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# Regional Milk Production Costs in N.S.W.

M. A. Graham and M. A. Hayward\*

## 1 Introduction

This note briefly outlines some data concerning regional costs of milk production derived from a recently published survey of New South Wales dairy farmers (Graham and Hayward, 1978). The survey was undertaken by the Division of Marketing and Economics of the N.S.W. Department of Agriculture, for use by the N.S.W. Dairy Industry Prices Tribunal in its market milk pricing deliberations. The data outlined below relate to the financial year 1975-76.

## 2 Methodology

To enable the results presented to be viewed in the proper context, several aspects of the methodology should be noted.

The dairy farm population to be sampled was defined to exclude low production farms (less than 80,000 L per annum) and very seasonal producers (produced milk for less than 26 weeks of the year). Areas around the larger inland towns supplying only local demand (island areas) were also excluded. All other dairy farms in N.S.W. (3,326) were eligible for inclusion in the sample.

The population was stratified on the basis of location, volume of production and seasonality of production.<sup>1</sup> To date, only regional costs have been derived from the data. Each regional cost is the average of strata means weighted by strata production.

The regions were based on the following statistical divisions and sub-divisions of the Australian Bureau of Statistics: Richmond-Tweed, Clarence/Hastings, Hunter, Outer Sydney, Illawarra, Lower South Coast, and Central Murray.

Cash costs were collected from tax and other farm records. Costs imputed for depreciation, return to operator (and family) labour and return to capital invested were a significant part of total farm costs. Therefore, the costs presented below are critically dependent on the assumptions regarding the cost allowances made for these non-cash expenses.

A depreciation rate of 10% was allowed on the current market value of plant and equipment. A rate of return of 10% for non-land assets, and 5% for land assets, was allowed as a cost of production. The distinction was made between land and non-land assets because dairy land values are generally influenced by non-dairying factors (urban or recreation uses *etc.*).

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\* Economists, Division of Marketing and Economics, N.S.W. Department of Agriculture, Sydney.

<sup>1</sup> Seasonality of production was measured as the proportion of annual milk output produced in the months of May-June-July.

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Capital is invested in land in anticipation of expected returns from both dairying and capital gains. Therefore, only half of the opportunity cost of the capital invested in land was allocated as a milk production cost.<sup>2</sup>

In the case of operator labour, two methods were used to estimate the value of operator and family labour. *Firstly*, an allowance based on the opportunity cost of the farmer and family labour was assessed. A uniform allowance of \$9,318 per family unit (based on average weekly earnings) was made. *Secondly*, an estimate of the time needed for farm tasks, valued at the award rate, gave an estimate of the value of all work done on the farm. Actual wages paid were deducted from this total figure to derive a “synthesised” operator labour allowance.

### 3 Results

Given the current Dairy Industry Authority requirements for year round production of wholemilk for market milk purposes, costs of production were also calculated for less seasonal producers (*i.e.* those who produced at least 19 per cent of their annual production in the months of May-June-July).

In addition to total costs of production, cash costs directly attributable to the dairy enterprise — “short term costs” — were also calculated. These costs do not include overheads or imputed values and thus serve as an approximation to the marginal cost of production.

*Table 1: Costs of Production — All Farms (cents/litre)*

Region	Total Cost		
	Opportunity cost labour allowance	Synthesised labour allowance	Short term cost
Richmond-Tweed (n = 30)	13.00 ( 0.71)*	18.12 ( 0.72)	3.45 (0.26)
Clarence/Hastings (n = 34)	15.66 ( 0.82)	18.63 ( 0.79)	4.23 (0.40)
Hunter (n = 30)	15.32 ( 0.71)	16.54 ( 0.73)	4.42 (0.26)
Outer Sydney (n = 27)	18.62 ( 0.84)	19.67 ( 1.56)	7.98 (0.60)
Illawarra (n = 28)	16.54 ( 0.87)	17.77 ( 0.76)	5.01 (0.34)
Lower South Coast (n = 30)	12.25 ( 0.71)	14.98 ( 0.68)	3.43 (0.23)
Central Murray (n = 26)	10.87 ( 1.02)	14.66 ( 1.05)	2.62 (0.20)

\*. Figures in parentheses under the regional costs are standard errors.  
n = Sample size.

<sup>2</sup> This is conceptually similar to including potential capital gains as a sideline enterprise (with the normal sideline cost equals sideline income assumption).

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Table 2: Costs of Production — 19%+ Seasonality Group (cents/litre)

Region	Total Cost		
	Opportunity cost labour allowance	Synthesised labour allowance	Short term cost
Richmond-Tweed (n = 15)	13.56 ( 0.72)*	18.10 ( 1.00)	4.65 (0.26)
Clarence/Hastings (n = 19)	15.28 ( 0.92)	17.62 ( 0.96)	4.45 (0.44)
Hunter (n = 23)	15.09 ( 0.76)	16.18 ( 0.73)	4.47 (0.28)
Outer Sydney (n = 27)	18.62 ( 0.84)	19.67 ( 1.56)	7.98 (0.60)
Illawarra (n = 23)	16.59 ( 0.91)	17.84 ( 0.79)	5.03 (0.36)
Lower South Coast (n = 15)	11.98 ( 0.97)	14.62 ( 0.88)	3.50 (0.31)

\* Figures in parentheses under the regional costs are standard errors.  
 19%+ Seasonality Group — This group of farms produced at least 19% of their total milk production in the months of May-June-July.  
 All farms in the Central Murray Region produced less than 19% of their annual milk production in May-June-July.  
 n = Sample size.

#### 4 Discussion

The costs presented in Tables 1 and 2 refer to the cost of milk delivered to the factory. For a proper comparison of different regions as potential sources of market milk supply for the Sydney area, the cost of transporting milk from the factory to Sydney should be considered.

Table 3 shows an approximate transport cost, and the regional costs adjusted for transport. The inclusion of transport costs tend to reduce the magnitude of any production cost advantages of outer areas.

Table 3: Approximate Freight Cost Incurred in the Transport of Wholemilk to the Sydney Market and the Approximate per Litre Cost of Milk Delivered to Sydney.

Source region	Approximate freight cost (c/L) <sup>a</sup>	Cost delivered to Sydney cents/litre			
		All farms		19%+ seasonality group	
		Opp. cost lab. all.	Synth. lab. all.	Opp. cost lab.all.	Synth. lab. all.
Richmond-Tweed	2.43	15.43	20.55	15.99	20.53
Clarence/Hastings	1.62	17.28	20.25	16.90	19.24
Hunter	.77	16.09	17.31	15.86	16.95
Outer Sydney	.24	18.86	19.91	18.86	19.91
Illawarra	.52	17.06	18.29	17.11	18.36
Lower South Coast	2.10	14.35	17.08	14.08	16.72
Central Murray	2.90	13.77	17.56		

a. Source: N.S.W. Dairy Industry Prices Tribunal, September, 1977.

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As the value of land varies markedly between regions and is a major cost component, it is interesting to note the production costs *excluding* the imputed return to land. These costs are presented in Table 4.

Table 4: Milk Production Costs Excluding Imputed Land Cost

Region	Cost of production cents/litre			
	All farms		19%+ seasonality group	
	Opp. cost. lab. all.	Synth. lab. all.	Opp. cost lab. all.	Synth. lab. all.
Richmond-Tweed	10.74 ( 0.66)	15.85 ( 0.63)	11.29 ( 0.67)	15.83 ( 0.96)
Clarence/Hastings	13.02 ( 0.79)	15.99 ( 0.77)	12.67 ( 0.83)	15.01 ( 0.87)
Hunter	12.46 ( 0.62)	13.68 ( 0.58)	12.26 ( 0.67)	13.34 ( 0.59)
Outer Sydney	14.27 ( 0.39)	15.32 ( 0.67)	14.27 ( 0.39)	15.32 ( 0.67)
Illawarra	12.13 ( 0.60)	13.36 ( 0.60)	12.22 ( 0.62)	13.46 ( 0.63)
Lower South Coast	10.54 ( 0.54)	13.32 ( 0.49)	10.30 ( 0.72)	12.95 ( 0.60)
Central Murray	8.94 ( 0.83)	12.73 ( 0.85)		

Figures in parentheses under the regional costs are standard errors.

The significance of the differences between the regional mean costs of production was tested statistically. The results are presented in Table 5.

The addition of transport costs to the original production costs (and assuming the original standard errors) affected the significance of the differences (see Table 5). The exclusion of land costs also altered the significance of some regional cost differences (see Table 5).

Table 5: Significance of Regional Cost Differences<sup>b</sup>

(i) Significance of Regional Total Cost Differences – All Farms<sup>c</sup>

Region <sup>a</sup>	Opportunity Cost Labour Allowance							Synthesized Labour Allowance						
	R-T	C/H	H	OS	I	LSC	CM	R-T	C/H	H	OS	I	LSC	CM
R-T	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C/H	s <sup>t</sup>	-	-	-	-	-	-	ns	-	-	-	-	-	-
H	s <sup>t,1</sup>	ns	-	-	-	-	-	ns <sup>t,1</sup>	ns <sup>t,1</sup>	-	-	-	-	-
OS	s	s <sup>t,1</sup>	s	-	-	-	-	ns	ns	ns	-	-	-	-
I	s <sup>t,1</sup>	ns	ns	ns <sup>1</sup>	-	-	-	ns <sup>t,1</sup>	ns <sup>1</sup>	ns	ns <sup>1</sup>	-	-	-
LSC	ns	s	s <sup>t</sup>	s	s <sup>1</sup>	-	-	s	s	ns	s <sup>t</sup>	s <sup>t,1</sup>	-	-
CM	ns	s	s <sup>t</sup>	s	s	ns	-	s	s	ns	s <sup>t</sup>	s <sup>t,1</sup>	ns	-

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(ii) Significance of Regional Total Cost Differences – 19%+ Seasonality Group<sup>c, d</sup>

Region	Opportunity Cost Labour Allowance						Synthesized Labour Allowance					
	R-T	C/H	H	OS	I	LSC	R-T	C/H	H	OS	I	LSC
R-T	-	-	-	-	-	-	-	-	-	-	-	-
C/H	ns	-	-	-	-	-	ns	-	-	-	-	-
H	ns	ns	-	-	-	-	ns <sup>t,1</sup>	ns	-	-	-	-
OS	s	s <sup>t,1</sup>	s	-	-	-	ns	ns	s <sup>t</sup>	-	-	-
I	s <sup>t,1</sup>	ns	ns	ns <sup>1</sup>	-	-	ns	ns	ns	ns <sup>1</sup>	-	-
LSC	ns	s	s <sup>t,1</sup>	s	s <sup>1</sup>	-	s	s <sup>t,1</sup>	ns	s <sup>t</sup>	s <sup>t,1</sup>	-

(iii) Significance of Regional Short Term Cost Differences<sup>d</sup>

Region	All Farms							19%+ Seasonality Group						
	R-T	C/H	H	OS	I	LSC	CM	R-T	C/H	H	OS	I	LSC	
R-T	-	-	-	-	-	-	-	-	-	-	-	-	-	
C/H	ns	-	-	-	-	-	-	ns	-	-	-	-	-	
H	s	ns	-	-	-	-	-	ns	ns	-	-	-	-	
OS	s	s	s	-	-	-	-	s	s	s	-	-	-	
I	s	ns	ns	s	-	-	-	ns	ns	ns	s	-	-	
LSC	ns	ns	s	s	s	-	-	s	ns	s	s	s	-	
CM	s	s	s	s	s	s	-	-	-	-	-	-	-	

Notes: (a) Regional abbreviations: R-T represents Richmond-Tweed; C/H, Clarence/Hastings; H, Hunter; OS, Outer Sydney; I, Illawarra; LSC, Lower South Coast; CM, Central Murray.

(b) s – significant at 5% level.

ns – not significant at 5% level.

(c) <sup>1</sup> – the addition of the cost of transport to Sydney reversed the significance indicated.

<sup>t</sup> – the exclusion of the imputed land cost reversed the significance indicated.

(d) 19%+ Seasonality Group – This group of farms produced at least 19% of their total milk production in the months of May-June-July.

## 5 Conclusion

The cost of production information presented above provides evidence for the debate on the rationalisation of the market milk supplies in N.S.W. However, these costs should be used with caution.

Although the survey illustrated significant differences in the milk production costs between some regions, the *reasons* for these cost differences have not been investigated. For example, it may be that costs are related to the amount of market milk supplied from a region. Higher costs in market milk areas may be due to the more demanding production requirements for market milk, or due to the cost circularity process associated with cost oriented administered pricing (Harris, 1977). The implication is that the re-allocation of market milk quotas to “low cost” areas could result in production cost increases in these areas. Further, if seasonality of production is a major element in explaining the lower costs of some outer areas, policy alternatives of seasonal pricing or of drawing

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milk for the Sydney market from different regions in different seasons may be more rational than a quota redistribution.

Despite these words of caution, the cost differences indicate that further study of the factors influencing regional costs of production may reveal areas where the efficiency of milk procurement can be improved.

### References

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HARRIS, D. G., "Inflation Indexed Price Supports and Land Values", *American Journal of Agricultural Economics*, 59 (3), August 1977, pp. 489-495.