed to be grown on a holding has increased over the past few years to the present area maximum of 51 hectares. The number of holdings permitted to grow rice has also increased dramatically, from 376 holdings in 1973/4 to 526 holdings in 1978/79. However, not all farms permitted to grow rice actually do so. In 1978/79, only 480 holdings grew rice. A major reason for this is the water usage on cereals and the expectations of water restrictions. If in 1978/79, the typical 243 ha. farm grew a rice area of 51 ha., in a dry season it could expect the rice crop to need up to 787 Ml, with a Permanent Allotment of only 550 Ml.

Table 3 indicates approximate numbers of holdings permitted to grow rice, and actually growing rice over the past eight seasons.

TABLE 3

### BERRIQUIN RICE HOLDINGS

SEASON	PERMITTED TO GROW RICE	ACTUALLY GROWING RICE
1978/79	526	480 (91%)
1977/78	483	391 (81%)
1976/77	483	382 (79%)
1975/76	459	390 (85%)
1974/75	398	354 (89%)
1973/74	376	299 (80%)
1972/73	376	264 (70%)
1971/72	376	325 (86%)

Source: Water Resources Commission

In the past the ability of farmers to grow approved rice areas has been closely related to availability of "off allocation" flows. A common farming strategy has been to attempt to establish the rice crop on "off allocation" water. The combination of a dry winter, where winter cereals require irrigation early in the season, and of the lack of "off allocation" flows, has severely constrained rice sowings.

TABLE 4

EFFECT OF WATER AVAILABILITY  
ON RICE AREA

SEASON	% OF APPROVED RICE AREA ACTUALLY GROWN	% OF PERMANENT ALLOTMENT AVAILABLE	AVAILABILITY OF "OFF ALLOCATION" WATER
1975/76	69	140	From 1/8/79 until 31/1/76
1976/77	61	140	From 26/7/76 until 10/11/76 Excess supply avail- able late in season (March-April)
1977/78	49	125	No. "off allocation"
1978/79	72	160	From 1/7/78 until 27/11/78

Source: Water Resources Commission

The operation of Dartmouth Dam should increase the percentage of regulation of the River Murray's resources. Following the commencement of operation, the River Murray Commission will be in a position to increase the proportion of water available to the Water Resources Commission. This increased assurance means that the Water Resources Commission will be able to provide 110% of the old allocation on a more assured basis.

With the increase in the number of holdings actually growing rice over the past eight years, production of rice from the District has risen from about 28,000 tonnes in 1972/73 to 121,000 tonnes in 1978/79. Varietal composition of the rice has changed little. The short to medium grain Calrose variety dominates, accounting for 98% of production last season. Yields have ranged over the past four seasons from 5.73 tonnes/ha to 6.74 tonnes/ha. Last season's provisional average is 6.74 tonnes/ha. Details of rice production are shown in Table 5.

TABLE 5

BERRIQUIN IRRIGATION DISTRICT  
RICE PRODUCTION AND AREA

	1976	1977	1978	1979*
Total Rice (tonnes)	74,412	81,166	61,843	121,000
Hectares	10,991	12,658	10,796	17,946
Yield (t/ha)	6.74	6.41	5.73	6.74

\* 1979 Harvest Figures Provisional

Source: Rice Marketing Board for N.S.W.

## THE TYPICAL FARM

### (1) INTRODUCTION

It is now proposed to examine what is expected to be the economic performance of a typical Berriquin farm for the 1979/80 financial year. This analysis is purposely limited only to apply to those 400 farms actually growing rice in the 1979/80 season. No attempt is made to analyse the performance of dairies or mixed non-rice growing Berriquin farms.

What follows is an attempt to qualify the "typical" Berriquin rice growing farm. No claim can be made that it is a statistically representative average, as parameters selected are not based on any major survey. The picture of this typical farm has been built up using available statistics, a small telephone survey and the wide experience in the field of officers of the Department of Agriculture and the Water Resources Commission.

One of the co-authors, Jim Kennedy, was the author of the "Berriquin Farming", 1st Edition.

The purpose of the exercise is to examine the broad magnitude of costs and returns for the typical 243 hectare farm, rather than to provide individual figures which claim statistical accuracy and representativeness.

It should be noted that the quantities of farming inputs used in the budgets attempt to show what really will be common in 1979/80, rather than to show any Departmental recommendation for maximum production.

The following programme and budget has been prepared on estimates and expectations in August, 1979. Many statistics for the 1979/80 year are not yet available and final likely prices for crop pools have had to be estimated. Pool returns spread over more than one year have been brought back to the year of production, less expected costs and deductions. Contract rates are those expected at next harvest. Appropriate alterations should be made to the budgets in the light of cost movements, between August, 1979, and harvest of crops in 1980.

### (2) FARM SIZE AND PROGRAMME

Total farm area is 243 hectares, which is the basis used by the Water Resources Commission in calculating water allocations for Berriquin farms. It also falls within the modal size range for Berriquin farms growing rice, of from 200 to 249.9 hectares. Table 1 showed that 197 of all such farms fall within this range.

Reference to Figure 1 shows that farm size frequency distribution peaks at around this size.

The farming programme for the 79/80 year is:

38.4 ha. rice  
 27.1 ha. last season's rice stubble to go in to wheat next season.  
 45.7 ha. wheat  
 17.4 ha. barley  
 3.2 ha. summer pasture  
 63.9 ha. winter pasture  
 15.8 ha. dry area not yet cleared or laid out to irrigation.  
 12.1 ha. unproductive - house, roads, channels.  
 19.4 ha. fallow

---

243.0 ha.

Due to increasing rice areas and seasonal extremes, the rotation is not fully stabilised. Of the previous season's 38.4 ha. of rice stubble, 11.3 ha. will be sown back into rice this season while the balance of 27.1 ha. is stubble being fallowed for wheat next season. There is a trend to sow rice back on rice to allow a longer sub-clover phase. There is also an increasing trend to sow sub-clover under the first wheat crop rather than the second wheat or barley crop.

During 1979/80 the farm was stocked with a 20 cow breeding herd for vealer production, including followers and bull. It also carried a flock of 300 crossbred ewes for lamb production.

### (3) WATER

Average cost of water depends on total usage. Application rates for crops and pastures (as measured at the wheel) have been derived from actual use figures, and from Table 2.

Rice:	38.4 ha. @ 14.58 ML/ha (or 4.8 acre feet/acre)	560 ML
Wheat:	45.7 ha. @ 2.5 ML/ha (or 0.8 acre feet/acre)	114 ML
Barley:	17.4 ha. @ 1.5 ML/ha (or 0.5 acre feet/acre)	26 ML
Summer Pasture:	3.2 ha. @ 7.6 ML/ha (or 2.5 acre feet/acre)	24 ML
Winter Pasture:	63.9 ha. @ 2.13 ML/ha (0.7 acre feet/acre)	136 ML
TOTAL USAGE		860 ML (699 acre feet)

We found earlier that for this farm, the Permanent Allotment on Dartmouth Dam being declared operational, was 605 ML. Over the last few years, there has generally been water available over and above the permanent allotment (see Table 4), and with off quota water being available earlier this season, it is reasonable to assume that 860 ML would be the water usage in 1979/80.

Using our arbitrary increases, the total water bill for this farm in the 1979/80 season will be \$2,770. If the estimates regarding water usage for the coming season are correct, the average cost of water in 1979/80 for this farm would then be \$3.22 per megalitre.

#### (4) ENTERPRISE BUDGETS

Budgets for each of the enterprises in the programme for the 1977/80 season, appear on the following pages.

From the following budgets, a gross margin per hectare has been derived. The concept of gross margin analysis allows comparisons of farm enterprises to be made on an economic basis. Overhead costs (such as rates and depreciation) which are difficult to allocate to one particular farm enterprise, are not considered in gross margin analysis. The gross income per hectare (or per ewe/cow for livestock enterprises) for the enterprise is estimated, and from this is deducted the total of variable costs - that is, those costs directly associated with the enterprise and which vary with its area (livestock numbers). Examples are seed, water, fertilizer. Basically, variable costs are those farm costs which would be avoided if the crop was not grown. Overhead costs, however, are incurred whether or not the crop is grown. The result of deducting variable costs from gross income is the gross margin, or gross profit available for each hectare of that enterprise - that is, the contribution that each hectare makes toward paying overhead costs and providing a farming profit.

Chemicals listed in the following budgets are those recommended at time of publication.

CALROSE RICE - AERIALY SOWN, 1978/9

VARIABLE COSTS:		\$/hectare
Seed:	120 kg/ha @ \$110 per tonne undusted less \$15/t collection before 24/8	11.40
Fertilizer:	120 kg/ha Urea @ \$204/tonne plus \$4/t freight to farm	24.96
Machinery:	Banking, pushing up ends, furrows @ 1.25 hrs/ha 1 disc @ 0.875 hrs/ha 1 scarify @ 0.625 hrs/ha 1 grade (8m) @ 0.625 hrs/ha 1 combining @ 0.65 hrs/ha Harvest help @ 0.70 hrs/ha Total 4.725 tractor hrs/ha. @ \$3.44/hr	16.25
Sowing:	By air @ \$11.40 per hectare	11.40
Herbicide:	2.8 litres/ha 27% M.C.P.A. @ \$1.60 - aerial application - \$6.42	4.48 6.42
Water:	14.58 Ml/ha @ \$3.22/Ml	46.95
Bloodworm:	Apply 60 ml Temephos 500 with seed @ \$31.50/litre - \$1.89 - Additional application one year in four - \$1.33	3.22
Snails/ Slime:	6 kg/ha @ \$0.74 kg plus aerial application - \$4.44 - total cost - \$8.88 - apply one year in four	2.22
Rice Beetle or Armyworm:	Trichlorphon (Dipterex) 0.75 litres @ \$6.20/litre for liquid concentrate plus aerial application (\$6.42) - total cost \$11.07/ha - apply one year in four	2.77
Harvest:	by contract, \$12.50 per tonne recommended	78.75
Cartage	by contract, \$3.60/tonne for 16 Kms	22.68
TOTAL VARIABLE COSTS		<u>231.50</u>
GROSS INCOME:		
	6.3 tonnes @ \$110.50 cash (estimated \$114 less \$8 equity plus \$4.50 R.C.M. cash)	\$696.15
GROSS MARGIN:		
	Per hectare	\$464.65
	Per megalitre	<u>\$ 31.86</u>

## MALTING BARLEY

- following rice and wheat

VARIABLE COSTS:	\$/hectare
Seed:	65 kg/ha 14¢/kg 9.10
Fertilizer:	at sowing, 50 kg/ha Confos/Trifos @ \$165 per tonne 8.25
Machinery:	Banking topping @ 1.00 hrs/ha 2 scarify @ 0.625 hrs/ha 1 disc @ 0.875 hrs/ha 1 grade @ 0.75 hrs/ha sowing @ 0.625 hrs/ha Harvest help @ 0.50 hrs/ha Total 5.0 tractor hours @ \$3.44/hour 17.20
Water:	1.5 Ml/ha @ \$3.22/Ml 4.83
Harvest:	by contract, \$9.60 per tonne 16.32
Cartage:	by contract, 16 Km @ \$3.94 per tonne 6.70
	TOTAL VARIABLE COSTS \$62.40
GROSS INCOME:	
	2.0 tonnes/ha @ \$95.00/tonne (rail freight to Sydney deducted) \$190.00
GROSS MARGIN:	
	Per hectare \$127.60 Per megalitre \$ 85.00

\* \* \* \* \*

WHEAT

- sown following rice

VARIABLE COSTS:		\$/hectare
Seed:	70 kg/ha @ 17¢/kg	11.90
Fertilizer:	at sowing, 55 kg/ha Confos/Trifos @ \$165 per tonne	9.08
Machinery:	Bank topping @ 1.00 hrs/ha 2 scarify @ 0.625 hrs/ha 1 grade @ 0.75 hrs/ha 1 disc @ 0.875 hrs/ha sowing @ 0.625 hrs/ha harvest help @ 0.50 hrs/ha Total 5.0 tractor hours @ \$3.44/hour	17.20
Water:	2.5 ML/ha @ \$3.22/ML	8.05
Harvest:	by contract, \$9.60/tonne	20.16
Cartage:	by contract, 16 Kms @ \$3.94 per tonne	<u>8.27</u>
TOTAL VARIABLE COSTS		\$74.66

GROSS INCOME:

2.5 tonnes/ha @ \$100/tonne  
(rail freight to Sydney deducted) \$250.00

GROSS MARGIN: Per hectare \$175.34  
Per megalitre \$ 70.14

\* \* \* \* \*

SUMMER PASTURE - ANNUAL MAINTENANCE

		\$/hectare
Fertilizer:	200 kg/ha single super @ \$84.96 per tonne - applied one year in two	8.50
Water:	7.6 ML/ha @ \$3.22/ML	<u>24.47</u>
ANNUAL COST		\$32.97

WINTER PASTURE

- annual maintenance cost  
- sown under winter cereals

		\$/hectare
Fertilizer:	200 kg/ha single super @ \$84.96 per tonne - applied one year in three	5.66
Water:	2.13 ML/ha @ \$3.22/ML	6.86
Insects:	Red legged earthmite - one year in three	0.55
Weeds:	1.5 litres/ha 27% M.C.P.A. @ \$1.60 - boom spray application - \$1.20 - total cost - \$3.60 - apply one year in two	<u>1.80</u>
ANNUAL COST		\$14.87

BORDER LEICESTER X MERINO EWES

Mated to Dorset Rams mid October to December

Rams purchased \$120, retained 4 matings, used at rate of 2%, \$15 scrap value.

Ewes purchased 12-18 months old, off shears \$38.00.

Retained for 6 lambings, sold after lambs weaned \$17.00.

Depreciation \$3.50/year. (i.e.  $\frac{38-17}{6}$ )

50 ewes/ram.

Lambs sold July/August/September, 1980 @ \$20 average.

Lambs selling average 80 percent.

No carryover lambs. Wool prices net of selling costs.

Wool price \$2.10/kg greasy.

Sheep shorn August, 1980.

\$ per ewe

REVENUE:

4.5 kg wool 27 micron	9.45	
lambs 0.8 @ \$20.00	16.00	25.45

VARIABLE COSTS

Shearing: ewes @ \$68.13/100	0.6813	
rams @ \$136.26/100	0.0273	
Woolpacks @ \$3.00 (33 fleeces/pack)	0.091	
Shed hand 1,500/week	0.1332	
	<u>0.9328</u>	0.93

Crutching ewes, full crutch twice @ \$19.76/100	0.3952	
--	--------	--

Drenching ewes twice @ 6¢/dose	0.12	
Lambs (0.8) once @ 4¢/dose	0.32	

Vaccination ewes once @ 4¢/dose	0.40	
Lambs twice (0.8) @ 3¢/dose	0.48	

Dipping ewes and rams only @ 11¢	0.11	
----------------------------------	------	--

Deaths 4% for year on average (\$27.50)	1.10	
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Depreciation	3.50	
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Ram cost/ewe mated	0.525	
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P.P. Board Rates	0.45	
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Lamb freight to sale	0.45	
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Lamb selling commission @ 5%	1.00	
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	<u>8.85</u>	8.85
--	-------------	------

		<u>9.78</u>
--	--	-------------

GROSS MARGIN per ewe:

\$15.67

SELF REPLACING HERD

- calves sold 8-10 months
- 85% calving
- 4% mating
- 4% deaths of breeders
- 20% culling breeders

	Per 100 cows and Followers \$
VARIABLE COSTS:	
Drench - cows once @ \$0.80 inject	80
- weaners twice @ \$0.60 inject	51
Lice control - cows and weaners once	50
Vaccinate twice 5 in 1, cows and calves	90
P.P.B. rates @ \$0.45	83
Calf marking casual labour	80
Tags - ear and tail, all weaners @ \$0.40	34
Bull cost - buy one for \$850, sell one cull for \$500	350
Veterinary expenses and requisites	100
Supplementary feeding, licks, misc.	250
Freight - sell 81 cattle in 6 lots, contract freight 20 kms @ \$45/trip	270
Selling Commission 5%	994
Cattle levy @ \$5.82/head	582
	<hr/>
	\$3,014
VARIABLE COST/COW	\$30.14

GROSS INCOME:

19 c.f.a. cows @ \$250	\$4,750
30 vealers @ \$270	\$8,100
32 vealers @ \$220	\$7,040
	<hr/>
	\$19,890
GROSS INCOME/COW	\$198.90
GROSS MARGIN/COW	\$168.76

(5) FINANCIAL SUMMARY

PAYMENTS

For ease of calculation, the pooling of returns from rice and wheat has been ignored, and all returns brought into the year of harvest - this does not offset measurement of profitability, provided adequate over-draft interest is allowed, but points out the need for cash flow budgets.

GROSS INCOME

		\$
Rice:	38.4 ha. @ \$696.15	26,732
Wheat:	45.7 ha. @ \$250	11,425
Barley:	17.4 ha. @ \$190	3,306
Sheep:	300 lambs @ \$25.45	7,635
Cattle:	20 breeding cows @ \$198.90	3,978
	TOTAL	<u>\$53,076</u>

VARIABLE COSTS

Rice:	38.4 ha. @ \$231.50	8,890
Wheat:	45.7 ha. @ \$74.66	3,412
Barley:	17.4 ha. @ \$62.40	1,086
Summer Pasture:	3.2 ha. @ \$32.97	106
Winter Pasture:	63.9 ha. @ \$14.87	950
Sheep:	300 ewes @ \$9.78	2,934
Cattle:	20 breeding cows @ \$30.14	603
Winter Pasture	30 ha. @ \$8.00	240
Seed:		
	TOTAL VARIABLE COSTS	<u>\$18,221</u>
	WHOLE FARM GROSS MARGIN	<u><u>\$34,855</u></u>

OVERHEADS

	\$	\$
(a) Cash		
Rates (Shire)	650	
P.P.B.	120	
Insurance - plant	240	
- worker's compensation	90	
- general	250	
Registration, licences, permits	230	
Telephone, electricity	750	
Accountant	280	
Overhead fuel & oil (i.e. all not covered in Variable Costs)	1,000	
Freight, travelling	300	
General pests - channel cleaning and weeds, insects	500	
Stationery, postage, subs, journals	250	
Repairs and maintenance		
- improvements, structures		
- fencing, vehicles and some plant (costs not already included in Variable Costs)	1,750	
Casual labour, surveyor	750	
Finance costs		
- interest on O/D averaging \$9,000, plus bank fees	1,100	
- plant interest cost	<u>350</u>	
		8,610
(b) Non Cash		
Depreciation/Asset replacement		
- improvements, structures (not home) @ 3% value	490	
- plant* (replacements)	3,420	
- vehicles* 15%	<u>750</u>	
		4,660
Total Overheads	\$13,270	
Total Variable Costs	<u>\$18,221</u>	
Total Costs		<u>\$31,491</u>
NET FARM INCOME		\$21,585

\* See farm valuation for details

\* \* \* \* \*

It should be again noted that this favourable result is based upon an optimistic guess at grain prices at next harvest, and on the expectation that high livestock prices will continue for 1979/80 financial year.

Prices used in the budgets for both winter cereals and livestock are considerably higher than in the past few years, and the result is highly sensitive to fluctuations in these prices.

This net farm income has to provide for:

- payment of a wage for the labour of the owner-operator
- payment of income tax
- servicing of debts to lenders, and reduction in bank overdraft
- return to capital invested in the farm (a profit).

Taxation is highly variable from farm to farm according to method of trading and income history. An arbitrary allowance of \$3,000 with a 2-way partnership, has been made.

In making some allowance for the value of the owner/operator's labour as a cost (in reality this is taken usually as personal drawings for payment of family living expenses), we could assume that he worked an average 41 hours per week for 49 weeks of the year, and allow him \$5.00 per hour as a permanent tractor driver wage. This would value the labour (living costs) at \$10,045. It is usual to make some allowance for the operator's management effort - i.e. the time and effort he puts in above the normal role of a farm employee. Again, an arbitrary allowance of \$3,500 is made, bringing total operator labour and management to \$13,545.

Subtracting taxation and operator labour and management (living expenses of the workforce) from the net farm income, leaves a monetary return to total capital investment (regardless of who owns it) of \$5,040. If no term debt exists and the farmer has full equity, this result can be related to the value of capital invested in the farm to get some idea of the farm purely as an investment of capital. Naturally, if a term debt does exist, this net result of \$5,040 must first pay interest and principal reductions.

#### CAPITAL

Approximate capital value of typical assets of a Berriquin Irrigation District rice growing farm of the most common size, is shown following. Naturally, this applies to no particular farm, and is not claimed to be a statistically representative average. The purpose is simply to show what could be the case for many such farms at around the start of the 1979/80 financial year. The value is established to provide some indication of the return as an investment on the capital tied up in the farm and to permit consideration in a following section of a proposal to borrow.

Land:

243 ha (600 acres) freehold of which	
- 215 ha. cleared, banked and laid out to irrigation @ \$342/ha	73,535
- 12 ha. not yet cleared or irrigated, irrigable @ \$240/ha	2,880
- 16 ha. dry grazing - non-irrigable, too low or too high @ \$160/ha.	<u>2,560</u>

78,975

Structures: (depreciated values)

Machinery shed	4,000
hay shed	2,000
cattle yards	1,500
storage shed	900
grain silo	1,700
sheepyards, dip	1,200
fencing	5,000
home/garage	<u>20,000</u>

36,300

Farming Plant: (basic plant, depreciated values,  
excludes header and truck as con-  
tract costs used in budgets).

Tractor	14,000
scarifier	2,000
offset disc	1,200
combine	2,000
trailers, spray	1,500
field bins	1,500
harrows, pump	700
delver	600
land plane	1,500
bikes	300
tools, portable plant	2,500
lift pump	<u>400</u>

28,200

Vehicles:

car, ute	5,000
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Livestock:

300 breeding ewes + rams @ \$20 average	6,000
20 breeding cows + bull @ \$230 average	<u>4,600</u>
Approximate current value of capital invested	<u><u>159,075</u></u>

RETURN TO CAPITAL

Looking at the farm purely as an investment of capital, ignoring indebtedness, the net return after allowance for tax, and owner labour and management, was \$5,040. The total value of capital invested was \$159,075, giving a net earning rate after tax, living expenses and asset replacement of around 3.16%.

PROPERTY TURNOVER

Because property purchase usually gives rise to significant borrowing, levels of property turnover were examined in the 1976 publication dealing with Berriquin Irrigation District farms. This information has been brought up to date. The following table (table 6) shows all property transfers recorded within the District from January, 1972 to July, 1979. It accounts for each separate title to property - no allowance is made for multiple ownership or transfer of groups of separate titles. That is, each legally individual piece of land, which carries its own farm number and title certificate, is counted. Very small or residential farm blocks have been excluded.

TABLE 6

PROPERTY TRANSFERS - BERRIQUIN

CALENDAR YEAR	TOTAL NO. OF FARMS TRANSFERRED	PROPORTION OF TOTAL HOLDINGS (%)
1972	59	5
1973	129	10
1974	101	8
1975	76	6
1976	82	6
1977	73	6
1978	80	6
1979 (½)*	59	5

\* 1/1/79 to 9/7/79

In the 12 months ended July, 1979, a total of 103 separate holdings were transferred (around 8% of total holdings). Of these, 49 were permitted to grow rice, which represented 12% of all holdings growing rice. Comparable figures for the four years 1972 to 1975 showed between 5% and 11% of Berriquin Irrigation District rice growing holdings transferred each year.

In order to examine the changing patterns in the ownership of Berriquin Irrigation District holdings, transfers since mid 1976 have been analysed in the following table.

TABLE 7

NUMBERS OF TITLES TRANSFERRED  
CLASSIFIED BY BUYER

BUYER	7/5/76 to 31/12/76	1977 Jan/Dec	1978 Jan/Dec	1/1/79 to 9/7/79
Devise	9 (18%)	17 (23%)	14 (18%)	11 (19%)
New Entrant to B.I.D.	28 (56%)	29 (40%)	37 (46%)	27 (46%)
Changeover of farm for local farmer	1 (2%)	0 (-)	4 (5%)	9 (15%)
Existing Farmer or group acquiring more land *	12 (24%)	27 (37%)	25 (31%)	12 (20%)
	<hr/> 50 (100%)	<hr/> 73 (100%)	<hr/> 80 (100%)	<hr/> 59 (100%)

\* may be related or family

These classifications can only be regarded as approximate - one can never trace all group or family connections. In the previous issue of this publication, we found that between 28% and 38% of Berriquin Irrigation District buyers were new entrants to the area, over the years 1973 to 1975. The present analysis shows some year to year variations, but a fairly stable, although slightly declining, population of new entrants.

The feature of note is the proportion of titles acquired over the last four years by existing farmers, their relatives or business partners; that is, the degree to which farm build up through multiple holding operation, has occurred.

## ACQUISITION OF ADDITIONAL BLOCK

Over the period May, 1976 to July, 1979, there have been a total of 79 cases where a current title holder within the Berriquin Irrigation District, has acquired an additional block(s) of land. The breakup of these figures indicate that of the 79 additional blocks purchased, 48 were non-rice holdings while the remaining 31 were rice holdings. However, over the last ten months of this period, the trend to acquire a non-rice holding in preference to a rice holding has not been as significant as previously.

### 1. FARMING PROGRAMME

Based on the overriding trend in land acquisition for the past 3 years, this farmer is to acquire a non-rice block of total size 180 hectares. In hypothesising this additional block, we have assumed it to have no house in order to avoid unnecessary complications within the analysis. Estimates of the farm programme for the 1979/80 season is:

- 40 hectares wheat
- 25 hectares barley
- 90 hectares winter pasture
- 15 hectares summer pasture
- 10 hectares dryland

180 hectares

Using the basic format of the budgets shown earlier, the expected financial costs and returns incurred with the operation of the additional block can be estimated. During the 1979/80 season the non-rice holding will be stocked with 600 crossbred ewes and a 15 cow breeding herd. The variable costs attached to wheat and the winter pasture would rise slightly for this holding because of the likelihood of an additional watering. On the other hand, the returns may fall slightly because of the additional pressure on the owner's management.

### 2. EXTRA CAPITAL REQUIRED

The 180 ha. non-rice irrigation block is to be purchased on the open market in September, 1979. The farm has no house, as it has been operated in conjunction with another farm. Purchase price (including legal costs) is \$495/ha (\$200 per acre), a total of \$89,100. It has good pastures and fences, and little expenditure on fixed improvements is needed.

We have budgeted for \$15,000 to be spent either changing over this present tractor for one of larger horsepower, or for the purchase of another second hand tractor. An allowance of \$4,000 is made for either small items of additional plant or improvement, or immediate maintenance. To implement the farming programme which follows allowance has been made in costings for interest on additional working capital. Purchase of additional livestock involved \$18,000 for 600 sheep, and \$3,000 for 15 cows.

Total extra capital required follows:

- land (incl. legal)	\$89,100
- plant/tractor	\$15,000
- other capital	\$ 4,000
- 600 sheep @ \$30	\$18,000
- 15 cows @ \$200	\$ 3,000
	<u>          </u>
	\$129,100
	<u>          </u>

### 3. COSTS AND RETURNS

		\$
GROSS INCOME		
Wheat:	40 ha. @ \$250	10,000
Barley:	25 ha. @ \$190	4,750
Sheep:	600 lambs @ \$25.45	15,270
Cattle:	15 breeding cows @ \$198.90	2,983
		<u>          </u>
	TOTAL:	\$33,003

#### VARIABLE COSTS

Wheat:	40 ha. @ \$74.66	2,986
Barley:	25 ha. @ \$62.40	1,560
Sheep:	600 ewes @ \$9.78	5,868
Cattle:	15 breeding cows @ \$30.14	452
Winter Pasture:	90 ha. @ \$14.87	1,338
Summer Pasture:	15 ha. @ \$32.97	494
		<u>          </u>

TOTAL VARIABLE COSTS: \$12,698

WHOLE FARM GROSS MARGIN: \$20,305

(say \$20,300)

ADDITIONAL OVERHEAD COSTS

		\$
Rates (Shire)	400	
P.P.B.	90	
Insurance - plant	100	
- worker's compensation	100	
- general	200	
Casual labour	2,000	
Electricity - sheds	300	
Accountant	100	
Overhead fuel and oil	500	
Freight, travelling	200	
Pests and weeds	300	
Repairs and maintenance		
- improvements, structures, plant	750	
Finance costs		
- additional interest on O/D averaging \$5,000, plus bank fees	600	
	<u>        </u>	
		5,720
Non-cash		
- depreciation to improvements and structures @ 3% value	400	
- plant depreciation (additional)	2,000	
	<u>        </u>	
		2,400
OTHER COSTS		
Pasture seed, dry area maintenance, pest and insect control, fallow water	500	
	<u>        </u>	
		500
Total Overhead and Additional Costs		<u>\$8,620</u>
Residual		\$11,680

4. EQUITY AND DEBT ADJUSTMENT

Assuming that the operator requires no more return for his own labour, the residual is available for payment of income tax and then loan repayments. If the income tax payment was \$1,868, then \$9,812 would be available for debt reduction from the additional holding. If this is added to the \$5,040 expected to be available for debt reductions from the home farm, then an annual repayment of principal and interest of \$14,852, say \$14,850, can be made.

Using current commercial banking terms, it is likely that the finance involved in the purchase of the additional holding, plant, stock, etc., would be available over say, 14 years at 11½% reducible. This annual repayment of \$14,850, under these borrowing terms, would support an initial loan of \$101,000, given that the loan was amortized. Given a total additional capital requirement of say \$129,000, this would indicate an initial equity requirement of \$28,000 provided that no term debt exists on the home farm. If a term debt is current on the home farm, the initial equity required for the additional farm will be higher because the home farm will not be able to contribute as great a proportion towards the servicing of the debt.

However, if the finance available to purchase the additional holding, plant, stock, etc., was only available over a 10 year period at 11½% reducible, the size of the initial loan, given the amount available for annual repayment remained at \$14,850, would fall to \$85,640. Under such circumstances, the initial equity requirement would increase to \$43,360, again assuming no term debt existed on the home farm.

#### 5. LOWER PRICES - SECOND THOUGHTS

The whole analysis has been based on record wheat and barley prices of \$100 and \$95 per tonne respectively. Also, current prices of \$20 per lamb and around \$250 per cow/calf wealers sold are significantly higher than an average over the last four years would indicate.

A lender faced with a loan proposal over fourteen years may not be prepared to bank on returns staying at this level. If the whole analysis was reworked using prices of the last few seasons, both profitability and the debt which can be serviced, will fall.

Using prices for wheat of \$73/tonne, barley \$66/tonne, lambs \$14 each and an average vealer price of \$150, the following would result, if the same variable and overhead costs shown in the previous budgets continued to apply.

\* Gross income on the home farm would fall by \$7,080, to around \$46,000.

\* Even with allowance for substantially reduced tax payment, there would be no surplus available for debt reduction after providing for a return to labour and management (personal drawings for living expenses). In reality, any payment of principal or interest on the debt would have to be made out of the depreciation allowances, or the owner's management allowance.

\* On the additional block, the gross income would fall by \$8,187, to around \$24,800.

\* Allowing for reduced taxation, the amount available from both farms for debt reduction would fall to around \$2,900.

\* Taking a pessimistic view of prices and costs, this would mean that the amount available for debt servicing from both farms would be around \$2,900. Over 14 years with an amortized term loan at 11½%, this would support an initial borrowing of around \$20,000.

\* With total capital required for the additional block falling from \$129,000 to \$122,000 due to reduced stock prices, minimum equity would rise from \$35,200 to around \$102,000.

\* On the other hand, if the finance terms were only available over a 10 year period with an amortized term loan at 11½%, an initial borrowing of only \$16,700 could be supported. Under such circumstances the minimum equity would rise even further to around \$105,300.

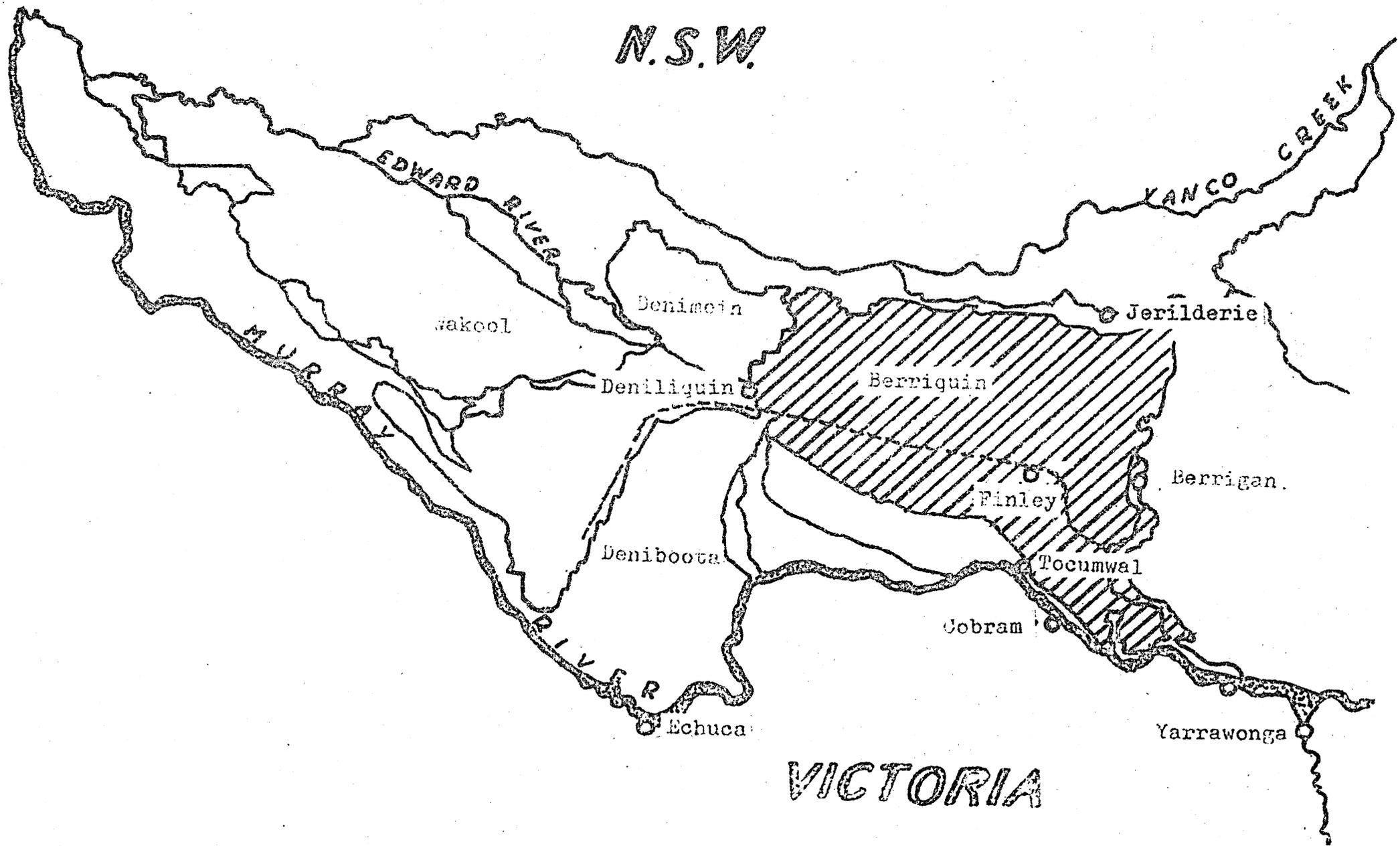
# ANNEX 1 TRACTOR OPERATING COSTS - AUGUST, 1979

An attempt has been made to establish operating costs for normal tractor usage in broad acre cultivation. The only costs considered are those that vary directly with tractor usage - overhead costs (such as depreciation or cost of shelter) which are incurred regardless of usage, are not included. The operating cost for the tractor is directly attributable to the crop for which the tractor is being used.

The data is based on a diesel wheeled tractor of 75 engine horsepower. Performance figures and technical data were collected from a small sample survey conducted in the Berriquin Irrigation District, together with manufacturers' recommendations. It is recognised that such things as fuel consumption and tyre wear may vary according to type of operation (e.g. deep ripping, versus spraying), work load on tractor, nature of terrain, and so on. The following costing is designed to cover most broad acre cultural operations. The tractor size of a 75 engine horsepower is fairly typical on Irrigation Area mixed farms within the Berriquin Irrigation District. Variation on fuel consumption is the most important factor affecting operating costs.

OPERATING COSTS		\$ per hour* of tractor operation
* 75 engine H.P. diesel wheeled tractor		
Fuel:	14.0 litres per hour @ 17 cents/litre	2.38
Oil:	Engine oil 12.8 litres @ \$1.11/litre changed every 150 hours	0.1
	Topping up, including filter 2.8 litres @ \$1.11/litre	0.02
	Transmission oil: 51 litres every 1,000 hours @ \$1.18/litre	0.06
	Topping up, 5.6 litres every 1,000 hours @ \$1.18/litre	0.01
Filters:	Fuel filter and grease every 500 hours @ \$4.70	0.01
	Oil filter changed every 150 hours @ \$10.80	0.07
Tyres:	Replace 2 rear @ 3,250 hours @ \$300 ea.	0.18
	Replace 2 front @ 4,000 hours @ \$58 ea.	0.03
Tubes:	Replace 2 rear tubes @ 3,500 hours @ \$100	0.03
	Replace 2 front tubes @ 4,000 hours @ \$25	0.01
Repairs & Maintenance:	varies with age and use of tractor, but over a 10 year life at present prices averages around \$540 per 1,000 hrs. operation	0.54
Operating Costs per Hour		<u>\$3.44</u>

\* Per hour of operation using cultivation implement on back of moderate load (e.g. discing, scarifying). Fuel consumption would be much higher on heavy operation (e.g. deep ripping), lower on light operation (e.g. spraying).



ANNEX 2: LOCATION MAP