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## REGIONAL EXPENDITURE PATTERN AND ITS IMPLICATIONS FOR THE ECONOMY: A CASE STUDY IN FAR WEST NEW SOUTH WALES

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### *Abstract*

*Possible changes in access to natural resources can affect a regional economy. An understanding of the flow of business expenditure in the regional economy, including both purchases and sales transactions performed by businesses, is one of the key factors in determining the impacts of these changes. This paper aims to fill gaps in our understanding of the flow of financial transactions by analysing the expenditure and sales pattern of industries involved in irrigated agriculture, providing inputs and services to agriculture, and those engaged in tourism and recreational activities in the Barwon-Darling region. This study is based on a survey, conducted as a part of a larger project, addressing issues important for planning activities of the Barwon-darling River Management Committee. The results of the study will assist natural resource planners and managers to gain insights into the direction of flow-on impacts of different planning options.*

**Keywords:** *Expenditure Pattern, Regional Economic Analysis, Barwon-Darling*

Note: The views expressed in the paper are those of the authors and not necessarily those of the NSW Department of Land and Water Conservation.

## **REGIONAL EXPENDITURE PATTERN AND ITS IMPLICATIONS FOR THE ECONOMY: A CASE STUDY IN FAR WEST NEW SOUTH WALES**

### **1 INTRODUCTION**

The financial transactions performed by sub-sectors of the regional economy determine the flow-on impacts of any change within the economy. A higher proportion of these transactions performed within the regional economy means that there would be more flow-on impacts of a given change felt within the region. Where the regional economies are more dependent on outside economies for their needs the flow-on impacts would be felt less in the regional economies.

The knowledge of the flow of business transactions in the regional economy, including both purchases and sales transactions performed by businesses, is therefore important in determining the impacts of possible changes in access to natural resources. There is a lack of empirical studies to provide insights into the detail of financial transactions as performed by key business industries in the regional economies of New South Wales (NSW). This paper aims to fill gaps in our understanding by analysing the expenditure and sales pattern of industries involved in irrigated agriculture, providing inputs and services to agriculture, and those engaged in tourism and recreational activities in the Barwon-Darling region. It also attempts to identify the underlying implications of the existing flow of expenditure pattern for the regional economy.

The following section presents the background, while Section 3 explains the survey methodology and analysis. The findings along with their implications are provided in Section 4. Finally some concluding remarks are drawn in Section 5.

### **2 BACKGROUND**

The Barwon-Darling region refers to the areas covered by both the Barwon and the Darling River catchments in north west of NSW. The Statistical Local Areas (SLAs) of Walgett, Bourke, Brewarrina, Central Darling, Cobar and Unincorporated Far West approximately cover the boundaries of this region. The combined Barwon-Darling river

system is 'unregulated' having irregular and unpredictable flows. Water users manage their security of supply by using large capacity pumps, to take advantage of flows when they occur, and on-farm storage that can hold diverted water until it is needed.

The Barwon-Darling River Management Committee (BDRMC) is responsible for the development of a river management plan addressing changes in bulk water access. There are also possible changes in access to water under the Murray-Darling Basin CAP on diversions in the Barwon-Darling River system. The BDRMC established a CAP Management Working Group (CMWG) to identify and assess options for managing the CAP on diversions. The BDRMC also established a Socio-economic Working Group (SEWG) to evaluate the social and economic impacts of different CAP management options as identified by the CMWG.

Possible changes in access to natural resources in the Barwon-Darling region would result in direct and flow-on impacts within and outside the region. As part of a bigger project aiming to assess the socio-economic impacts of various CAP management options and bulk water access rules, the NSW Department of Land and Water Conservation (DLWC) commissioned an industry survey of stakeholders. Hassall and Associates Pty Ltd undertook the survey. The objective of the survey was to produce industry information for use in regional and sub-regional economic models including input-output models for the Barwon-Darling River system. These models are to be used to consider the socio-economic impacts of changes in CAP management options and bulk water access rules.

### **3 INDUSTRY SURVEY AND METHOD OF ANALYSIS**

To improve the reliability and acceptability of the survey results, a community-oriented approach was used to plan and conduct the survey. The SEWG, which included irrigator's representatives, environmentalists, members of the BDRMC, and members of various agencies dealing in natural resource management, was consulted in this process and the decisions regarding the details of the survey were based on its recommendations. These decisions included the details regarding the definition of the survey area in terms

of regional and sub-regional boundaries, selection of the industries to be included and items of financial transactions to be surveyed.

### **3.1 DESCRIPTION OF THE STUDY AREA**

The Barwon-Darling region was divided into three sub-regions. Sub-region 1 included the Statistical Local Areas (SLAs) of Walgett and Moree Plains. Although the SLA of Moree Plains does not fall in the actual areas covered by the BDRMC, it was included in the survey as it has strong socio-economic links with other parts of the Barwon-Darling region. Sub-region 2 included the SLAs of Bourke and Brewarrina. Sub-region 3 included the SLAs of Cobar, Central Darling and Unincorporated Far West.

### **3.2 INDUSTRIES SURVEYED AND METHOD OF SURVEY**

The SEWG recommended the list of industries to be surveyed, which was based on their perception of the importance of the industry for the Barwon-Darling regional economy. The survey only covered the industries using water or having strong links with water based industries. The flow of regional expenditure pattern is limited to those industries covered under this survey and does not cover dryland agriculture. The following were three categories of industries surveyed in the region:

**Irrigated Agriculture:** The first category included irrigated agricultural sub-sectors such as irrigated cotton, irrigated horticulture, and irrigated cereals. These are directly dependent on water and any change in the access to this natural resource will directly affect them.

**Input Providers to Agriculture:** The second category includes a group of industries supplying inputs and services to irrigated agriculture. These are not directly dependent on water but have strong linkages with irrigated agriculture, the main water based industry.

**Tourism and Recreation:** The third category of industries includes tourism and recreational industries. These have some dependence on water and are considered to have strong linkages with irrigated agriculture and other industries supplying inputs and services to agriculture.

The population of the industries and businesses surveyed along with the sample size are presented in Table 1.

Irrigated cotton is the key sector of the Barwon-Darling region covering 23,877 ha during 1998-99 (NSW Agriculture). The survey covered 20,273 ha of irrigated cotton, which represent 85% of the total area under it. The survey also covered a fairly large proportion of the area under horticultural crops. The coverage of irrigated cereal crops was not that large. However, the relative size of irrigated cereals in the regional economy is small and hence the sampling error because of its small sample size would not have a significant impact on the results of the study. As is evident from Table 1, there is a fair representation of the other sectors of the economy.

A combination of survey techniques were used including, focus groups and 'fax back' for irrigators, and face to face interviews, telephone interviews and 'fax back' for other business types.

**Table 1 POPULATION AND SAMPLE SIZE**

Sectors	Total Area/ Number <sup>*,**</sup>	Sample Size	Percent of Total
<b>Irrigated Agriculture</b>			
Irrigated Cotton – Large (Ha)	23877	17282	85%
Irrigated Cotton – Small/Medium (Ha)		2991	
Irrigated Horticulture (Ha)	297	234	79%
Irrigated Cereals (Ha)	2219	430	19%
<b>Input Providers to Agriculture</b>			
Ginning	4	2	50%
Aerial Crop Sprayer	5	1	20%
Chemical Resellers	26	5	46%
Engineering Workshops & Irrigation Equipment Suppliers		7	
<b>Tourism and Recreational</b>			
Accommodation Providers	36	9	25%
Pubs, Taverns & Bars	32	9	28%
Café & Restaurants	27	5	19%
Clubs	15	6	40%

Source: \* ABS, 1996

\*\* DLWC & NSW Agriculture, 2000, History of Development Survey in Barwon-Darling, Dubbo.

Note: Area under different crops was used to represent the population for irrigated agricultural sub-sectors rather than the number of farms in the region. This eliminated the possible bias, which could have been introduced by using the number of farms having substantially different farm sizes as the basis unit.

### 3.3 ITEMS OF FINANCIAL TRANSACTIONS

The survey was specifically designed to gather details of financial transactions within and outside the regional / sub-regional economies. The survey questionnaires included questions regarding all major financial transactions performed by various business

organisations. These financial transactions referred to the financial year 1998-99. The following is the detail of the major items included in the survey:

**Labour:** Total wage bill to hire the full- and part-time and casual labour including superannuation and workers compensation costs.

**Major Inputs:** Cost of purchasing major inputs eg, seed, fuel, fertilisers, chemicals, water charges, and others.

**Contract Services:** Expenditure on contract services including planting/cultivation, transport, chemical application, and harvesting/picking.

**Repairs & Maintenance:** Repairs and maintenance expenses on buildings, vehicles, plant and machineries.

**Administrative Costs – Bills:** Payments for phone, electricity & gas bills, accounting, bank, insurance, and legal expenses.

**Administrative Costs - Rates and Taxes:** Council rates, vehicle registration and land rent.

**Other Expenses** included machinery lease & hire, depreciation on fixed assets, and rent.

**Capital Expenses on Fixed Assets –** Any capital expenses during 1998/99 on building and roads, on-farm storage, channelling, land levelling, machinery equipment, and vehicles were considered under this heading

**Sales:** The sales transactions performed by various businesses included an approximate value of business income during 1998/99 (all revenue) for the main activity. These transactions do not necessarily represent the gross output of the farm or business enterprises considered in the survey. Therefore, these figures should not be used to assess the financial viability of the enterprises.

### 3.4 ANALYSIS

Survey data was summarised first at the industry level and then grouped into irrigation industries, industries that provide input and services to agriculture and tourism and recreational industries. For each of the irrigation industries, estimates of financial transactions (both sales and expenditure) were derived on per hectare level. Weighted average per hectare financial transactions for all irrigated industries was estimated by using equation number 1.

$$AT = \left( \sum_{j=1}^n AT_j * a_j \right) / \sum_{j=1}^n a_j \quad \dots\dots\dots(1)$$

where

*AT* = Weighted average per hectare financial transactions

*AT* = Average per hectare financial transaction for *j*th irrigated crop

*a<sub>j</sub>* = Area under *j*th irrigated crop

*n* = number of crops grown in the region

Weighted average of per hectare expenditure and sales figures was estimated by dividing the sum-product of the per hectare expenditure/sales for each of the irrigated crop and its area covered by the total area under irrigated crops in the regional economy.

For industries that provide inputs and services to agriculture and tourism and recreational industries, estimates of financial transactions were derived at the per business unit level. Using a similar concept as explained in equation 1, but having the population number of each business unit as weight, the weighted-average for these two categories of industries sectors was estimated. Data was also summarised at sub-regional level and then aggregated for the whole Barwon-Darling region.

## 4 FLOW OF FINANCIAL TRANSACTIONS AND THE IMPLICATIONS

Flow of financial transactions would indicate the proportion of expenditure and sales carried out by each industry within and outside the sub-region/region. A higher proportion of financial transactions remaining within the region would mean strong linkages of that business sector with the regional economy and vice versa. Subsequently,

the regional economy would have a greater proportion of flow-on impacts resulting from any direct change in that business. Any expenditure transaction performed outside the region is considered as import into the regional economy and any sales transaction performed outside the region is export from the regional economy. This paper analyses only the 'flow-on' implications of these transactions for the regional economy.

#### **4.1 IRRIGATED AGRICULTURE**

The total financial transactions per hectare for irrigators of the Barwon-Darling region was about \$7,000 in 1998/99; 54% of which remained within the region (Table 2). The flow of total financial transactions indicates that the flow-on impacts resulting from any direct change in the irrigated agriculture would probably be evenly distributed within and outside the regional economy. Although it gives some indication, it is not possible to 'guess' about the exact size and nature of the flow-on impact without having a comprehensive study using an appropriate model, which is beyond the scope of this paper

Though the share of expenditure and sales was almost equal in the total transactions, their flows were substantially different. While 80% of expenditure incurred by the irrigators stayed within the regional economy, 70% of sales proceeds were derived from outside the region. The details of expenditure items presented in Table 2 clearly show most of the irrigators' expenditure on labour, major input items, contract services and repair and maintenance stayed in the regional economy. This indicates a strong linkage of irrigated agriculture with other sub-sectors of the regional economy.

**Table 2 Flow of Expenditure and Sales for Irrigators in the Barwon-Darling**

Items	Average Value (\$/Ha)	Percent Flows	
		Within	Outside
<b>Expenditure</b>			
Labour	\$450	92%	8%
Major Inputs	\$1,060	88%	12%
Contract Services	\$370	84%	16%
Repairs & Maintenance	\$220	87%	13%
Administrative Costs – Bills	\$170	67%	33%
Administrative Costs - Rates & Taxes	\$50	98%	2%
Other Expenses	\$270	72%	28%
Capital Expenses on Fixed Assets	\$810	61%	39%
<b>Total Expenditure</b>	<b>\$3,400</b>	<b>80%</b>	<b>20%</b>
<b>Sales</b>	<b>\$3,720</b>	<b>30%</b>	<b>70%</b>
<b>Total Transactions</b>	<b>\$7,120</b>	<b>54%</b>	<b>46%</b>

Note: Sales figures may not equal gross value of production and should not be used to judge the profitability or financial situation of the farms

#### 4.2 INPUT PROVIDERS TO AGRICULTURE

Total financial transactions (per business) of the industries providing inputs and services to agriculture was about \$8 million, more than 70% of which was within the Barwon-Darling region (Table 3).

Nearly 48% of total transactions were expenditure incurred almost equally within and outside the region. These businesses mostly purchased their major inputs (77%), which represent a significant proportion of the total expenditure, from outside the region. In the case of sales, 95% remained within the region. This is mainly because these industries supply inputs and services to the agricultural industries.

As mentioned earlier, these industries are not direct consumptive users of water. Therefore, any change in water availability would not have a direct impact on these industries. However, if there is a downturn in the irrigation industries resulting from changes in the water access regime, demand for goods and services of the related industries would change. This will have flow-on impacts for these industries because of their strong linkages with irrigated agriculture.

**Table 3 Flow of Expenditure and Sales for Input providers to agriculture in the Barwon-Darling**

Items	Average Value (\$'000/Business)	Percent Flows	
		Within	Outside
<b>Expenditure</b>			
Labour	\$352	100%	0%
Major Inputs	\$2,566	23%	77%
Contract Services	\$57	92%	8%
Repairs & Maintenance	\$108	78%	22%
Administrative Costs – Bills	\$131	78%	22%
Administrative Costs - Rates & Taxes	\$13	94%	6%
Other Expenses	\$109	71%	29%
Capital Expenses on Fixed Assets	\$475	97%	3%
<b>Total Expenditure</b>	<b>\$3,811</b>	<b>46%</b>	<b>54%</b>
<b>Sales</b>	<b>\$4,206</b>	<b>95%</b>	<b>5%</b>
<b>Total Transactions</b>	<b>\$8,017</b>	<b>72%</b>	<b>28%</b>

Note: Sales figures may not equal gross value of output and should not be used to judge the profitability or financial situation of the farms

### 4.3 TOURISM AND RECREATIONAL INDUSTRIES

In the case of tourism and recreational industries included in the survey, total financial transactions (per business) were estimated to be \$1.2 million during 1998/99. More than

70% of these transactions remained within the regional economy (Table 4). Thus, on average, most of the flow-on impacts resulting from any change in these industries would probably be felt within the regional economy.

However, there were some differences between flow of expenditure and that of sales. Flow of sales was more regionally oriented than expenditure in these businesses. Although the flow of total expenditure were two-third within and one-third outside the region, there were also some differences among the expenditure items, in particular nearly 80% of the expenses on major inputs went outside the region.

**Table 4 Flow of Expenditure and Sales for Tourism & Recreational Industries in the Barwon-Darling**

Items	Average Value (\$'000/Business)	Percent Flows	
		Within	Outside
<b>Expenditure</b>			
Labour	\$139	100%	0%
Major Inputs	\$225	21%	79%
Contract Services	\$7	61%	39%
Repairs & Maintenance	\$18	90%	10%
Administrative Costs – Bills	\$42	80%	20%
Administrative Costs - Rates & Taxes	\$21	92%	8%
Other Expenses	\$86	81%	19%
Capital Expenses on Fixed Assets	\$101	92%	8%
<b>Total Expenditure</b>	<b>\$639</b>	<b>66%</b>	<b>34%</b>
<b>Sales</b>	<b>\$576</b>	<b>80%</b>	<b>20%</b>
<b>Total Transactions</b>	<b>\$1,215</b>	<b>73%</b>	<b>27%</b>

Note: Sales figures may not equal gross value of output and should not be used to judge the profitability or financial situation of the farms

#### **4.4 COMPARATIVE FLOW BY FARM/BUSINESS TYPES**

When comparing the industries under the three groups considered in this paper, some degree of diversity from the average pattern of flow of transactions was apparent (Table 5). In the case of the horticultural and cereals industries under the irrigators category, most of the expenditure went outside the region. On the other hand, most of the sales of the small to medium cotton and cereal growers were within the region. In the case of sales, as most of the large cotton irrigators had their own ginning facilities, they sold post-ginned cotton that went outside the region. Whereas, most of the small and medium cotton growers did not have their own ginning facilities and had to sell their produce to the local ginning industry, which is reflected in the higher proportion of sales within the region for these categories.

In the case of input providers to agriculture, Aerial Crop Sprayers bought the majority of their inputs and services from within the region; by contrast Chemical Resellers incurred almost all of their expenses outside the region.

Under tourism and recreational industries, 96% of Accommodation Providers' expenses were within the region while 60% of their sales revenue were generated from outside the region. A study conducted by NSW Tourism (1998), indicated that the tourism industry during 1996-97 contributed around \$70 million towards the regional economy. The flow of expenditure and sales by different tourism and recreational industries in the region provides important and interesting information about financial transactions. However, using this information in isolation, it is difficult to draw conclusions about how these industries would be affected if there were changes to access to water.

**Table 5 Comparative Flow of Expenditure and Sales by Types of Industry in the Barwon-Darling**

	Percent of Expenditure Flow		Percent of Sale Flow	
	Within	Outside	Within	Outside
<b>Irrigators</b>				
Large Cotton	81%	19%	23%	77%
Small-Medium Cotton	90%	10%	63%	37%
Horticulture	45%	55%	1%	99%
Cereals	37%	63%	70%	30%
<b>Agriculture Related</b>				
Ginning	71%	29%	99%	1%
Aerial Crop Sprayer	100%	0%	100%	0%
Chemical Reseller	6%	94%	91%	9%
Engg Workshop & Irrig Suppliers	57%	43%	97%	3%
<b>Tourism &amp; Recreational</b>				
Accommodation Providers	96%	4%	40%	60%
Pubs, Taverns, Bars	55%	45%	86%	14%
Café & Restaurants	52%	48%	84%	16%
Clubs	72%	28%	87%	13%

#### 4.5 COMPARATIVE FLOW BY SUB-REGION

When the flow of financial transactions are compared in-terms of sub-regions within the Barwon-Darling region it is clearly apparent that the 'within region' financial transactions were performed within the smaller sub-region in the case of all three categories of industries (Table 6). Thus the financial transactions of all the businesses under consideration were confined to their immediate region, where the market opportunities were available. In other cases the transactions were conducted with the businesses outside the Barwon-Darling region.

Implications for these localised transactions would be that the flow-on impacts due to any change would remain localised.

**Table 6 Comparative flow of expenditure and sales in different sub-regions of the Barwon-Darling**

Sub-Region	Irrigators		Agricultural Related		Tourism & Recreation Related	
	Expenditure	Sales	Expenditure	Sales	Expenditure	Sales
<b>Bourke-Brewarrina</b>						
Within sub-region	85%	0%	53%	85%	67%	83%
Within other sub-regions	1%	16%	5%	15%	0%	3%
Outside the region	14%	84%	42%	0%	33%	14%
<b>Walgett-Moree</b>						
Within sub-region	64%	50%	41%	87%	50%	80%
Within other sub-regions	6%	0%	0%	2%	1%	2%
Outside the region	30%	50%	59%	11%	49%	18%
<b>Cober-Central Darling</b>						
Within sub-region	NS	NS	NS	NS	66%	71%
Within other sub-regions	NS	NS	NS	NS	0	3%
Outside the region	NS	NS	NS	NS	34%	26%

NS – Not surveyed.

Note: The survey did not cover dryland agriculture. As the Cober-Central Darling region does not have any irrigated industry, there was no business developed to provide inputs and services to irrigation based agriculture.

## **5 CONCLUSION**

The results of the study provide a clear understanding about the flow of financial transactions performed by different industries in the Barwon-Darling region. Irrigators purchase most of the inputs and services used on the farm from within the region. The sub-regional analysis further indicated that irrigators spent in the local communities. This clearly means that any change in access to water for irrigated agriculture would have flow-on impacts for the regional economy.

However, the majority of sales transactions of agricultural produce were performed outside the region. This shows that the flow-on impacts of any change in sales transactions of the agricultural sector would be felt mostly outside the regional economy. The overall assessment of the irrigated industries indicates that the flow-on impacts of any change in these industries would probably be shared within and outside the region. The extent and magnitude of such impacts would depend on the relative effects of policy changes on the input or output market of a particular industry.

The industries supplying inputs and services to agriculture mostly buy their major inputs from outside the region (77%). But most of the services used as input in their businesses come from within the small regional economy. Their sales transactions mainly remained within the regional economy. As these industries are not direct consumptive users of water, any change in water access would have hardly any direct impacts for them. However, they would have strong flow-on impacts coming possibly from changes in irrigated agriculture. A similar trend was observed for the tourism and recreational industries.

Information on the flow of financial transactions would help in the understanding of the distribution of the flow-on impacts within and outside the regional economy. This information has limitations, as the size of the flow-on impacts cannot be determined by using this information in isolation. Further, it does not show anything about the size of the initial direct impacts which industry would have as a result of changes in the availability of some of its key inputs, for instance, water for agricultural industries.

This information has been used in the current input-output modelling work being undertaken by the NSW Department of Land and Water Conservation in order to estimate the size of the flow-on impacts. Those models will be used to assess the size and flow on impacts resulting from direct change in key regional industries.

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