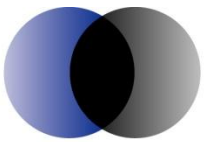
Developing the Narrabri workforce

An assessment of the potential impact of the Workforce Development Strategy in Narrabri

Prepared for Agrifood Skills Australia

October – November 2010



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Economics Policy Strategy

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Executive summary

ACIL Tasman was commissioned to prepare an *ex ante* impact assessment of the Narrabri Initiative of the National Skills and Workforce Development Strategy by AgriFood Skills Australia.

This analysis was conducted during October and November 2010.

This analysis has been conducted in two broad parts; how the Narrabri Initiative is likely to produce an economic impact; and the potential scale and scope of that impact.

Characterising the Narrabri economy and regional workforce

The Narrabri economy is dominated by rural businesses. Resource industries are also expanding in the region. The rural businesses, and the businesses that support them, employ more than 50 per cent of the Narrabri region's work force, and contribute over 43 per cent of gross value adding in the region.

The primary industry businesses are predominately cereal, cotton and oilseed producers they have similar seasonal and skilled labour demand. These businesses also have a history of collective action through a number of regional bodies such as the Chamber of Commerce, the Cotton Research and Development Corporation (CRDC) and peak farming bodies.

The Narrabri region's population is slowly falling, the workforce is aging and there is significant migration of young workers out of the region each year. The aging workforce and considerable competition for skilled staff from outside the region pose challenges for the businesses operating in and around Narrabri, as they do for many regional businesses.

These businesses have realised that by acting alone or in small voluntary groups they cannot deal with the labour constraints affecting their businesses.

The objectives of the Initiative

The objectives of the initiative are to:

- Match the skills development of the regional workforce to the skills demanded by local industries now and in the future
- Reduce the migration of skilled employees from the region, particularly those in the 20 to 30 year old age group
- Increase the productivity of the existing work force as the Australian economy reaches labour capacity constraints, and as the number of new workforce entrants recruited from within the region declines as the population falls and ages

How the initiative creates value

The Narrabri Initiative was initiated by AgriFood Skills Australia following a jobs summit held in Narrabri in mid 2009, with the Initiative being jointly funded by AgriFood Skills Australia and the NSW Department of Industry and Investment. Branded *Make It Work*, the initiative appears to have several key elements:

- A cross industry regional skills development model driven by a local employer and community leaders' group to attract, train and retain workers in the region, and to improve the mobility of workers across enterprises:
  - An important investment under this theme is cross industry skills training in machinery and operations where participants are trained to work across a range of industries and enterprises in the region. This training also introduces trainees to basic management concepts and operational practices to help them better understand the role they play in the business, and equips them to better communicate with their employers
- The Employer of Choice program aimed at improving employers workforce management capabilities:
  - The principal activity in this area is enhancing employers' capability in job design and titling, contemporary and employment and remuneration packaging practices, work organisation and skills utilisation. This builds the capacity to attract new entrants to industry and the region and to retain and better utilise existing workers.
- Employers collectively working to enhance innovation and productivity through a range of initiatives, including through new career pathways, and developing skilled labour pools and demand schedules within the region, to manage seasonal and other employment needs
  - One activity of this part of the Initiative is the labour pool pilot being run by the Narrabri Shire Council. This trial is designed to test the concept establishing a pool of skilled labour resources that can be tapped into by a range of businesses across the region. The Council is offering the pool participants 12 months full time employment and will subcontract the employees out to business in the region as needed, with many ultimately being offered jobs by industry.
- Improving the skills of the regions broader transport, services and local government workforces that support key agrifood and resources sectors.

The potential scale of the economic impact

After characterising the Narrabri region, the nature of the regional labour market and the core elements of the Initiative we reviewed the literature to identify what the likely regional economic impacts might be.

ACIL Tasman identified two potential quantifiable impacts of this Initiative:

- An improvement in the productivity of the Narrabri labour force of potentially as much as 3.2 per cent per year **(Labour productivity only)**
- A 33 per cent reduction in net migration of workers in the target labour market **(Labour productivity plus reduced outward migration)**

These impacts were used as the base assumptions in the Tasman Global general equilibrium model to quantify the potential Narrabri local government area economic impact of the Initiative.

The results of the modelling were:

- Under the *Labour productivity only* Scenario a cumulative total of $29 million relative to the reference case (with a net present value of $22 million, using a 4 per cent real discount rate) was estimated
- Under the *Labour productivity plus reduced migration* Scenario a cumulative total of $60 million relative to the reference case (with a net present value of $46 million, using a 4 per cent real discount rate) was estimated

There results were based on a conservative estimated adoption rate for only the businesses most likely to utilise the machinery and operations skills of cross industry training. Clearly these results will represent the lower bound impact if the skills program is extended to other enterprises, and there is wider adoption of the Employer of Choice survey and diagnostic tool.

While this is not a cost benefit analysis the direct financial contribution to this initiative by Agrifood Skills Australia and the NSW Government is likely to be between $250,000 to $300,000 over the life of the project.

1 Introduction

ACIL Tasman has been commissioned by Agrifood Skills Australia to undertake a cost-benefit study of the Narrabri Initiative of the Regional Skills Workforce Development Strategy, developed by Agrifood Skills Australia. The report is being prepared during September and October 2010.

The project involves:

- Mapping how the Initiative creates economic value
- Identifying and analysing the key risks of the project
- Establishing what would happen to the Narrabri economy and workforce if the Initiative was instituted (the counterfactual case).

This analysis has been prepared based on extensive consultations with participants in the Initiative in Narrabri, and a review of the economic literature on how workforce development investments create economic value. This analysis informed a series of assumptions that allowed ACIL Tasman's GE model to be run to assess the extent of the economic benefits that could emerge if the objectives of the Initiative are met.

As the Initiative is largely in the initial stages this analysis is *ex ante* or before the event.

2 Background

This analysis uses the Narrabri local government area as the principal area of interest. This is because it aligns well with census and other ABS data, and it is where the majority of the activities under the Initiative are being undertaken, at least in the initial phases. However, there is strong interest and some participation in the Initiative from the neighbouring shires of Gunnedah and Moree.

It is also important to recognise that many of the activities and impacts, even though they are centred in Narrabri, spill over to adjacent regions and local government areas. This is due to the crossover of business activities across these shires and because a number of employees live in one shire and work in another.

The origins of the Narrabri Initiative, and its Make It Work program, lay in concerns among regional employers that publicly funded or subsidised employment programs and skills development courses are 'supply driven'. That is, these programs were designed to assist the unemployed become employed

and were not aligning the training well with requirements of regional employers.

Often the people in these programs were long term unemployed. This is particularly so when the economy is near full employment. In many instances skills training alone did not address the reasons why these people remained unemployed.

In most instances the employers required skill levels that were higher than the unemployed of the region generally held or were likely to achieve.

It was also the experience of the regional employers that the TAFE system is 'metro centric' in that it catered for the needs of the metropolitan areas of Sydney, Newcastle and Tamworth. For regional areas this also adds additional costs for employers as they have to pay the travel and accommodation costs for staff undertaking training courses. Also, as staff members have to travel to attend the courses, which tend to be run over one or two weeks, this means that staff are away from the business for extended periods of time.

At the launch of its Environmental Scan at the National Press Club in April 2009, AgriFood Skills Australia announced that it intended to hold a jobs summit in regional Australia. This reflected the outcomes of several years of national consultations and research by the company that highlighted the need for a regionally-driven skills and workforce development approach to address skills and labour shortages in regional Australia. These outcomes were documented in AgriFood's Environmental Scans.

Based on this and progress with an AgriFood-funded Machinery Partnerships Program which piloted the training of semi-skilled employees on a range of machines used in the central west region of NSW, AgriFood Skills Australia chose Narrabri as the location for its first jobs summit. Eighty of the ninety people who attended the jobs summit were employers. At the jobs summit a North West Advisory Group (NWAG) was formed and it works under the banner of 'Make it Work'. Agrifood Skills and the NSW Department of Industry and Investment agreed to jointly fund the Narrabri Initiative and the activities overseen by NWAG, which includes the cost of engaging a regional coordinator (Russell Stewart).

The Machinery Partnerships Programs was predicated on the fact that no one employer used all of the types of machines used for training in the Program, but all had a need for skilled operators for at least one of the machines.

This course was designed to give practical hands-on experience and training in machinery operation and occupational health and safety, to make those attending the courses more mobile among employers. There were 14

participants in the Machinery Partnerships Program; 13 were employed immediately following the course.

Recently the NWAG through its Make It Work program launched a cross-industry skills traineeship pilot program. The pilot program which offered 10 traineeships to unemployed and under-employed local people and funded by NSW's Department of Industry and Investment, has now concluded. A more detailed description of the traineeship package is presented in section 6.1.1.

2.1 Methodology

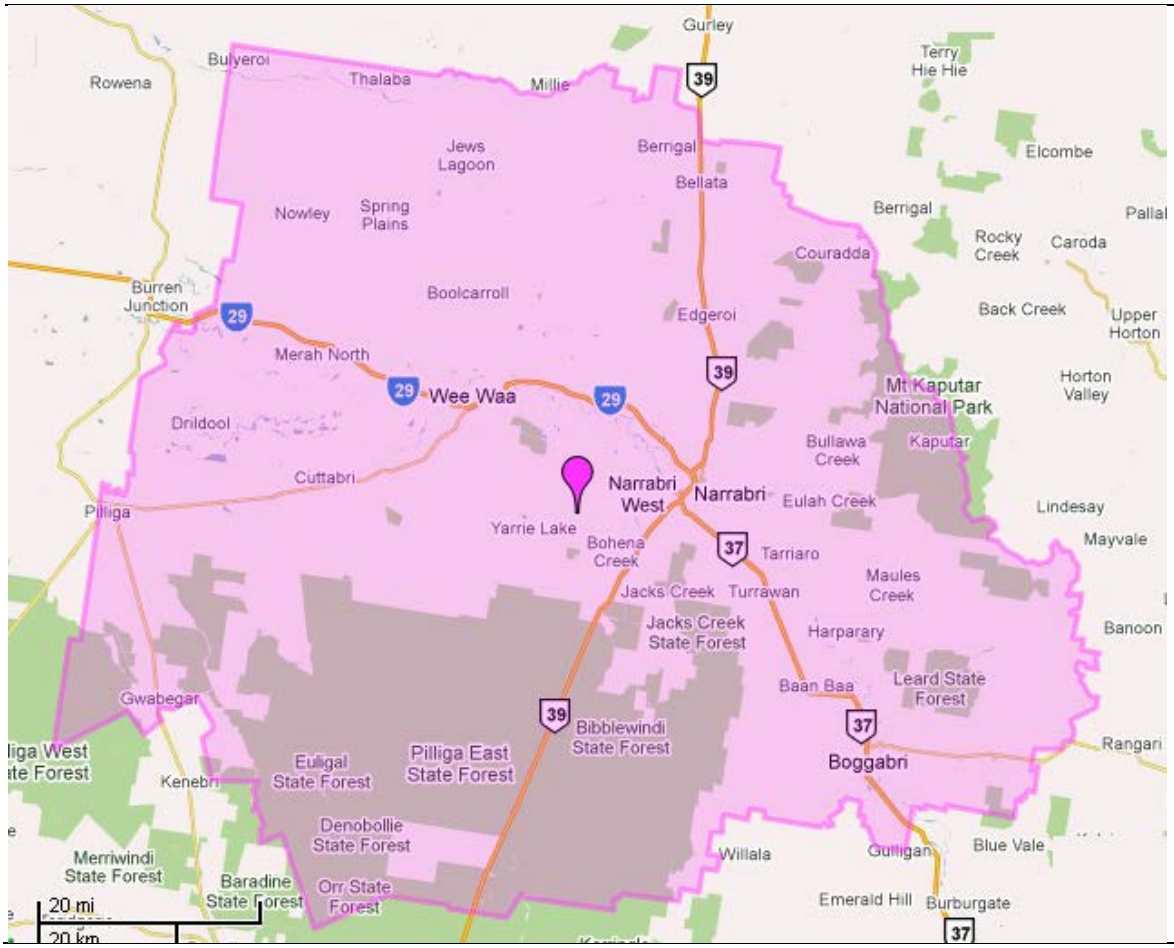
The methodology employed in this analysis follows the following steps:

- Defining the proposed activities for the central Narrabri Initiative
- Characterising the relevant aspects of the Narrabri economy, population and workforce
- Collecting and analysing the relevant ABS data for the Narrabri local government area that will be used in the economic modelling
- Conducting a series of targeted consultations with representative individuals and organisations participating in the iniative
- Developing the theoretical impact, based on an economic literature review, that aligns with our analysis of the key activities in the Initiative
- Modelling the likely impacts if the Initiative meets its objectives, including a detailed assessment of the sensitivity of the results to key variables
- Reviewing the results.

3 Characterising Narrabri

The focus of this analysis is the Narrabri local government area but surrounding councils are also involved in the Initiative. The extent of the Narrabri LGA is shown in Figure 1.

Figure 1 **Narrabri Local Government Area**



3.1 Population

Overall the population of Narrabri fell by 428 (3 per cent) between 2004 and 2008, according the ABS statistics. Over the period the population has been steadily ageing, with a 3 per cent increase in the proportion of the total population over 50 and a 3 per cent decline in the population under 50 years old (see Table 1).

Table 1 **Estimated resident Narrabri population – at 30 June**

		2004	2005	2006	2007	2008
Persons - 0 to 4 years	no.	1 026	1 011	998	977	967
Persons - 5 years to 9 years	no.	1 070	1 082	1 084	1 070	1 043
Persons - 10 years to 14 years	no.	1 093	1 017	1 036	1 008	990
Persons - 15 years to 19 years	no.	880	916	885	874	871
Persons - 20 years to 24 years	no.	762	742	728	719	703
Persons - 25 years to 29 years	no.	845	830	800	779	781
Persons - 30 years to 34 years	no.	922	903	871	839	810
Persons - 35 years to 39 years	no.	959	935	928	912	889
Persons - 40 years to 44 years	no.	1 116	1 072	1 011	975	925
Persons - 45 years to 49 years	no.	999	991	1 036	1 037	1 041
Persons - 50 years to 54 years	no.	906	901	867	868	902
Persons - 55 years to 59 years	no.	826	841	839	827	818
Persons - 60 years to 64 years	no.	713	719	741	741	767
Persons - 65 years to 69 years	no.	588	571	595	624	619
Persons - 70 years to 74 years	no.	487	493	485	497	504
Persons - 75 years to 79 years	no.	351	372	396	415	426
Persons - 80 years to 84 years	no.	209	207	234	236	245
Persons - 85 years and over	no.	183	186	200	191	206
Persons - Total	no.	13 935	13 789	13 734	13 589	13 507

Data source: (Australian Bureau of Statistics, 2010)

The age groups suffering the biggest declines are those between 20 and 44. This decline in population is occurring despite a slight rise in the number of births per annum from 185 in 2004 to 200 in 2008 (see Table 2).

Table 2 **Births and deaths – year ended 31 December**

		2004	2005	2006	2007	2008
Births	no.	185	181	184	172	200
Total fertility rate	rate	2.2	2.1	2.2	2.2	2.3
Deaths	no.	126	144	138	126	114
Standardised death rate	rate	7.7	8.7	9.6	9.4	8.5

Data source: (Australian Bureau of Statistics, 2010)

This aging of the population is flowing into the workforce, as would be expected without large changes to migration patterns to and from the region.

3.2 Employment

In 2007 there were 1,857 businesses operating in Narrabri (see Table 3) employing approximately 5,230 people (see

Table 5). There has been a decline in the number of businesses (down by 3.7 per cent). However, there has been only a slight reduction in total employees (down by only 0.5 per cent).

Table 3 **Number of businesses by industry – at 30 June**

		2004	2005	2006	2007	2008
Agriculture, forestry and fishing	no.	942	933	954	924	-
Mining	no.	6	9	9	12	-
Manufacturing	no.	57	51	51	51	-
Electricity, gas and water supply	no.	6	6	6	6	-
Construction	no.	171	156	153	159	-
Wholesale trade	no.	45	42	42	39	-
Retail trade	no.	138	135	138	138	-
Accommodation, cafes and restaurants	no.	66	72	60	54	-
Transport and storage	no.	132	129	120	120	-
Communication services	no.	12	9	18	12	-
Finance and insurance	no.	27	30	24	27	-
Property and business services	no.	234	228	249	237	-
Education	no.	6	6	6	6	-
Health and community services	no.	30	33	36	30	-
Cultural and recreational services	no.	18	18	18	12	-
Personal and other services	no.	39	33	39	30	-
Total businesses	no.	1 929	1 890	1 923	1 857	-

Data source: (Australian Bureau of Statistics, 2010)

Of the 1,857 business in Narrabri in 2007, 50 per cent were in agriculture, followed by 13 per cent offering business services largely to the agricultural sector.

While there is considerable distribution about the mean, the average number of employees per business in 2007 was 2.8. In 2004 the average number of employees per business was 2.7.

Between 2004 and 2007 employment in the Narrabri local government area has remained relatively stable. However, the labour force has been maintained as older workers occupy an increasing percentage of positions (see Table 4).

Table 4 **Wage and salary earners – year ended 30 June**

		2004	2005	2006	2007	2008
Persons - 15 years to 24 years	no.	1 017	1 029	1 017	1 004	-
Persons - 25 years to 34 years	no.	1 121	1 135	1 085	1 066	-
Persons - 35 years to 44 years	no.	1 291	1 257	1 251	1 176	-
Persons - 45 years to 54 years	no.	1 071	1 050	1 106	1 112	-

Persons - 55 years to 64 years	no.	616	667	682	698	-
Persons - 65 years and over	no.	141	143	161	172	-
Persons - Total	no.	5 257	5 281	5 302	5 228	-

Data source: (Australian Bureau of Statistics, 2010)

The proportion of employees aged 44 and under fell from 65 to 62 per cent of the workforce between 2004 and 2008. Over the same period, the employees over 45 as a proportion of the workforce increased from 35 to 38 per cent, with the biggest increase in the 55 to 64 year age bracket.

Table 5 **Wage and salary earners by occupation**

		2004	2005	2006	2007	2008
Managers and Administrators	no.	404	409	413	380	-
Professionals	no.	702	706	707	680	-
Associate Professionals	no.	251	256	257	294	-
Tradespersons and Related Workers	no.	459	483	490	506	-
Advanced Clerical and Service Workers	no.	140	120	115	113	-
Intermediate Clerical, Sales and Service Workers	no.	718	733	759	775	-
Intermediate Production and Transport Workers	no.	426	415	453	449	-
Elementary Clerical, Sales and Service Workers	no.	462	449	458	486	-
Labourers and Related Workers	no.	1 021	1 064	1 123	1 079	-
Not Stated	no.	675	646	525	468	-
Total wage and salary earners	no.	5 258	5 281	5 300	5 230	-

Data source: (Australian Bureau of Statistics, 2010)

Over this period the rate of unemployment has fallen from 5.7 per cent to 5.0 per cent in line with the national average.

Table 6 **Estimates of unemployment June quarter**

		2004	2005	2006	2007	2008
Unemployed persons	no.	425	392	343	416	423
Unemployment rate	%	5.7	5.1	4.2	5.2	5.0

Data source: (Australian Bureau of Statistics, 2010)

The number of people in Narrabri receiving the aged pension and a carers payment has increased, with most other forms of Government assistance recipients falling. The number of persons that have been on the new start allowance for more than 365 days has fallen slightly from 69.7 to 67.9.

Table 7 **Selected Government pensions and allowances – at 30 June**

		2004	2005	2006	2007	2008
Age Pension - Centrelink	no.	1 330	1 346	1 324	1 319	1 379
Age Pension - DVA	no.	np	np	np	np	np
Carers Payment	no.	65	75	68	78	90
Disability Support Pension	no.	495	540	526	523	542
Newstart Allowance	no.	398	327	337	427	387
Parenting Payment - Single	no.	354	361	361	329	301
Youth Allowances	no.	272	240	224	226	213
Newstart Allowance - more than 365 days	%	69.7	66.3	67.3	61.9	67.9

Data source: *(Australian Bureau of Statistics, 2010)*

In summary, the Narrabri workforce could be described as:

- Approaching full employment in line with the national average
- Aging, with the 55 to 64 year age bracket increasing the most as a proportion of the total workforce
- The proportion of 25 to 34 year olds in the Narrabri work force has fallen the most among the younger categories
- There are likely to be few young people coming into the work force from within the region as the general population continues to age.

3.3 Narrabri Economy

The Narrabri economy (and labour market) is dominated by agricultural production and the industries that support it. Agricultural production accounts for 43 per cent of the gross valued added in the Narrabri economy with food processing adding another 4 per cent to this percentage. The contribution agriculture makes to the NSW gross added value is 2 per cent.

It follows then that over 50 per cent of the business in Narrabri are involved in agricultural production (see Table 8).

Table 8 **Number of businesses by industry**

		2004	2005	2006	2007
Agriculture, forestry and fishing	no.	942	933	954	924
Mining	no.	6	9	9	12
Manufacturing	no.	57	51	51	51
Electricity, gas and water supply	no.	6	6	6	6
Construction	no.	171	156	153	159
Wholesale trade	no.	45	42	42	39
Retail trade	no.	138	135	138	138
Accommodation, cafes and restaurants	no.	66	72	60	54
Transport and storage	no.	132	129	120	120
Communication services	no.	12	9	18	12
Finance and insurance	no.	27	30	24	27
Property and business services	no.	234	228	249	237
Education	no.	6	6	6	6
Health and community services	no.	30	33	36	30
Cultural and recreational services	no.	18	18	18	12
Personal and other services	no.	39	33	39	30
Total businesses	no.	1 929	1 890	1 923	1 857

Data source: *(Australian Bureau of Statistics, 2010)*

The agricultural businesses in Narrabri and dominated by cereal grain production by area and by value of production (see Table 9 and Table 10)

Table 9 **Agricultural commodities by area**

		2006
Area of holding	ha	790 855
Cereals for grain	ha	156 916
Vegetables for human consumption	ha	141
Orchard trees (including nuts)	ha	106
All fruit (excluding grapes)	ha	106
Non-cereal broadacre crops	ha	70 894

Data source: *(Australian Bureau of Statistics, 2010)*

Table 10 **Agricultural commodities gross value**

		2006
Gross value of crops	$m	215.1
Gross value of livestock slaughterings	$m	41.4
Gross value of livestock products	$m	4.0
Total gross value of agricultural production	$m	260.5

Data source: *(Australian Bureau of Statistics, 2010)*

Much of the value of agricultural production is produced by irrigated farmers growing predominately cotton (see Table 11).

Table 11 **Water use in the Narrabri LGA**

		2006
Area of agricultural land	ha '000	791
Area irrigated	ha '000	51
Irrigation volume applied	ML	260 266
Other agricultural uses	ML	4 355
Total water use	ML	264 621
Area irrigated as proportion of agricultural land	%	6.4

Data source: *(Australian Bureau of Statistics, 2010)*

It is not surprising that there is considerable seasonal labour force demand as the region's economy is dominated by agricultural enterprises and the business that support them.

3.4 Key attributes of Narrabri relevant to the Initiative

There are several key elements of the Narrabri economy that appear to strong influence the formation of the Narrabri initiative and it likely success. They can be summarised as:

- Agricultural and agricultural service industries dominate the labour demand, creating a level of homogeneousness of labour issues. Agricultural businesses appear less competitive with each other and are more willing to work collectively to solve common problems
- There are several key representative bodies active in the region including the NSC, CRDC, and the local Chamber of Commerce. Many of the business in the region are a member of one or more of these groups, and therefore have a history of working together on a number of issues
- There appears to be a realisation by local business that they cannot retain a skilled workforce in the region acting alone or even in small groups of businesses. This is particularly so as most businesses see great value in collaborating to retain a skilled workforce but also retaining the flexibility to employ people on a short term basis

4 The nature of the problem

The main workforce problems the Initiative is seeking to address are:

- Matching the skill development of the regional workforce to the skills demanded by local industries now and in the future

- Reduce the leakage of skilled employees from the region, particularly those in the 20 to 30 year old age group
- Increasing the productivity of the existing work force as the Australian economy reaches labour capacity constraints and as the number of new work force entrants recruited from within the region declines as the population falls and ages

Many of those consulted during this analysis expressed a view that the Initiative may increase the capability of the region to ultimately attract people and families to the region and reverse the population decline. However, most held the view that a number of other factors, well beyond the scope of the Initiative, contribute to the decision to move to the region.

The root cause of many of the workforce problems experience by Narrabri businesses is the seasonality of semi-skilled and skilled labour. An inherent feature of the majority of the businesses in the region is the seasonality of labour demand. This has been exacerbated by the increase in dry land crop production, which has two annual labour peaks: sowing and harvesting. In the past, livestock management probably filled some of the remainder of the time but the number of sheep and cattle in the region has decline significantly over the last 10 years. The seasonality of labour demand can be seen in Table 12.

Table 12 **Make It Work Employment Demand Timeline – Narrabri, Moree, Gunnedah Region**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Expected Numbers	Skills Required
AGRICULTURE														
Wheat													700 – Site workers & demand on machinery operators.	Physically fit, reliable, OH&S, some machinery experience an advantage.
Cotton													600 – Gin workers & demand on machinery operators.	Physically fit, reliable, some machinery experience an advantage.
Other Grains													100 – Significantly fewer numbers than wheat and cotton as most covered by permanent staff.	Reliable with machinery experience
FOOD PROCESSING													20 – Numbers are not high; mostly covered by permanent staff.	Physically fit & reliable.
LIGHT MANUFACTURING													30 – Numbers are not high due to skills required.	Qualifications or experience.
CIVIL														
Local Government													Numbers are not high, covered by permanent staff.	Relevant to position.
Earthmoving													30 – Numbers are not high, mostly covered by permanent staff.	Previous experience essential.
TRANSPORT													Extra work load handled internally except for wheat, which requires around 40.	MC License & experience essential.
RETAIL													150 – Driven by seasons, trends and Christmas. Can be affected by end of June Sales. Extensive use of school students.	Strong communication skills and reliable. Covered mostly by school students.

Code

Recruitment

Working

Employment Void

Data source: Russel Stewart: Making it Work coordinator Narabri

Seasonality of demand means that for a number of employees in the region there are limited permanent employment opportunities. Seasonality for employers means that they are unwilling to invest in training employees who may not return next season. Also the costs of finding and employing seasonal workers are expensive, as the costs are incurred each year. These are called the transaction costs.

Employees, who may be gainfully employed in seasonal work, find that getting a mortgage is difficult as they appear to be less secure to potential financiers. If they can get credit it is often more expensive. These employees are then less likely to buy or build a house in the region and are therefore more mobile across regions.

4.1 The solutions

The solutions to the inherent labour constraints in the region are difficult to achieve for single employers, particularly as the majority are small businesses, or by one or more businesses voluntarily pooling their resources. If businesses are unable to resolve the problems through the labour market, the market is said to be failing to allocate resources efficiently. This may be due to:

- businesses lacking the information to coordinate their activities (asymmetries of information)
- the costs of organising collective voluntary activities exceeding the benefits of the collective action (transaction costs exceed the benefits)
- a group of businesses may receive benefits where these benefits without contributing to the solution (the free rider problem)

Mobility of labour within the region is an important part of the labour market for many businesses in and around Narrabri. Seasonality is an inherent part of many agricultural enterprises. While technology and availability of capital have assisted many businesses to reduce the impact of labour constraints by making agricultural plant bigger and more efficient; much of this equipment requires skilled and experienced operators.

This has meant that as agricultural businesses have invested capital to increase labour productivity and reduce labour constraints, they have also increased the skills demanded of the existing workforce.

The trade-off primary producers (and many other small businesses) are making is that they are reducing their reliance on a larger unskilled or semi-skilled work force, but becoming more reliant on a skilled work force that is likely to be smaller in number for which the barriers to entry, by definition, are higher.

5 Our understanding of the key elements of the Initiative

ACIL Tasman's initial review has identified three principal elements of the Narrabri Initiative:

1. Activities and investments to increase the supply of appropriately skilled workers available to businesses and organisations in the Narrabri region
2. Activities and investments aimed at increasing the demand for a skilled workforce by maximising the value of work force skills captured by employers, leading to an optimisation of the utilisation of the skills of the workforce
3. Reducing the transaction costs associated with the identification of skills shortages, improving skills, and deploying people to the most appropriate work.

The central objective of the Narrabri Initiative is to improve the utilisation of the existing workforce. It is not an employment Initiative.

5.1 Skills supply

Increasing the supply of skills may not necessarily lead to increased productivity, if those skills are not appropriate and timely and, in the case of region subject to considerable season labour demand, providing mobility of labour:

- Appropriate: that is the types of skills required by regional business and organisations. These skills can be introduced either through new entrants to the regional work force, by expanding the skills set of the existing work force, or a combination of both. In a period of close to full employment in Australia, attracting new entrants to the regional workforce either comes at the expense of other regions or through immigration.
- Timely: available when the businesses need them. Given that there is a lag between the development of skills and their delivery, early identification and rapid skills development is important. However, long term skills development cannot be ignored as it lays the foundation for up-skilling in future
- Mobile: in a region subject to considerable seasonal variation in labour demand, the ability of labour to move efficiently between businesses as seasonal demand ebbs and flows is an important aspect of the regional workforce for employers.

5.2 Increasing utilisation

Increasing utilisation of the available skills will be critical when the region's businesses have to compete in a competitive labour market: approaching full

employment means that competition will be strong within the region, between regions and with metropolitan centres.

The lowest cost improvement to labour productivity is almost certainly going to come from improving productivity of the existing labour force, followed by attracting new entrants. When labour market capacity constraints ease the Narrabri regional businesses will be well placed to compete for labour as it is freed up in other areas or as immigration rates increase.

Improving skills utilisation will have some important spin-off benefits for the region. There are also likely to be considerable benefits from the flexibility a pool of skilled labour in a region may offer employers and employees. For example, employers and employees may be more willing to negotiate more flexible contracts if there is a sufficient supply of labour and jobs. Also small businesses may have to worry less about offering career paths, as a career path for an employee may involve progressing through multiple employers rather than relying on one employer. The result will be a greater willingness by businesses to hire new staff and less anxiety about career options within regions by employees.

Having a mobile pool of appropriately skilled employees will reduce the impact of the seasonality of labour demand in a region such as Narrabri.

5.3 Reducing the cost of identifying and addressing skills development and utilisation

Regional coordination of the identification of future skill requirements, and the most appropriate way to acquire them (up-skilling or new entrants) is likely to play a crucial role in the success of the Initiative. Therefore the role and composition of the regional advisory board/steering committee will be an important consideration in this analysis.

6 Key activities and organisations of the Initiative

6.1 Core activities of the Narrabri Initiative

There are three core activities of the Narrabri Initiative that have been considered in detail in this analysis. However, with an Initiative such as this and the diversity of people directly and indirectly involved in the project, there are numerous other activities that will spin-off from the central activities.

6.1.1 Cross-industry skills development

This is a cross-industry skills development course piloted in 2010. In November 2010 the first 10 trainees graduated from the first course run by the Narrabri TAFE, with the majority then placed in jobs. The objective of the course is to provide trainees with skills and qualifications that are common to a number of businesses. This means each graduate achieves recognised proficiency in a range of machinery operations that are in demand by local businesses. The objective of this type of training is to give each trainee experience across a number of business enterprises, increasing their employment mobility.

The cross-industry skills training also provides each employee with generic occupational, health and safety awareness and skills, and management processes.

Inductees into the course are usually proficient with at least one type of machinery operation and show high levels of general aptitude and work ethic.

6.1.2 Employer of choice program and survey

The principal activity in this area is enhancing employers' capability in job design and titling, contemporary leading employment and remuneration packaging practices, work organisation and skills utilisation. This builds the capacity to attract new entrants to industry and the region and to retain and better utilise existing workers.

The Employer of Choice element of the initiative is supported by a survey developed and trialled by Make It Work regional coordinator and Neil Jacobsen from Agrifood Skills Australia . The features of the survey include:

- The survey is conducted at all levels of the firm
- Information is anonymously collected
- The information is collected by facilitators in face to face meetings with staff members and groups of staff members. Each question is worked through with those attending the session
- A comprehensive report is provided to the employer of the survey results

The survey focuses on six key areas where operational improvements can be readily identified. The six areas are:

- Jobs and job design
- Procedures and workflow
- Responsibility, accountability and engagement
- Mentoring, internal and external support
- Training and skills gaps

- Reward and remuneration

Questions in the survey are designed to elicit information such as:

- how the employee view the performance of management
- how communication across the firm is working
- the aspirations of the employee
- what the employee values about his or her role and what they think they contribute to the firm
- opinions on how each employee thinks he or she is viewed/valued by their employer
- what actions the employers could take to improve the employees productivity
- What training the employee believes would help them improve their performance and job satisfaction

There has expert assistance provided by the Sydney University Workplace Research Centre to critically evaluate the system, further develop the questions, enhance and automate the response, analysis and feedback process (Make It Work, 2010)

6.1.3 Labour pool pilot program

The labour pool pilot program has been established to provide employers with a pool of employees that they can draw from when labour demand increases. The pool also reduces the transaction costs of employing seasonal workers, as the pool will charge a flat hourly fee for the labour it contracts out.

The operator of the pool manages all of the human resource, occupational health and safety, superannuation and personal income tax administration of the employees. The pool operator will also have the responsibility to ensure that the employers contracting the staff meet OHS standards for their work places.

A labour pool benefits the employees by providing them with a permanent position. It also reduces the employment transaction costs for the employee as they do not have to spend time finding positions and negotiating terms and conditions.

The hourly rate charged by the pool operator will recover the administration costs for the employees and the pool.

6.2 Key organisations and individuals involved in the Initiative

6.2.1 Chamber of commerce

The Narrabri Chamber of Commerce plays an important role in the Initiative that may grow over time. The Chamber has grown from around 30 to 40 members 5 years ago, to 106 in 2010. It provides an importation form for regional employers to exchange HRM experiences, particularly how the results of the Employer of Choice Surveys can be implemented.

The Chamber also provides an important point of contact between the Narrabri Shire Council and regional businesses.

6.2.2 Make it Work Committee

The Make It Work Committee is made up of representatives from:

- The Narrabri Shire Council
- The Narrabri Chamber of Commerce
- Farming business
- Cotton growers
- Rural industries support businesses

The Make It Work committee appears to play a critical role in the Initiative as it:

- Identifies local workforce development issues. In this case, the particular issue is the need to maintain a flexible supply of appropriately skilled employees to align with seasonal workforce demand
- Develops strategies to address the identified issues
- Coordinates regional efforts (in this case largely through the local workforce coordinator Russel Stewart)
- Monitors the progress and outcomes of the Initiative.

6.2.3 Cotton Research and Development Corporation

The Cotton Research and Development Corporation (CRDC) is represented on the Make It Work Committee. The cotton producers represent a significant proportion of the total businesses in the area and a large number of businesses service cotton producers.

The CRDC provides an important extension network into the cotton industry for the experience and results generated by the Narrabri Initiative. The CRDC and the Cotton CRC also have research programs that could contribute to the Make It Work activities.

6.2.4 Narrabri Shire Council

The Narrabri Shire Council,,its mayor and Councilors have been strong supporter of the Narrbri Iniaitive from the start. (NCS) has agreed in principle to run a pilot employment pool for the region. This pool is likely to complement the cross-industry training program by providing the possibility of full-time employment for the cross-industry skills training program graduates.

The labour pool pilot program will offer 10 to 15 permanent full-time places at the NSC. The NSC labour pool pilot will hire the participants out to local businesses at a flat hourly rate and manage all of the employment administration. The pooled employees will work for the Council when they are not sub-contracted out to other employers.

The NSC will charge the employees out at a flat fee of $27 per hour, which will cover the direct employment and administration costs incurred by the Council.

The NSC has the ability to shift some of its work program in areas suitable for the expertise of the pooled employees, into periods of low general labour demand in the general Narrabri economy. The Council has also indicated that the skills of the pooled employees could be utilised to undertake some of the work that is currently sub-contracted out to private firms. This is especially likely in areas requiring skilled machinery operation. It is anticipated that this will increase the utilisation rate of some of the Council's machinery.

There are several private labour hire companies operating in the Narrabri area that could provide a similar service. However, when approached they could not provide an hourly rate that matched the NSC.

The risk of this exercise is that the NSC could:

- Subsidise the cost of the pooled labour it makes available with rate payer funds, as it is not charging market rates
- As it is effectively underwriting the employment of the pooled labour, if uptake of the labour by regional businesses does not meet expectations then the Council runs the risk of having labour in excess of requirements. That is, the Council is taking on the risk of a lack of demand, whereas without the scheme this risk would be borne by the regional employers and employees.

However, while there are some public policy risks associated with this particular activity, there are some mitigating circumstances:

- The program is a pilot and as such unlikely to have sufficient scale to attract or enable a private provider to offer competitive hourly contract rates
- The Council is an employer in its own right and the project is more aligned to the way a counter-cyclical employer might operate in the Narrabri labour

market. In that sense, the program may not be competing with private labour service providers but is more like a demonstration project that could be used to attract such an employer to the region

- If the council increases the utilisation of existing machinery and recoups the marginal costs of administering the project and all of the direct costs of employment, the potential net cost (inclusive of the risks mentioned above) to the Narrabri rate payer could be reduced or even eliminated
- The private employment services receive large subsidies (up to $8,000) for placing the unemployed (provided they are registered with Centrelink) into jobs or training. This could have the effect of distorting the labour market where resources that would be used to operate a labour pool similar to the one planned in Narrabri are diverted to assisting the unemployed.

6.2.5 Regional make it work coordinator

A regional workforce coordinator has been jointly funded by Agrifood Skills Australia and the NSW Department of Industry and Investment. Russell Stewart has extensive experience in employment services in the region.

The coordinator's role is to undertake workforce development activities that are directed by the Make It Work advisory committee.

7 Risks facing the project

As this is a review in advance of some of the results of the Initiative being realised, an analysis of the costs and benefits must be adjusted to account for the risks faced. The key risks of this Initiative appear to be:

- The likely participation in the project and adoption of outputs by regional enterprises and employees and others
- The effect local and wider economic conditions may have on the impact of the project, e.g. cotton and other commodity prices, interest rates, etc.
- The actual costs of coordinating, implementing and monitoring the project
- The ability to match skills development to future needs where there is a lag between skill development and utilisation
- Potential competition from other regions and enterprises
- The effect that other constraints on skills development and utilisation may have, such as industrial relations laws, education policy, welfare policy, economic environment for sectors of the economy, and the quality and access costs of regional infrastructure.

Many of these risks are built into the general equilibrium model and but many are largely outside the control of the Initiative.

Adoption of the program results (particularly the Employer of Choice survey and addressing the survey results) is a specific variable and a sensitivity test has been included in the model assumptions.

The lag of productivity improvements following the roll out of the Initiative is another variable that has been included in the model. This is discussed in more detail in the model results section.

8 What would have happened if the Initiative did not proceed?

There are a number of questions that need to be considered to develop a 'business as usual' case to compare to the Initiative:

- How would employers and employees have responded to the employment challenges the region faces without the Initiative?
- Would businesses have had enough incentives to improve their work force management skills and to advocate the development of certain skills and/or provide the training themselves?
- Would skilled workers leave the region and acquire improved skills elsewhere?
- How would businesses compensate for inadequate skills in the region?
- How would seasonality of labour demand be addressed by employers and employees in the future?

Some businesses have been working together to reduce the seasonality of the supply of labour, where their activities are complementary in the skills required and the timing of their demand. For example, a feed mill and cotton tarping contractor have been working together to share labour as the feed mill's peak demand is slightly before the tarping business. In this situation the seasonal workers at the feed mill are offered work with the tarping contractor as the feed mill moves into off-season.

While this covers a portion of the seasonal labour demand trough, it does not completely fill it and can only offer some additional work for the employees.

While there are likely to be pockets of collaboration between businesses to smooth labour demand, seasonality of demand would persist. There would also be a residual skills shortage and an ageing workforce. This adds up to a significant labour constraint on regional businesses. The response to this would be two fold:

- Pursue investment opportunities that did not have a high reliance on semi-skilled labour
- Replace labour with capital by increasing the automation of processes and/or use more contractors (however, contractors are faced with the same labour constraints)

These trends, if well established, are picked up in the general equilibrium model as the counterfactual case or 'business as usual' economic projection.

9 Economics of workforce development

This study has identified that one of the primary economic impacts of the Narrabri initiative is likely to be a potential improvement in the productivity of the existing workforce. We reviewed the available studies on the impacts of workforce development, referred to as human resource management (HRM) in the literature, to determine what the level of impact of the Narrabri initiative might be.

The field of firm level work force development or HRM covers a wide range of activities, including work incentives, work organisation, job matching and skills development and training. Work incentives include remuneration systems such as incentive/contingent pay, as well as the system of work appraisal, promotion and career advancement (Bloom & Van Reenen, 2010, p. 2). Work organisation refers to the distribution of decision rights (autonomy/decentralisation) between managers and workers, job design (e.g. flexibility of working, job rotation), team-working (e.g. who works with whom) and information provision (Bloom & Van Reenen, 2010, p. 2). Job-matching is the process whereby heterogeneous workers are matched with heterogeneous positions (Barron, Black, & Loewenstein, 1989, p. 2). Skills training and development is concerned with activities directed towards improving the performance of individuals and groups in organisational settings.

Productivity is essentially a measure of how much output we get from a unit of input, and thus the 'efficiency' of production (Productivity Commission, 2009, p. 1). Labour productivity is a measure of the amount of output produced per hour worked (Productivity Commission, 2009, p. 2). Improvements to labour productivity become more important the greater the costs of employing someone (inclusive of the transaction costs associated with finding an retaining staff), and where labour availability is a constraint on the business.

As we have identified skilled labour availability has been identified by Narrabri regional employers as a significant constraint on their businesses.

Improvements to productivity are more generally important because it is a major contributor to income growth (or economic growth). Productivity growth contributes to growth in per capita income as it increases the outputs of goods and services produced per unit of physical input (Productivity Commission, 2009, p. 4).

Research has shown that workforce development policy can make an important contribution to productivity. According to Associate Professor Nicholas Bloom of Stanford and Professor John Van Reenen of the London School of Economics (2010, p. 18):

> There are a huge number of studies that have correlated various aspects of the firm's performance on various aspects of its HRM ... **There is generally a strong and positive correlation between HRM and productivity**.

However, there is little direct evidence of how workforce practices influence the principal intermediate variables that ultimately affect firm performance (Becker, Huselid, Picus, & Spratt, 1997, pp. 40-41). It would appear that workforce practices do not influence firm performance directly, but through a (casual) chain of intermediate variables (Sels, De Winne, Delmotte, Maes, Faems, & Forrier, 2006, p. 85).

A fairly recent research technique developed to test the impact of HRM practices on productivity is known as *insider econometrics*. Insider econometric studies have three elements:

1. They estimate a productivity regression in which the productivity is a function of some "treatment". The treatment is the innovation – and innovations can include HRM practices.
2. They must model the adoption of the treatment; why did the firm adopt the workforce development practices?
3. They must explain why the workforce management practices increase productivity. (Shaw, 2009, p. 608)

Research has found that groups or clusters of complementary workforce development practices can have large effects on productivity, while changes in individual work practices have little or no effect on productivity (Ichniowski, Shaw, & Prennushi, AssociationThe Effects of Human Resource Management Practices on Productivity: A Study of Steel Finishing Lines, 1997, p. 291).

According to Professor Casey Ichniowski of Columbia University and Professor Kathryn Shaw of Carnegie Mellon University (2003), the theoretical literature provides three primary reasons for the adoption of multiple practices:

1. When firms cannot accurately measure the contribution of individual workers, they will consider a range of other incentive pay plans.
2. There has been an increasing emphasis on moving decision making from managers to lower-level workers, with the objective of eliciting valuable ideas from these workers. However, it is generally the case that multiple workforce management practices must be adopted to support decentralised decision making. In particular, for firms to elicit valuable ideas, employees must have the opportunity, the incentive and the skills to generate the

ideas. Different workforce development practices can help address these three dimensions.

3. Theoretical studies of employees who are responsible for multiple tasks offer another reason for complementarities among workforce development practices. Many employees work on a range of tasks and produce more than one type of output. If firms want employees to be diligent on the production line (one task) and to generate ideas for long-term improvements in production equipment (a second task), the firm will need to adopt and balance multiple workforce management policies that address incentive issues for the different tasks.

A study by Ichniowski, Shaw and Dr Giovanni Prennushi of the World Bank (1997) compared the labour productivity performance of systems of innovative workforce management practices to more traditional practices in relation to integrated steel finishing lines. This study investigated four distinctive combinations of workforce practices which mapped out a hierarchy from the traditional to the most innovative:

- The *traditional* workforce management system contained no innovative practices. Facilities with this system had close supervision of workers by foremen; strict work rules and narrow job responsibilities; incentive pay based on quantity of output and not quality of output; no work teams; no practice of managers sharing financial information or meeting regularly off-line with workers; no screening, and no off-line or other formal training.
- The *communications* workforce management system was similar to the traditional system, except that these workplaces introduced innovative practices in two specific areas. They initiated worker involvement in teams and they enhanced their labour-management practices, either by sharing financial information or through regular meetings between line managers and workers or their union representatives.
- The *high-teamwork* workforce management system incorporated the information-sharing and work team practices associated with the communications workforce management system, but these workplaces also included two other innovative practices – extensive skills training and high levels of worker involvement in teams.
- The *innovative* workforce system incorporated innovative workforce practices in all policy areas. Workplaces with this system had a multi-attribute incentive pay plan or a "pay-for-knowledge" incentive pay system; extensive screening of new workers, often lasting over one year; off-line training in technical skills and team problem solving; high levels of employee involvement in multiple problem-solving teams; job duties covering a wide range of tasks with workers often rotating across jobs; regular information sharing between workers and management; and an implicit employment security pledge.

The results of this study showed that relative to the traditional system, labour productivity was 6.7 per cent higher under the *innovative* system, 3.2 per cent higher under the *high-teamwork* system, and 1.4 per cent higher under the *communications* system. This study also estimated the productivity effects of changes in individual practices, and in no case did an individual innovation have a measurable effect on productivity by itself.

The Narrabri Employer of Choice program, in particular the cross industry skills program and the supporting survey tool, combine to deliver many of the attributes of the high teamwork system identified by Ichniowski, Shaw and Prennushi (1997). The following extract from a case study of one of the recent participants in the survey demonstrates the correlation between the survey impact and the high teamwork system:

> Having already undertaken of the Make It Work survey and having analysed the initial results, Greg has already implemented a number of measure to promote teamwork and improve communication. He has instigated regular face-to-face meetings, notice board postings and improved contact procedures with staff when working in the field. Greater employee engagement and understanding has resulted across the business units from the new strategy through initiatives such as section reports, notice board updates and celebrating successes at the combined meeting.
>
> It is apparent in the case of Busy Bee that the impetus to make these improvements was a result of Greg's involvement and enthusiasm for this ground-up regional skills ecosystem initiative[1].

While the study by Ichniowski, Shaw and Prennushi on integrated steel finishing lines may not be directly applicable to the *Make it Work* pilot program in Narrabri, but the case study cited suggests that participation in the program produces work place changes similar to those identified in the study. On this basis, it has been decided to extrapolate on the results of the Ichniowski, Shaw and Prennushi study and model the effects of a 3.2 per cent labour productivity improvement from the introduction of a *high-teamwork* system implemented through the *Make it Work* program. This is considered the best representation of the likely ability of the targeted programs to deliver business skills for owners and managers as well as a range of measures to provide additional training for workers.

10 Modelling the Initiative impacts on the Narrabri LGA

This section outlines the methodology used to estimate the broader economic impacts that may be achieved if the *Narrabri Initiative* is rolled out more broadly

[1] Taken from the Greg Morris Busy Bee auto electrics Employer of Choice survey case study.

across the community. The result and sensitivity of the modelling are presented in Section 11.

10.1 Framework of analysis

The economic impacts of a policy, project or other activity can be estimated using a variety of economic analysis tools, with the most often utilised generally being input-output (I-O) multiplier analysis and computable general equilibrium (CGE) modelling. The selection of the right tool is critical to the accuracy of the estimated impacts and depends upon the characteristics of the project/industry. Sometimes a range of tools are required. For this analysis, labour productivity changes are the linkages between markets and how these linkages develop and change over time are critical to the analysis. Due to the nature of the changes, CGE modelling has been chosen as the preferred tool to undertake the economic impact assessment in this report. ACIL Tasman's CGE model of the Australian and world economies, *Tasman Global*, has been used.

Tasman Global is a large-scale CGE model which is designed to account for all sectors within an economy and all economies across the world. ACIL Tasman uses this modelling platform to undertake industry, project, scenario and policy analyses. The model is able to analyse issues at the industry, global, national, state and regional levels and to determine the impacts of various economic changes on production, consumption and trade at the macroeconomic and industry levels. For a more detailed overview of Tasman Global see appendix 15A.

10.2 Business as usual or reference case

To isolate the economic implications of a project, the outputs from a CGE model are typically reported as deviations between a scenario with the Initiative, and a scenario without the Initiative.[2]

In the base case scenario, the pattern and rate of real economic growth is a function of assumptions on:

- Changes in population – particularly changes in the number of people of working age (15 years old and over).
- Changes in workforce participation rates – defined here as the average number of hours worked in the labour force by all people of working

[2] The deviation results are generally reported as percentage deviations or changes in the underlying units, for example dollars of Gross Regional Product and the number of full time jobs.

age. This measure encompasses changes in participation rates by age by gender, the unemployment rate and average hours worked.

- Growth in labour productivity – defined here as the average output per hour worked.

The projection of each of these elements is discussed in the following sections.

Population growth

Population growth is an important determinant of economic growth through the supply of labour and the demand for final goods and services. Population growth for 112 international regions and the 8 states and territories of Australia represented in the *Tasman Global* database has been projected using ACIL Tasman's in-house demographic model.[3] The demographic model projects how the population in each region grows and how age and gender composition changes over time and is an important tool for determining the changes in regional labour supply and total population over the projection period.

For each of the 120 regions, the model projects the changes in age-specific birth, mortality and net migration rates by gender for 101 age cohorts (0-99 and 100+). The demographic model also projects changes in participation rates by gender by age for each region, and, when combined with the age and gender composition of the population, endogenously projects the future supply of labour in each region. Changes in life expectancy are a function of income per person as well as assumed technical progress on lowering mortality rates for a given income (for example, reducing malaria-related mortality through better medicines, education, governance etc). Participation rates are a function of life expectancy as well expected changes in higher education rates, fertility rates and changes in the work force as a share of the total population.

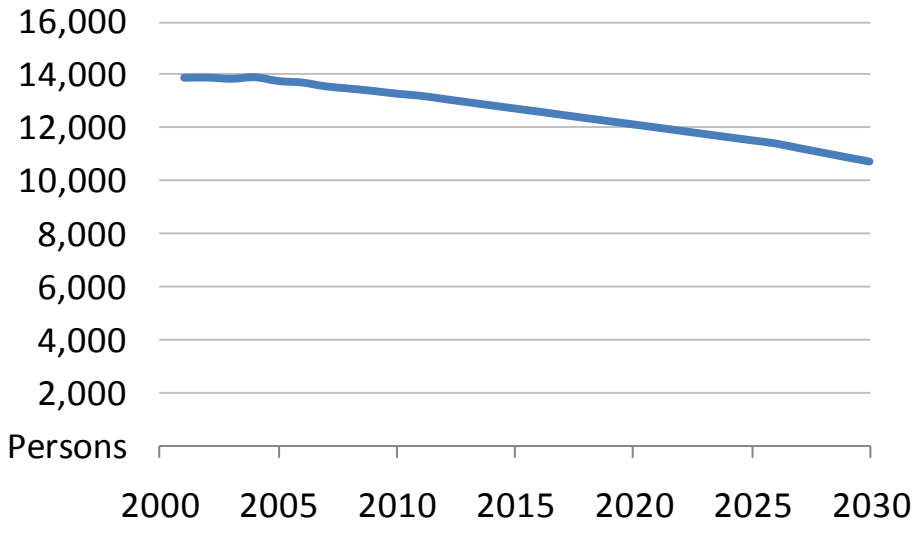
For this analysis, global population is projected to increase over the projection period by 0.83 per cent a year, increasing the global population from around 6.7 billion in 2008 to 8.03 billion in 2030. Most of this growth occurs in the next decade, with the average annual growth projected to be 0.95 per cent a year to 2020, falling to 0.67 per cent a year between 2020 and 2030. The slowing rate of growth is due to continuing declines in fertility rates across developing countries coupled with ageing population effects across developed economies and some developing economies such as China. For example, Japan's population is projected to begin declining in the 2009 calendar year while the population of the European Union over the period is projected to increase moderately before falling back to current levels around 2022.

[3] For the modelling in this report the populations of all Australian states and territories (other than New South Wales) have been aggregated to form the population for the 'rest of Australia'.

Population growth for the eight Australian states and territories incorporates all the latest ABS information on population levels, fertility, mortality and migration rates The total Australian population in 2020 is projected to be 25.9 million, with the population of New South Wales projected to be 8.0 million.

Population growth rates over the reference case for the Narrabri LGA are assumed to match those projected by the NSW Department of Planning (2009), which implies a fall in the total population from around 13,300 to just over 12,100 by 2020 (see Figure 2). This projection assumes a continuation of the historically observed decline in Narrabri's population – albeit accelerating slightly due to ageing population effects.

Figure 2 **Assumed Narrabri LGA population, reference case**

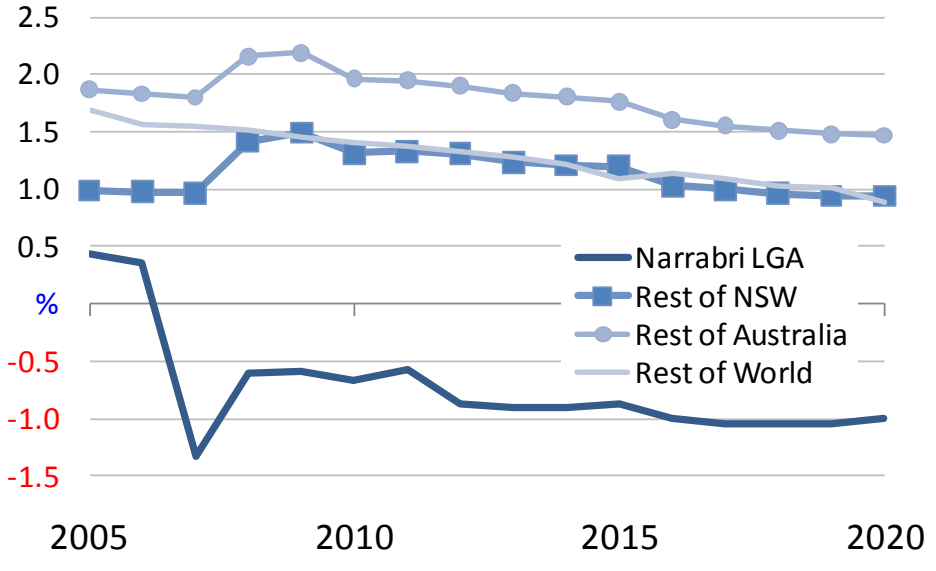


Data source: ACIL Tasman assumptions based on Department of Planning (2009).

Labour supply

Labour supply is derived from the combination of the projected regional population by age by gender and the projected regional participation rates by age by gender. Over the projection period labour supply in most developed economies is projected to grow slower than total population as a result of ageing population effects. The Narrabri region is projected to experience a declining workforce broadly in line with the decline in total population. The labour supply growth assumptions used for the regions modelled in this analysis are shown in Figure 3.

Figure 3 **Assumed growth in labour supply, reference case (per cent, year on year)**



Source: ACIL Tasman projections

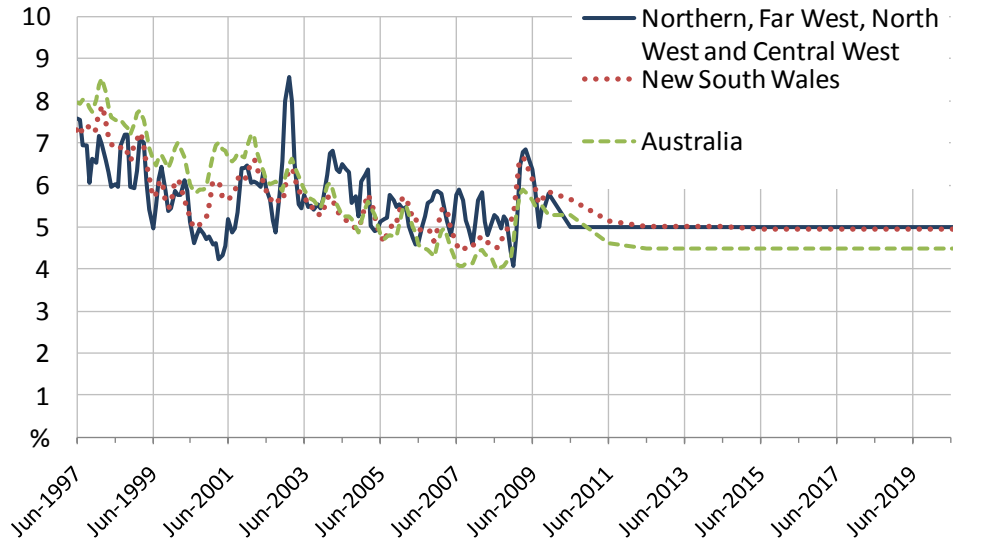
Unemployment

In addition to tracking the available workforce through the changes in population demographics and participation rates, *Tasman Global* also tracks unemployment rates. It should be noted that unemployment and participation rates are largely interchangeable in affecting the number of people available for work in the model. Separate identification of the components is undertaken to allow a more representative labour market. In general, when unemployment is high, increases in labour demand can largely be supplied by reducing the unemployment rate but when unemployment is low, increases in labour demand will largely be met by increasing participation rates (and/or hours worked). Changes in participation rates in *Tasman Global* are driven by changes in the real wages offered by employers.

Figure 4 presents the historical unemployment rates in the broader Narrabri region, New South Wales and Australia. It can be seen that the Narrabri region has traditionally experienced similar levels of unemployment (albeit more volatile) as New South Wales as a whole and Australia.

For the current modelling it has been assumed that the Narrabri LGA region will experience similar levels of unemployment as New South Wales as a whole. It has been assumed that the unemployment rate in the Narrabri region will remain around recent levels of 5.0 per cent, in line with the assumed unemployment rate across New South Wales, while the Australian average unemployment will move toward 4.5 per cent.

Figure 4 **Historical and assumed unemployment rate by region, reference case**



Data source: ABS Detailed Labour Force by region statistics, catalogue number 6291.0.55.001 (three month rolling average) and ACIL Tasman assumptions.

Labour productivity growth

Labour productivity is a measure of the quantity of goods and services per unit of time worked. Growth in labour productivity is highly variable on a year to year basis and is influenced by many developments in the economy, including changes in capital intensity and the composition of the work-force (Treasury, 2008).

Over the past 30 years Australian labour productivity growth has averaged 1.75 per cent a year and 1.8 per cent over the past 40 years (Treasury, 2008). Near term labour productivity growth is based on projections of labour supply and real GDP. In the reference case, the annual growth in Australian labour productivity is assumed to gradually slow from around 1.75 at the end of the next decade to 1.5 per cent a year over the remaining projection period as the composition of the Australian economy continues to shift toward services, which has historically had lower rates of productivity growth compared to the rest of the economy.

Real economic output growth

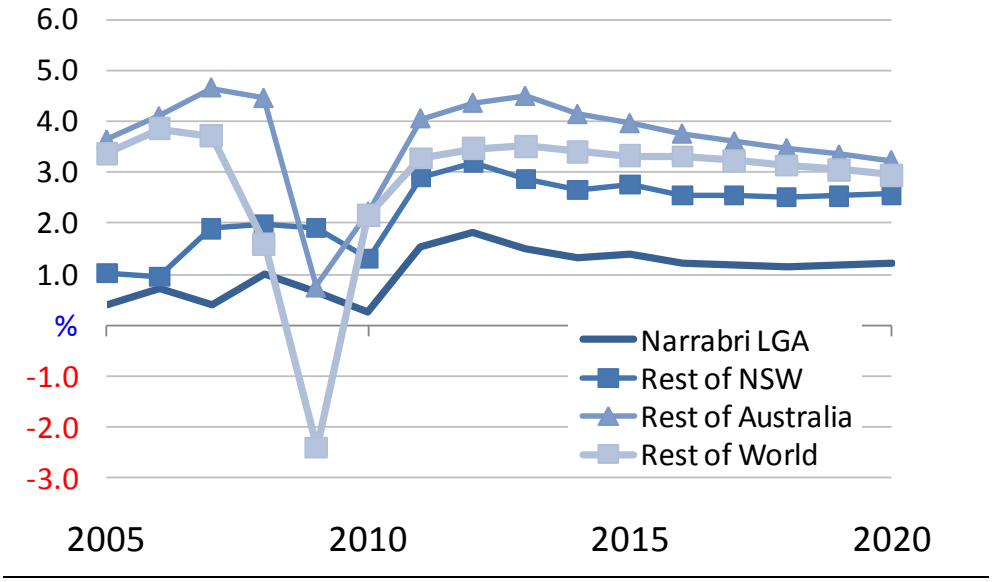
In *Tasman Global*, base case growth in economic output (i.e. GDP and GSP) is based on a mixture of historical data, near-term projections by the Commonwealth and State Treasuries and medium-long run projections. Australian historical GSP growth to 2008 is sourced from the ABS national accounts, while historical growth for the rest of the World is sourced from the IMF World Economic Outlook. The projections for the rest of the World (to

2014) are sourced from the latest IMF World Economic Outlook. Projections for economic growth past these points are determined using ACIL Tasman's projections of labour supply and labour productivity.

The impacts of the current financial crisis are expected to take a couple of years to move through the system, with the global economy returning to historical growth trends by 2012. The real economic growth in the Narrabri and rest of New South Wales regions have been solved endogenously based on the aggregate growth in GSP for New South Wales, but with each region's projections of population, labour supply and industry growth.

The real economic growth assumptions/projections used for the reference case for this analysis are shown in Figure 5.

Figure 5 **Growth in real economic output by region, reference case (per cent, year on year)**



Source: ACIL Tasman projections

In levels, Australia's real GDP is projected to rise from $1.25 trillion[4] in 2008-09 to $1.80 trillion in 2019-20. Over the same period New South Wales GSP is projected to grow from approximately $402 billion4 in 2008-09 to $531 billion in 2019-20.

Labour market assumptions

In the simulations performed with *Tasman Global* the labour market can be treated in a number of ways. Traditionally, CGE modelling utilises one of three labour market assumptions:

[4] Where billion is defined as $1x10^9$ as per the US convention. Trillion is defined as $1x10^{12}$.

4. Fixed labour supply (the full employment approach) and zero labour mobility between Australian regions
5. Medium term adjustment to labour supply and zero labour mobility between Australian regions
6. Full labour mobility between regions so that changes to wages are equalised across Australian regions.

Labour market assumption 2 simply allows local supply to vary in the medium term (five to ten years) before returning to its long run position. It provides a temporary reprieve from labour market constraints.

Labour market assumptions 1 and 3 are more extreme. Under assumption 1, the proposed developments would have to be accomplished with only the current labour available in the Narrabri region with some allowance for natural growth, i.e. no new labour could be drawn to the Narrabri region as a result of the projects. Under assumption 3 changes to wages in the Narrabri region would be the same as changes to wages in all Australian regions, with labour shifting between Australian regions until changes to wages equalise. Modelling under assumption 3 provides the largest movement in labour across regions.

Tasman Global includes a labour market module that allows for constrained movement between regions of the Australian economy. For this project, we have elected to use a hybrid labour market assumption as the default (which allows for some medium term adjustment potential), rather than resort to the use of assumption 2. The question that then arises is what level of constraint is appropriate (i.e. what level of labour movement between Australian regions makes sense)? In previous work the model has been calibrated to replicate the observed movement of labour between Australia's States and Territories during the period from 2001 to 2006. These settings have been used for the modelling in this analysis.

Given the nature of the analysis and the importance of the labour market settings, the sensitivity of the results to alternative labour market settings have been tested explicitly. The alternative settings are discussed in more detail in Section 10.4.

10.3 Modelling the Narrabri Initiative

The broader economic impacts of the Narrabri Initiative on the Narrabri economy have been modelled by modelling two key implications of the program:

- Labour productivity only — under this scenario the introduction of the Narrabri Initiative is assumed to result in a 3.2 per cent labour productivity improvement (see Section 9), relative to the reference case. The productivity improvement has been applied to the managers, trades

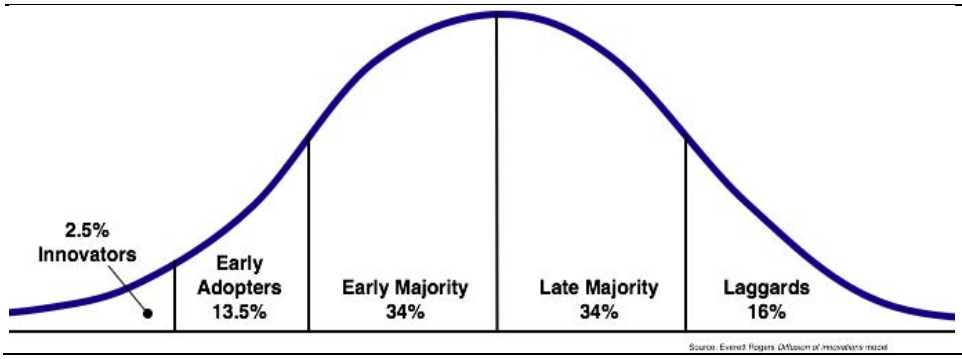
workers, machinery operators and labourers in the agriculture, mining, construction and transport and storage industries. All other workers are assumed to have the same labour productivity as the reference case. Businesses have been assumed to gradually adopt the potential benefits of the Initiative (and the associated productivity benefit) according to Rogers adoption model and is discussed separately below.

- Labour productivity plus reduced net outward migration — in addition to the labour productivity benefit discussed above, this scenario also assumes that the net outward migration of working age adults (i.e. people aged between 15-64) is reduced by one-third as a result of the better employment conditions generated by the Initiative (e.g. more full-time versus casual employment, better training, etc). This equates to around 60 fewer outward adult migrants per year by 2014-15. This reduction in net outward migration is assumed to ramp up gradually to 60 extra workers by 2014-15 using Rogers adoption curve.

10.3.1 Adoption

The extent that the Narrabri Initiative benefits the regional economy will depend on the level of adoption by businesses in the region. The classic description for the adoption of new innovations is the Rogers adoption curve (Figure 6).

Figure 6 **Rogers' adoption curve**



Data source: http://en.wikipedia.org/wiki/File:DiffusionOfInnovation.png

Rogers (1962) estimated five broad categories of adopters: innovators (2.5 per cent), early adopters (13.5 per cent), early majority (34 per cent), late majority (34 per cent) and laggards (16 per cent). These estimates have been broadly corroborated by many case studies including those in the original research by Rogers. In the absence of a more detailed study, these reference figures have been adopted for the current report.

Rogers does not indicate a speed of adoption over time, although the general wisdom is that the adoption rate typically follows an S-curve – namely, a slow

initial rate of adoption, followed by a 'tipping point' at some stage where rapid uptake in the broader population occurs, which is then followed by a progressively slower rate of adoption as the majority of the population has already adopted.

For this analysis, we have assumed that the rate of adoption broadly follows the categories of adopters but with the laggards never adopting the Initiative (because they are either unable or unwilling). More specifically, we have assumed the rate of take-up presented in Table 13 with 84 per cent of businesses adopting the potential benefits (and associated labour productivity improvement) by the fifth year of the Initiative (2014-15).

Table 13 **Assumed adoption of Narrabri Initiative by businesses**

	Year of adoption	% of businesses	Cumulative adoption (%)
Early innovators	2010-11	1.25	1.25
Innovators	2011-12	1.25	2.50
Early adopters	2012-13	13.5	16.0
Early majority	2013-14	34	50.0
Late majority	2014-15	34	84.0
Laggards	N/A	16	84.0

Source: ACIL Tasman

10.3.2 Net Outward Migration

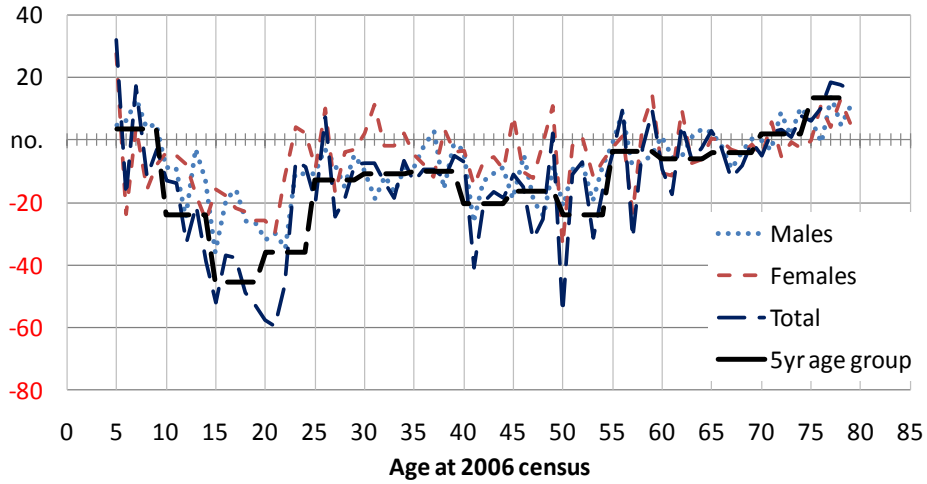
As discussed in Section 10.2, Narrabri has been experiencing net outward migration to the extent that the total population has been falling steadily over recent years. The most reliable data for estimating the net migration are the population by age by gender counts from the 2001 and 2006 censuses. For example, the 2006 count of the number of 10 year old males should equal the 2001 count of the number of 5 year old males (adjusted for mortality), with any difference being due to net migration.

Applying the New South Wales average mortality rates by age by gender to the 2001 census data provides the estimated number of net migrants shown in Figure 7. As can be seen, most age groups are estimated to have experienced net outward migration, with the exceptions being the age groups entering primary school and retirees (who may be moving into the city to access better health services). The cohorts with the largest net outward migration of people are the 15-19 and 20-24 year olds, many of whom are presumably leaving to access tertiary education opportunities not supplied within the Narrabri LGA. Importantly, however, there is no indication that those who leave come back after finishing any such studies.

In total, it is estimated that the net outward migration for working people aged people of 15-64 was 962 people, or approximately 185 net outward migrants

per year. This is equivalent to an average annual migration rate of approximately 2.1 per cent of the working age population (or approximately 11 per cent over 5 years).

Figure 7 **Estimated net migration by age by gender for Narrabri LGA from 2001 and 2006 censuses**



Note: Due to the small absolute population, there is a large degree of error in these estimates for individual ages and for cohorts with low total population (e.g. people aged 70 years and over). Local differences in the mortality rates compared to the NSW average will also influence estimates for individual ages.

Source: ACIL Tasman estimates from ABS 2001 and 2006 census data.

10.4 Labour market sensitivities

The labour market in *Tasman Global* has a range of constraints through the functional forms, the elasticities, and/or through the choice of closure[5] for the CGE model. The functional forms and elasticities have been chosen and/or estimated to provide a realistic representation of the Australian labour market. Ultimately, however, there is always uncertainty around the specification of the behaviour that is being modelled. Even though the model has been calibrated to match history, there is no guarantee that the system will behave in a similar manner in the future.

As a result of these uncertainties and the importance of the labour market assumptions, we have also modelled the proposed Initiative with an unconstrained labour market (but maintaining the constraints on the supply of land and capital).

[5] Standard CGE models have many more variables than equations. In order to solve the system of equations it is necessary to exogenously specify the value of a number of variables. The choice of which variables are exogenous and which are endogenous is called the model 'closure'. The closure choice can have significant impacts on the model results – as this section demonstrates by using an unconstrained labour market closure.

11 Results

11.1 Measures of macroeconomic impacts

One of the most commonly quoted macroeconomic variables at a national level is Gross Domestic Product (or GDP) which is a measure of the aggregate output generated by an economy over a period of time (typically a year). From the expenditure side, GDP is calculated by summing total private and government consumption, investment and net trade.[6] At the state level, the GDP equivalent is called Gross State Product (GSP) while at a regional level the GDP equivalent is usually called Gross Regional Product (GRP). To reduce potential confusion with the various acronyms, the term '**economic output**' will be used in the following discussion.

Although changes in real economic output are useful measures for estimating how much the output of the relevant economies may change, changes in the **real income** of a region is more important as it provides an indication of the change in economic welfare of the residents of a region. Indeed, it is possible that real economic output can increase with no, or possibly negative, changes in real income. In *Tasman Global*, changes in real income at the national level is synonymous with real gross national disposable income (RGNDI) reported by the ABS.

Real income is equivalent to real economic output plus net foreign income transfers, while the change in real income is equivalent to the change in real economic output, plus the change in net foreign income transfers, plus the change in terms of trade (which measures changes in the purchasing power of a region's exports relative to its imports. As Australians have experienced first-hand in recent years, changes in terms of trade can have a substantial impact on people's welfare independently of changes in real GDP. The change in real income (as projected by *Tasman Global*) is the authors' preferred measure of the change in economic welfare of residents.

Economic output is a measure of the amount of goods and services generated within a region and, consequently, wealth transfers only have a second order effect through the additional consumption induced demand. Wealth transfers will, however, have a significant impact on the real income of the residents within a region with consequent impacts on consumer orientated sectors of the economy (primarily services). The income and demand effects will have consequent impacts on employment, real wages and migration incentives.

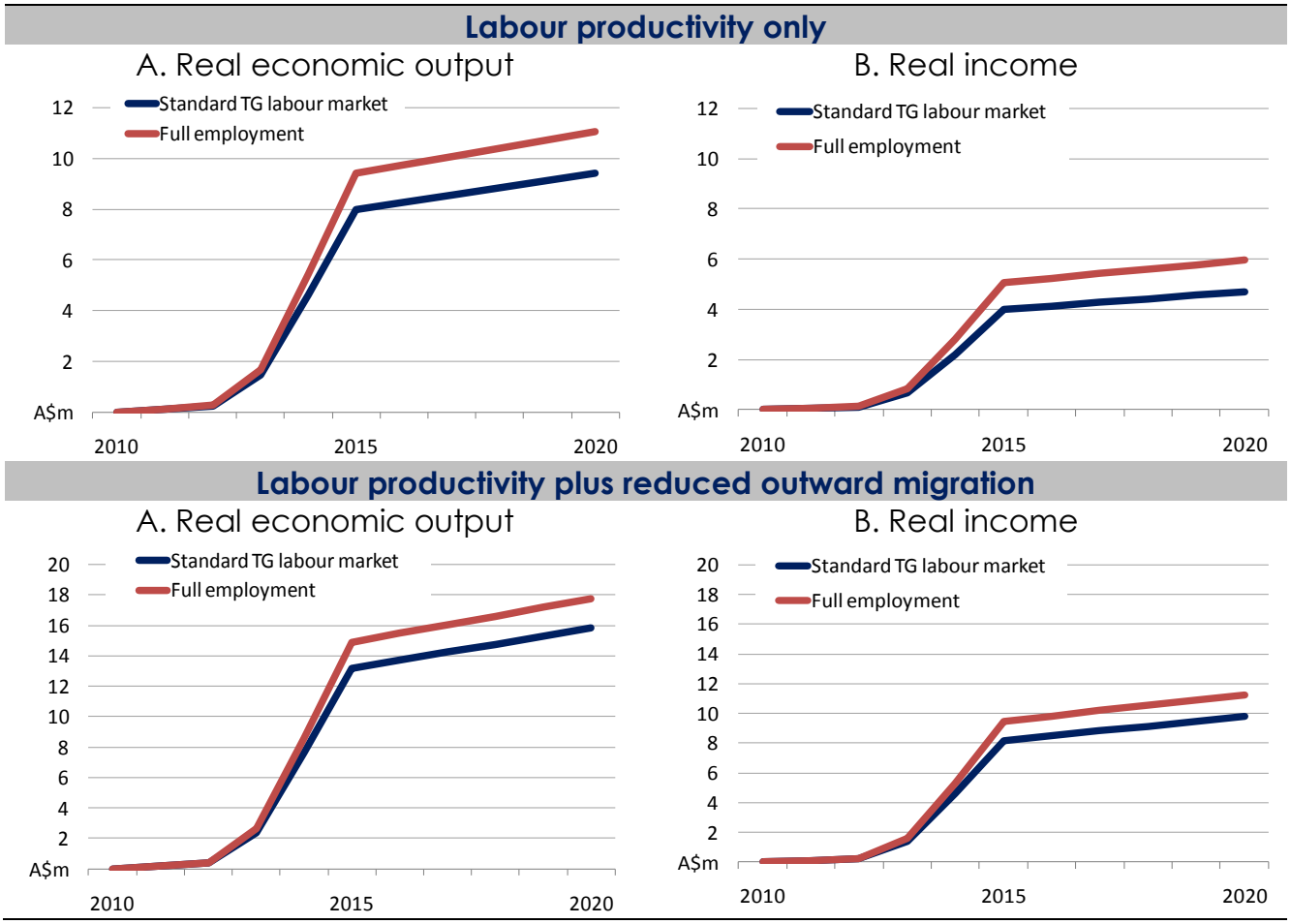
[6] From the income side, GDP is equal to the returns to factors plus all tax revenues.

11.2 Projected impacts

Real economic output and real income

Figure 8 shows the change in the Narrabri's real economic output and real income in each year of the projection period (2011-2020) for the *Labour productivity only* and *Labour productivity plus reduced migration* Scenarios. Based on the assumed adoption rates, the benefits begin to ramp up from 2013.

Figure 8 **Projected change in real economic output and real income, relative to the reference case (in 2010 terms)**



Notes: All data for financial year ending June 30. Real income for Australia as a whole is synonymous with real gross national disposable income (RGNDI) as used by the ABS.

Source: ACIL Tasman modelling

It can be seen from Figure 8 that the projected increase in Narrabri's real income is less than the projected increase in real economic output. The productivity improvements associated with the Initiative reduce the total production costs. Most, but not all, of these cost reductions are passed onto final consumers including foreigners (i.e. non-Narrabri residents) – and this results in a decline in Narrabri's terms of trade compared to the reference case.

The decline in terms of trade means that Narrabri residents will have to export slightly more goods and services to pay for their imports. In noting this effect, two things should be kept in mind:

1. Total production by the Narrabri economy has also increased, but part of the increased production needs to be used to support demand for foreign products
2. Although the (small) decline in terms of trade offsets the growth in real economic output, total economic welfare of Narrabri residents is still higher as a result of the productivity improvements than without.

A further nuance of the modelling is that the labour productivity improvement reduces the overall amount of labour required to produce a given quantum of goods and services. As discussed above, this reduces the overall costs of production in the Narrabri region which encourages an expansion in total production. However, if the size of the expansion is not enough to soak up the labour freed up by the productivity improvement then there will actually be a net *reduction* in overall employment (as measured by full-time equivalent jobs). As presented in Figure 9 below, the projections under the standard *Tasman Global* labour market assumptions projects precisely this effect.

The validity of this modelled employment effect depends on the nature of the constraints to production in the Narrabri economy. In the standard model structure labour is only one constraining factor and to soak up the additional labour freed up by the productivity improvement requires greater demand for capital and land. As mentioned in Section 10.4, for comparison sensitivity scenarios in which any additional labour available as a result of the Initiative is assumed to be fully employed has also been modelled. Under this sensitivity, the projected increases in real economic output and real income are around 15-20 per cent higher.

Real economic output

Table 14 shows the cumulative impacts of the Initiative under the *Labour productivity only* and *Labour productivity plus reduced migration* Scenarios. Over the period 2010-11 to 2019-20, the Narrabri Initiative is projected to increase the real economic output of the Narrabri LGA:

- Under the *Labour productivity only* Scenario by a cumulative total of $59 million relative to the reference case (with a net present value of $44 million, using a 4 per cent real discount rate)
- Under the *Labour productivity plus reduced migration* Scenario by a cumulative total of $97 million relative to the reference case (with a net present value of $74 million, using a 4 per cent real discount rate).

In the context of the local economy, this is a sizeable amount of economic activity generated by the program.

Under the labour market sensitivity the increase in real economic output is projected to be around $10 million higher under both scenarios.

Table 14 **Cumulative change in Narrabri's real economic output and real income, relative to the reference case (in 2010 terms)**

		A. Real economic output			B. Real income [a]		
		Total (2011-2020)	NPV (4% discount rate)	NPV (7% discount rate)	Total (2011-2020)	NPV (4% discount rate)	NPV (7% discount rate)
		2010$m	2010$m	2010$m	2010$m	2010$m	2010$m
Labour productivity only	Standard TG labour market	59	44	36	29	22	18
	Full employment	69	52	43	37	28	23
Labour productivity plus reduced outward migration	Standard TG labour market	97	74	61	60	46	37
	Full employment	110	83	68	69	53	43

a Real income for Australia is synonymous with real gross national disposable income (RGNDI) as used by the ABS. In this modelling real income is a measure of the economic welfare associated with the project.

Notes: All data for financial year ending June 30. Totals may not add due to rounding. NPV = Net Present Value. It should be noted that the NPV calculation only includes the impacts through to 2043 even though the project will be likely to continue producing benefits beyond this artificial time horizon.

Source: ACIL Tasman modelling

Real income

Over the period 2010-11 to 2019-20, the Narrabri Initiative is projected to increase the real income of the Narrabri LGA:

- Under the *Labour productivity only* Scenario by a cumulative total of $29 million relative to the reference case (with a net present value of $22 million, using a 4 per cent real discount rate)
- Under the *Labour productivity plus reduced migration* Scenario by a cumulative total of $60 million relative to the reference case (with a net present value of $46 million, using a 4 per cent real discount rate).

To place these projections in perspective the discounted present value using a 4 per cent discount rate is equivalent to a one-off increase in the *average* real income of all current Narrabri residents of just over $1,600 per person under the *Labour productivity only* Scenario and of around $3,400 per person under the *Labour productivity plus reduced migration* Scenario. This is a significant increase in economic welfare.

Under the labour market sensitivity the increase in real income is projected to be around $8 million higher under both scenarios.

11.2.2 Employment

The projected changes in employment under each scenario are summarised in Table 15, Figure 9.

Over the period 2011 to 2020, the Narrabri Initiative is projected to change total employment under the:

- *Labour productivity only* Scenario by a total of –88 employee years[7] relative to the reference case (or an average of –9 FTE jobs a year)
- *Labour productivity plus reduced migration* Scenario by a total of 336 employee years relative to the reference case (or an average of 34 FTE jobs a year).

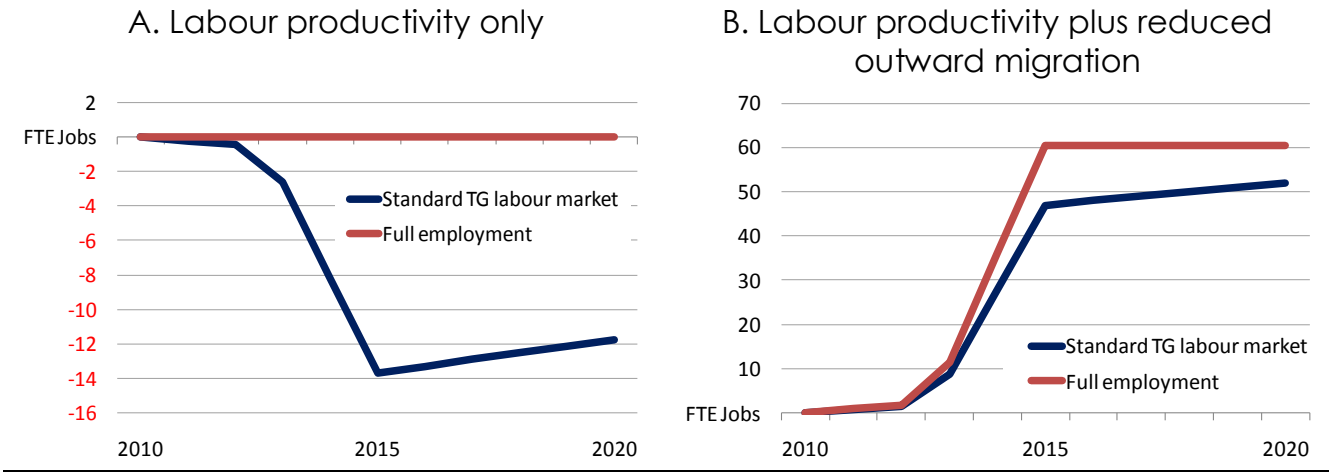
Table 15 **Cumulative and average annual change in employment, relative to the reference case**

	Labour productivity only		Labour productivity plus reduced outward migration	
	Cumulative employee years (FTE) (2011-2020)	Average FTE jobs per year (2011-2020)	Cumulative employee years (FTE) (2011-2020)	Average FTE jobs per year (2011-2020)
Standard TG labour market	–88	–9	336	34
Full employment	0	0	413	41

Notes: FTE = full time equivalent. These estimates do not include the direct jobs that are assumed to be filled using temporary foreign workers. An employee year is equivalent to one full time job held for a year or, for example, 0.5 of a full time job held for two years.

Source: ACIL Tasman modelling

Figure 9 **Projected change in Narrabri employment, relative to the reference case**



Note: FTE = full time equivalent.

Source: ACIL Tasman modelling

Under the labour market sensitivity where there is full employment there is no change in employment under the *Labour productivity only* Scenario or an increase

[7] An 'employee year' is defined to be equivalent to one full time job held for a year or, for example, 0.5 of a full time job held for two years

equivalent to the reduced net outward migration under the *Labour productivity plus reduced migration* Scenario.

12 Expected social impact of the Narrabri Initiative

While the brief for this project requires and economic assessment of the Initiative, there is likely to be a range of social benefits that will spillover from the Initiative. In many ways there is a reciprocal relationship between economic and social benefits in workforce development in a regional economy. The relationships established by local businesses building workforce development capability, are also likely to strengthen the social networks and institutions in the community, such as clubs, schools, sports teams, etc. Strong social networks are, in turn, likely to support economic networks.

A qualitative assessment of the Narrabri Initiative requires a characterisation of how the project may create social value for the people, businesses, organisations and the communities involved. Some key conditions need to be met by the project so that a significant social impact can be generated. The goals of Australia's regional skills and workforce development strategy are wide in scope, ranging from skills development to better employer's workplace practices, and increasing economic productivity and business investment in the region. In this light, some of these conditions include (but are not restricted to):

- Effective capacity of the project to *stimulate significant partnerships* between project participants. The project needs to create partnerships and use them to develop educational and work opportunities and thus contribute to community viability. It is important for the project to realise that action expectations are more likely to be triggered within an organisation's communities of practice than by external sources. For example, for a farmer, the expectations should be built from those within his or her communities of practice, which are likely to differ from those a commercial or government agent belongs to. As a consequence the project needs to not only identify and engage the relevant stakeholders, but also focus on a diversity of interests under coherent strategies.
- Effective capacity of the project to *tailor incentives* to meet stakeholders' different expectations, goals and needs. The aims of the Narrabri Initiative are diverse, from maximising the value of work force skills to improving skills utilisation. As a consequence, the project needs to foresee the necessary incentives that each agent involved in the project will respond to. For example, commercial agents would respond to incentives that may increase their financial and organisational capital, trainees and workers would respond to incentives that may increase their human capital or

financial capital, and community groups would respond to incentives that increase social and economic capital in the community.

- Effective capacity of the project to have and maintain *effective leadership*. Leadership is the key to the initiation of joint efforts for a project to promote diverse and relevant communities of practice, collaboration from stakeholders to create a shared agenda, and the formation of a partnership between regional businesses and community-based organisations. A model of distributed or enabling leadership —rather than investing all leadership roles in one person— mitigates the risk of dependency of the project on one leader. Enabling leadership requires encouragement and support of a range of partnership members to take on different leadership roles, so that leadership could be systemically embedded in the community.
- Effective capacity of the project to build a *high degree of trust* between the project providers and the people, businesses, organisations and communities involved. It is important for a project to anticipate that programs based on a 'provider–user perspective' are inherently unequal in power relations and are likely to distort mutual perceptions and expectations. According to some research, 'providers' are best seen as providing access to the resources needed to improve problematic situations. Another way to conceptualise a project is that all of the stakeholders are participants in, and beneficiaries of, the project. This would presuppose a proactive participation from all stakeholders. As a consequence, factors that encourage or inhibit the taking of action, or influence what is done and how, may be important.

12.1 How the Narrabri Initiative may create social benefits

Based on the main goals of Australia's regional skills and workforce development strategy —of which the Narrabri Initiative is a part— some of the social value that the project would be able to create for people, businesses, organisations and the community, include the following:

- Enhancing *human capital* in rural communities' workforces. The project aims to increase workforce skills consistent with labour demand in regional areas. We can expect that an optimisation of the utilisation of the skills by employers will increase the plausibility of keeping (and attracting) more young people and families in (to) rural communities and preventing them from moving to metropolitan or larger regional areas. This will contribute to community capacity-building and viability and also help maintain or strengthen a community's economic capital. Labour skills development will respond to local skills shortages, and may also spillover to minimise unemployment of marginalised community members. People involved in the project will gain skills, networks and confidence that will be observed by the longer term unemployed and those responsible for assisting them to find employment.

- Enhancing *organisational and financial capital* in businesses through the 'Employer of Choice' Initiative. This project aims to increase the capability of businesses in improving their work organisation, and creating meaningful job design and career paths, which can maximise employees' skills utilisation and productivity. The Initiative could produce social benefits such as better employee engagement with their workplace, greater worker motivation, self-esteem and commitment to the job through meaningful long-term work perspectives. The net gain is that rural industries and businesses will gain employees with skills, experience and work attitudes that are valued by employers. This increases the chances of people keeping their jobs and enables employers and industry to plan more effectively for the future. Skilled people would then exhibit a higher likelihood of staying in the community and therefore investing in the local economy by buying houses, land, etc., and would also choose to raise their families there. Consequently, this will increase the likelihood of enterprises setting up businesses there, since the skills that are needed to run the various businesses are available within the community.
- Enhancing *social capital and prosperity* in the community. The Initiative can be a pathway to the creation of stronger community relationships, with a corresponding increase in the social capital present in the community. Social capital is concerned with networks, relationships, and levels of trust and reciprocity among community members. To a large extent, social capital supports community members in demonstrating their personal capabilities. Valued and mutually beneficial partnerships are fundamental to the notion of social capital. Social capital both contributes to, and is dependent on, the fostering of human capital.

13 Some additional observations and suggestions

While it is beyond the ACIL Tasman brief, we have made some observations and suggested additional activities that have emerged during the course of our analysis and that might improve the outcomes of the Initiative.

Some additional activities that might be worth investigating as part of the Initiative:

- Financial institutions may be encouraged to offer seasonal employees the same hearing for a mortgage as permanent employees, if they are part of the labour pool or have attended cross-industry training programs
- More resources could be dedicated by the Chamber of Commerce and the Council to identify and attract counter-cyclical labour demand businesses. Attracting businesses that demand permanent employees does not solve the seasonality problem but will increase total economic activity in the region

- The Chamber of Commerce could play a more active role in reducing the asymmetries of information in the labour market, by providing a forum for employers to work collaboratively to smooth labour demand

14 Next Steps

14.1 Monitoring and evaluation

This analysis has been conducted *ex ante,* that is before the initiative has been fully implemented and adopted. We have estimated the potential impacts of the Initiative and provided an analysis of the key assumptions underpinning the modelling.

To verify these assumptions, particularly if the model is to be rolled out to other regions, Agrifood Skills should monitor the program as it rolls out in Narrabri. Monitoring could be done by:

- Conducting some follow up surveys of regional businesses who participated in the Employer of Choice survey to identify the extent of management practice changes attributed to participating in the survey and the affects of these management changes on the business
- Assessing of the net migration flows using ABS census data and possibly surveys of the target age group in the region
- Follow up consultations with the Narrabri Shire Council to assess the labour pool trial after twelve months

14.2 Developing a sustainable model

The benefits of the Initiative are largely private That is local business owners and employees are the main beneficiaries of the impacts of the Initiative. Therefore extended public support for the program cannot be justified unless there are significant ongoing labour market failures.

However, significant public benefits could accrue depending on the extent that a fully implemented region initiative impacts on regional development and its broader impact nationally.

Therefore one of the next steps of the Initiative is to plan the withdrawal of public funds. To do this several key initiatives need to be funded by non-public means. The main activities requiring ongoing funding are:

1. The regional coordinator (currently Russel Stewart)
2. The funding of the Employer of Choice initiatives to enhance employer capability and adoption on contemporary employment practices
3. The transfer of the labour pool to private service providers

The funding of the Employer of Choice survey can be done by charging participants the full cost of providing the survey. This could be done by a number of private consultants that specialise in this area.

The funding of the regional coordinator presents some additional challenges. The most efficient way to fund this position is from voluntary contribution from regional businesses. A voluntary contribution may create a free rider problem where those business who choose not to contribute may benefit from a continuation of the role; this is called the free rider problem. Peer pressure alone may correct much of the free rider problem in small regional communities. However, as long as sufficient benefits are captured by those contributing to funding the coordinator, some free riding by other should not be a problem.

The Narrabri Chamber of Commerce could provide the administration of the coordinators role and collect funding for this position through its membership fees. The Chamber could also oversee the provision of the Employer of Choice program as well.

There are a number of private employment service providers that can and do provide casual employees for a fixed hourly rate on a casual basis. With sufficient scale of the employees in the labour pool the charge out rates are likely to be competitive with what the Council is proposing to charge under the trial. However, the problem with private skilled labour service providers is that they do not directly employ the pool participants to undertake work.

Therefore the private service providers do not smooth out labour demand they only reduce the employment transaction costs. there are several alternatives that require further analysis to address the seasonality of labour demand:

- The Narrabri Shire should that the pool if continued is run on a full cost recovery basis and the Council should enter into take or pay contracts with local businesses to ensure it carries none of the seasonal demand risks of the labour pool
- Local businesses and the Council should identify and seek to attract to the region business that have a counter seasonal demand for labour to the existing regional businesses

14.3 Rolling out the initiative

In ACIL Tasman's view there are several key features of the Narrabri Initiative that would need to be replicated in regions where it is intended replicate the Narrabri Initiative:

- A regional group of employers and community leaders willing to work collectively to address some of their skills and labour constraints across the spectrum of the Narrabri Initiative's activities

- A clear understand of what the labour constraints are (e.g. seasonal labour demand, a common set of required skills lacking in the regional workforce)
- A skilled coordinator with experience in labour market programs
- A regional body able to act as a forum to
- The establishment of a regional advisory committee made up of local business owners and managers
- A local government willing to complement collective activities of local businesses

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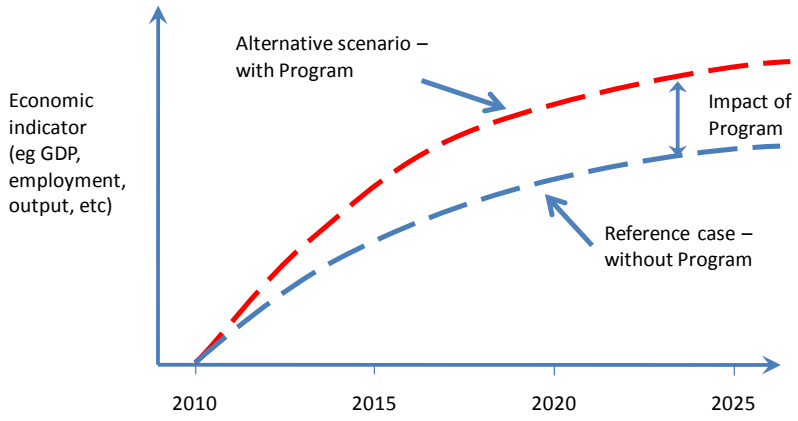
A Overview of Tasman Global

A.1 Overview of Tasman Global

Tasman Global is a model that estimates relationships between variables at different points in time. This is in contrast to comparative static models, which compare two equilibriums (one before a policy change and one following). A dynamic model such as *Tasman Global* is beneficial when analysing issues where both the timing of and the adjustment path that economies follow are relevant in the analysis.

In applications of the *Tasman Global* model, a reference case simulation forms a 'business-as-usual' basis with which to compare the results of various simulations. The reference case provides projections of growth in the absence of the changes to be examined. The impact of the change to be examined is then simulated and the results interpreted as deviations from the reference case (see Figure 10).

Figure 10 **Illustrative scenario analysis using Tasman Global**



Source: ACIL Tasman

The database

A key advantage of *Tasman Global* is the level of detail in the database underpinning the model. The database is derived from the latest Global Trade Analysis Project (GTAP) database which was released in 2008. This database is a fully documented, publicly available global data base which contains complete bilateral trade information, transport and protection linkages among regions for all GTAP commodities.

The GTAP model was constructed at the Centre for Global Trade Analysis at Purdue University in the United States. It is the most up-to-date, detailed database of its type in the world.

Tasman Global builds on the GTAP model's equation structure and database by adding the following important features:

- dynamics (including detailed population and labour market dynamics)
- detailed technology representation within key industries (such as electricity generation and iron and steel production)
- disaggregation of a range of major commodities including iron ore, bauxite, alumina, primary aluminium, brown coal, black coal and LNG
- the ability to repatriate labour and capital income
- a detailed emissions accounting abatement framework
- explicit representation of the states and territories of Australia
- the capacity to explicitly represent multiple regions within states and territories of Australia.

Nominally the *Tasman Global* database divides the world economy into 120 regions (112 international regions plus the 8 states and territories of Australia) although in reality the regions are frequently disaggregated further. ACIL Tasman regularly models Australian projects or policies at the regional level.

The *Tasman Global* database also contains a wealth of sectoral detail currently identifying up to 70 industries (Table 16). The foundation of this information is the input-output tables that underpin the database. The input-output tables account for the distribution of industry production to satisfy industry and final demands. Industry demands, so-called intermediate usage, are the demands from each industry for inputs.

For example, electricity is an input into the production of communications. In other words, the communications industry uses electricity as an intermediate input. Final demands are those made by households, governments, investors and foreigners (export demand). These final demands, as the name suggests, represent the demand for finished goods and services. To continue the example, electricity is used by households – their consumption of electricity is a final demand.

Each sector in the economy is typically assumed to produce one commodity, although in *Tasman Global*, the electricity, diesel and iron and steel sectors are modelled using a 'technology bundle' approach. With this approach, different known production methods are used to generate a homogeneous output for the 'technology bundle' industry. For example, electricity can be generated using brown coal, black coal, petroleum, base load gas, peak load gas, nuclear,

hydro, geothermal, biomass, wind, solar or other renewable based technologies – each of which have their own cost structure.

The other key feature of the database is that the cost structure of each industry is also represented in detail. Each industry purchases intermediate inputs (from domestic and imported sources) primary factors (labour, capital, land and natural resources) as well as paying taxes or receiving subsidies.

Factors of production

Capital, land, labour and natural resources are the four primary factors of production. The capital stock in each region (country or group of countries) accumulates through investment (less depreciation) in each period. Land is used only in agriculture industries and is fixed in each region. *Tasman Global* explicitly models natural resource inputs as a sector specific factor of production in resource based sectors (coal mining, oil and gas extraction, other mining, forestry and fishing).

Table 16 **Sectors in the *Tasman Global* database**

	Sector		Sector
1	Paddy rice	36	Paper products, publishing
2	Wheat	37	Diesel (incl. nonconventional diesel)
3	Cereal grains nec	38	Other petroleum, coal products
4	Vegetables, fruit, nuts	39	Chemical, rubber, plastic products
5	Oil seeds	40	Iron ore
6	Sugar cane, sugar beef	41	Bauxite
7	Plant- based fibres	42	Mineral products nec
8	Crops nec	43	Ferrous metals
9	Bovine cattle, sheep, goats, horses	44	Alumina
10	Animal products nec	45	Primary aluminium
11	Raw milk	46	Metals nec
12	Wool, silk worm cocoons	47	Metal products
13	Forestry	48	Motor vehicle and parts
14	Fishing	49	Transport equipment nec
15	Brown coal	50	Electronic equipment
16	Black coal	51	Machinery and equipment nec
17	Oil	52	Manufactures nec
18	Liquefied natural gas (LNG)	53	Electricity generation
19	Other natural gas	54	Electricity transmission and distribution
20	Minerals nec	55	Gas manufacture, distribution
21	Bovine meat products	56	Water
22	Meat products nec	57	Construction
23	Vegetables oils and fats	58	Trade
24	Dairy products	59	Road transport
25	Processed rice	60	Rail and pipeline transport
26	Sugar	61	Water transport
27	Food products nec	62	Air transport
28	Wine	63	Transport nec
29	Beer	64	Communication
30	Spirits and RTDs	65	Financial services nec
31	Other beverages and tobacco products	66	Insurance
32	Textiles	67	Business services nec
33	Wearing apparel	68	Recreational and other services
34	Leather products	69	Public Administration, Defence, Education, Health
35	Wood products	70	Dwellings

Note: nec = not elsewhere classified

Population growth and labour supply

Population growth is an important determinant of economic growth through the supply of labour and the demand for final goods and services. Population growth for the 112 international regions and for the 8 states and territories of Australia represented in the *Tasman Global* database is projected using ACIL

Tasman's in-house demographic model. The demographic model projects how the population in each region grows and how age and gender composition changes over time and is an important tool for determining the changes in regional labour supply and total population over the projection period.

For each of the 120 regions in *Tasman Global*, the model projects the changes in age-specific birth, mortality and net migration rates by gender for 101 age cohorts (0-99 and 100+). The demographic model also projects changes in participation rates by gender by age for each region, and, when combined with the age and gender composition of the population, endogenously projects the future supply of labour in each region. Changes in life expectancy are a function of income per person as well as assumed technical progress on lowering mortality rates for a given income (for example, reducing malaria-related mortality through better medicines, education, governance etc). Participation rates are a function of life expectancy as well as expected changes in higher education rates, fertility rates and changes in the work force as a share of the total population.

Labour supply is derived from the combination of the projected regional population by age by gender and the projected regional participation rates by age by gender. Over the projection period labour supply in most developed economies is projected to grow slower than total population as a result of ageing population effects.

For the Australian states and territories, the projected aggregate labour supply from ACIL Tasman's demographics module is used as the base level potential workforce for the detailed Australian labour market module, which is described in the next section.

The Australian labour market

Tasman Global has a detailed representation of the Australian labour market which has been designed to capture:

- different occupations;
- changes to participation rates (or average hours worked) due to changes in real wages;
- changes to unemployment rates due to changes in labour demand;
- limited substitution between occupations by the firms demanding labour and by the individuals supplying labour; and
- limited labour mobility between states.

Tasman Global recognises 97 different occupations within Australia – although the exact number of occupations depends on the aggregation. The firms who hire labour are provided with some limited scope to change between these 97

labour types as the relative real wage between them changes. Similarly, the individuals supplying labour have a limited ability to change occupations in response to the changing relative real wage between occupations. Finally, as the real wage for a given occupation rises in one state rise relative to other states, workers are given some ability to respond by shifting their location. The model produces results at the 97 3-digit ANZSCO (Australian New Zealand Standard Classification of Occupations) level (see Table A17).

Table A17 **Occupations in the Tasman Global database, ANZSCO 3-digit**

ANZSCO code, Description		
111 Chief Executives, General Managers and Legislators	262 Database and Systems Administrators, and ICT Security Specialists	442 Prison and Security Officers
121 Farmers and Farm Managers	263 ICT Network and Support Professionals	451 Personal Service and Travel Workers
131 Advertising and Sales Managers	271 Legal Professionals	452 Sports and Fitness Workers
132 Business Administration Managers	272 Social and Welfare Professionals	511 Contract, Program and Project Administrators
133 Construction, Distribution and Production Managers	311 Agricultural, Medical and Science Technicians	512 Office and Practice Managers
134 Education, Health and Welfare Services Managers	312 Building and Engineering Technicians	521 Personal Assistants and Secretaries
135 ICT Managers	313 ICT and Telecommunications Technicians	531 General Clerks
139 Miscellaneous Specialist Managers	321 Automotive Electricians and Mechanics	532 Keyboard Operators
141 Accommodation and Hospitality Managers	322 Fabrication Engineering Trades Workers	541 Call or Contact Centre Information Clerks
142 Retail Managers	323 Mechanical Engineering Trades Workers	542 Receptionists
149 Miscellaneous Hospitality, Retail and Service Managers	324 Panelbeaters, and Vehicle Body Builders, Trimmers and Painters	551 Accounting Clerks and Bookkeepers
211 Arts Professionals	331 Bricklayers, and Carpenters and Joiners	552 Financial and Insurance Clerks
212 Media Professionals	332 Floor Finishers and Painting Trades Workers	561 Clerical and Office Support Workers
221 Accountants, Auditors and Company Secretaries	333 Glaziers, Plasterers and Tilers	591 Logistics Clerks
222 Financial Brokers and Dealers, and Investment Advisers	334 Plumbers	599 Miscellaneous Clerical and Administrative Workers
223 Human Resource and Training Professionals	341 Electricians	611 Insurance Agents and Sales Representatives
224 Information and Organisation Professionals	342 Electronics and Telecommunications Trades Workers	612 Real Estate Sales Agents
225 Sales, Marketing and Public Relations Professionals	351 Food Trades Workers	621 Sales Assistants and Salespersons
231 Air and Marine Transport Professionals	361 Animal Attendants and Trainers, and Shearers	631 Checkout Operators and Office Cashiers
232 Architects, Designers, Planners and Surveyors	362 Horticultural Trades Workers	639 Miscellaneous Sales Support Workers
233 Engineering Professionals	391 Hairdressers	711 Machine Operators
234 Natural and Physical Science Professionals	392 Printing Trades Workers	712 Stationary Plant Operators
241 School Teachers	393 Textile, Clothing and Footwear Trades Workers	721 Mobile Plant Operators
242 Tertiary Education Teachers	394 Wood Trades Workers	731 Automobile, Bus and Rail Drivers
249 Miscellaneous Education Professionals	399 Miscellaneous Technicians and Trades Workers	732 Delivery Drivers
251 Health Diagnostic and Promotion Professionals	411 Health and Welfare Support Workers	733 Truck Drivers
252 Health Therapy Professionals	421 Child Carers	741 Storepersons
253 Medical Practitioners	422 Education Aides	811 Cleaners and Laundry Workers
254 Midwifery and Nursing Professionals	423 Personal Carers and Assistants	821 Construction and Mining Labourers
261 Business and Systems Analysts, and Programmers	431 Hospitality Workers	831 Food Process Workers
	441 Defence Force Members, Fire Fighters and Police	832 Packers and Product Assemblers
		839 Miscellaneous Factory Process Workers
		841 Farm, Forestry and Garden Workers
		851 Food Preparation Assistants
		891 Freight Handlers and Shelf Fillers
		899 Miscellaneous Labourers

Source: ACIL Tasman

The labour market structure of *Tasman Global* is thus designed to capture the reality of labour markets in Australia, where supply and demand at the occupational level do adjust, but within limits.

Labour supply in *Tasman Global* is presented as a three stage process:

1. Labour makes itself available to the workforce based on movements in the real wage and the unemployment rate;
2. Labour chooses between occupations in a state based on relative real wages within the state; and
3. Labour of a given occupation chooses in which state to locate based on movements in the relative real wage for that occupation between states.

By default, *Tasman Global*, like all CGE models, assumes that markets clear. Therefore, overall, supply and demand for different occupations will equate (as is the case in other markets in the model).

Including the affected LGAs in the model database

The database which underpins the Tasman Global model has been developed so that the Narrabri LGA region was identified as a separate economy in the database. In the model, the Narrabri economy trades with the rest of New South Wales, the rest of Australia and the rest of the World. Data from the 2006 Census underpins the specification of Narrabri's industry structure and detailed employment by the 97 labour types. Detailed estimates of the size of the agriculture industry in the region are based on data from the ABS catalogue number 7125.0 (2005-06 small area data agriculture commodities).

B ANZIC Industries Codes

Table B1 **2006 Census of Population and Housing, Customised Data Report, Persons Employed by Selected Industries (ANZSIC93) and Selected Place of Work, Reference period: 8th August 2006**

Industries ANZSIC 1993	Region 1 (a)
Selected Industries 93 June 2008	
0113 Vegetable Growing	3
0119 Fruit Growing, nec	3
0121 Grain Growing	257
0122 Grain-Sheep and Grain-Beef Cattle Farming	164
0123 Sheep-Beef Cattle Farming	54
0124 Sheep Farming	44
0125 Beef Cattle Farming	238
0151 Pig Farming	11
0159 Livestock Farming, nec	3
0162 Cotton Growing	314
2861 Agricultural Machinery Manufacturing	11
3701 Water Supply	3
4111 House Construction	43
4611 Farm and Construction Machinery Wholesaling	31
5311 Car Retailing	29
5321 Automotive Fuel Retailing	47
5322 Automotive Electrical Services	8
5323 Smash Repairing	15
5329 Automotive Repair and Services, nec	58
7321 Banks	34
7711 Residential Property Operators	6
011 Horticulture and Fruit Growing	13
016 Other Crop Growing	322
021 Services to Agriculture	156
152 Other Mining Services	17
214 Oil and Fat Manufacturing	21
216 Bakery Product Manufacturing	6
217 Other Food Manufacturing	3
221 Textile Fibre, Yarn and Woven Fabric Manufacturing	29
222 Textile Product Manufacturing	3
242 Publishing	10
263 Cement, Lime, Plaster and Concrete Product Manufacturing	3
271 Iron and Steel Manufacturing	3
273 Non-Ferrous Basic Metal Product Manufacturing	3

Industries ANZSIC 1993	Region 1 (a)
276 Fabricated Metal Product Manufacturing	15
286 Industrial Machinery and Equipment Manufacturing	15
292 Furniture Manufacturing	3
361 Electricity Supply	31
411 Building Construction	41
412 Non-Building Construction	27
421 Site Preparation Services	38
423 Installation Trade Services	50
424 Building Completion Services	21
425 Other Construction Services	7
732 Deposit Taking Financiers	40
772 Real Estate Agents	8
774 Machinery and Equipment Hiring and Leasing	3
781 Scientific Research	94
782 Technical Services	16
783 Computer Services	3
784 Legal and Accounting Services	55
785 Marketing and Business Management Services	18
786 Other Business Services	68
771 Property Operators and Developers	7
012 Grain, Sheep and Beef Cattle Farming	800
015 Other Livestock Farming	14
01 Agriculture	1212
02 Services to Agriculture; Hunting and Trapping	151
03 Forestry and Logging	3
11 Coal Mining	6
15 Services to Mining	23
22 Textile, Clothing, Footwear and Leather Manufacturing	33
24 Printing, Publishing and Recorded Media	12
25 Petroleum, Coal, Chemical and Associated Product Manufacturing	11
26 Non-Metallic Mineral Product Manufacturing	3
27 Metal Product Manufacturing	46
28 Machinery and Equipment Manufacturing	22
36 Electricity and Gas Supply	31
41 General Construction	78
42 Construction Trade Services	147
45 Basic Material Wholesaling	109
46 Machinery and Motor Vehicle Wholesaling	67
47 Personal and Household Goods Wholesaling	24
51 Food Retailing	271
52 Personal and Household Goods Retailing	241

Industries ANZSIC 1993	Region 1 (a)
53 Motor Vehicle Retailing and Services	208
57 Accommodation, Cafes and Restaurants	231
61 Road Transport	159
62 Rail Transport	36
66 Services to Transport	3
67 Storage	68
71 Communication Services	39
74 Insurance	3
73 Finance	45
77 Property Services	27
78 Business Services	300
81 Government Administration	200
84 Education	369
86 Health Services	278
87 Community Services	123
92 Libraries, Museums and the Arts	9
93 Sport and Recreation	12
96 Other Services	47
21 Food, Beverage and Tobacco Manufacturing	52
9521 Laundries and Dry-Cleaners	4
9525 Gardening Services	3
9526 Hairdressing and Beauty Salons	27
95 Personal Services	67
37 Water Supply, Sewerage and Drainage Services	3
Agriculture, Forestry and Fishing	1397
Other	3939
Total	5336

(a) Region 1 includes Narrabri (A) SLA.

(b) Region 2 includes Mirani, Mackay (C) Part A and B, Sarina, Nebo, Belyando, Broadsound, Peak Downs, Emerald, Bauhinia, Duaringa SLAs.

(c) Region 3 includes Gladstone (C) SLA.

(d) Region 4 includes Gladstone SSD.

Data source: Australian Bureau of Statistics Web page: www.abs.gov.au

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