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Inquiry into the Augmentation of Water Supply for Rural and Regional New South Wales

Supplementary Question

"If water was not a concern could you estimate what the potential economic output of this area would be?"

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Executive Summary

This submission is in response to a supplementary question raised during the Water Augmentation Inquiry Committee Meeting held in Moree on the 15th May 2017. The question put forward was:

"If water was not a concern could you estimate what the potential economic output of this area would be"?

If water was not a concern, the Gwydir Valley region has the potential to generate a Gross Production Value (GPV) of \$2,917/Ha from approximately 90,000 Ha of developed irrigation fields. This is equivalent to gross production of approximately \$263,000,000, resulting in an extended regional value of \$573,000,000 p.a.¹ This does not include the development of any additional irrigation land or investments in infrastructure or technology. Additional supplementary water allocations could be delivered to the Gwydir Valley, providing an immediate boost to the economy, without any improvements to existing infrastructure.

The WJ&A Seery Partnership have the potential to generate \$26,223,830 from cotton production utilising their available land. The multiplier for agriculture is considered to be 2.178, resulting in an extended regional value of \$57,115,502².

It should also be noted that if water was not a concern, it would be expected that large areas of land currently utilised for dryland cultivation could be converted to irrigated cultivation, significantly increasing the overall production of the area.

² Based on Seery production figures and the extended multiplier for agriculture.



¹Accounting for the economic multiplier for agriculture of 2.178

Scope

This submission is directed to the Portfolio Committee No. 5 – Industry and Transport in response to a supplementary question raised during the Water Augmentation Inquiry Committee Meeting on the 15th May 2017 in Moree. The question put forward was:

"If water was not a concern could you estimate what the potential economic output of this area would be?"

This question is significant and in order to present a reasonable answer to the committee a number of assumptions were made, full details on assumptions are included at the end of this report. The following highlights the key assumptions:

- 1. There is approximately 90,000 hectares of land that has been developed and available for irrigated crop production in the Gwydir Valley Region. The potential for developing additional land was not explored as part of this exercise.
- 2. The idea of "water was not a concern" has been defined in this report as the water required to irrigate cotton across the entire developed area. For 90,000 hectares at an average of 6.5 ML/Ha this equates to 585 GL.
- 3. The "potential economic output" was defined as the Gross Production Value. This was calculated using average income and costs per hectare for furrow irrigated cotton production assuming all farming operations were contracted³.
- 4. The gross production value per hectare was multiplied by the total developed area to provide an economic value for irrigation in the region.
- 5. The regional GVP assumes no water limit, unlimited availability throughout the year and no delivery constraints.
- 6. The calculations for water requirements include rainfall during the growing season.

Background – Cotton Industry

The Australian cotton industry stretches from central Queensland through southern Queensland and northern NSW to the Murrumbidgee valley in southern NSW. In a year with plentiful water, around 550,000 hectares of cotton are planted with potential production of over four million bales and a value of more than \$2 billion⁴. As the largest cotton producing region in Australia, the Gwydir Valley has a significant cotton farming history supplying up to two-thirds of the total Australian grown cotton for domestic and export purposes. Most of the Australian crop is grown under irrigation, although large areas of the Darling Downs and northern NSW are planted for dryland cotton. It is a summer crop, planted in spring (mid-September through to the end of November) and harvested in the autumn (early March through to late May).

⁴ The Australian Cotton Grower Website, 2012. <u>https://www.cottongrower.com.au/The-cotton-industry.php</u>. Accessed June 2017.



³ Department of Primary Industries, 2015. "Furrow Irrigated Cotton Central and Northern NSW 2014-2015". NSW Government.

Inquiry into the Augmentation of Water Supply for Rural and Regional NSW – Response to Supplementary Question Supplementary Question: "If water was not a concern could you estimate what the potential economic output of this area would be?"

Region – Gwydir Valley

For the purposes of this exercise, we have defined the subject area as the Gwydir Valley Region. The Gwydir Valley region extends from the northern tablelands to the northern plains, where it joins the Barwon River, covering an area of 26,596 km². Figure 1 presents a map of the region including Copeton Dam, regulated and unregulated rivers and local towns.

The structure of the local economy is strongly related to the mix of irrigation, cropping and grazing. Irrigation enterprises include cotton, horticulture (citrus, pecans), cereals, hay and pasture. The region currently has 90,000 Ha of land developed for irrigated cotton and 1,200 Ha for permanent plantings of orchards. Limited reliable information was available on horticulture in terms of water requirements and production value at the time of writing, and as such the value has been excluded from the total regional value.



Figure 1: Gwydir Valley Region

Potential Economic Output

The primary irrigated crop in the region is cotton. The average yield for furrow irrigated cotton is 11 bales/Ha. The average total income for the cotton lint and seed is \$554/bale. The potential income for region is therefore \$6,094/Ha. The region has the potential to generate an income of \$548,460,000 from the 90,000 Ha of cotton fields. The economic multiplier for agriculture is 2.178⁵ resulting in an extended regional value

⁵ Department of Primary Industries, 2016. "The contribution of primary industries to the NSW economy – Key Data 2016". NSW Government.



of \$1.195 billion. The variable costs are budgeted at \$3,177/Ha. This does not take into account risk or overhead costs (including permanent labour).

Assuming unlimited water availability and without further irrigation development or changes in technology, the region has the potential to generate a Gross Production Value of \$2,917/Ha⁶, which is equivalent to \$263,000,000 for the Gwydir Valley. Using the agriculture multiplier of 2.178⁷ resulting in an extended regional value of \$573,000,000.

Discussion

Prior to water recovery programs, irrigators in the Gwydir Valley had access to 217 GL of surface water and 33 GL of groundwater⁸. Water recovery programs to date have resulted in the transfer of 21 GL (approximately 10% of accessible water) of their surface entitlements to the Commonwealth. The value of this water at a production rate of 1.7 bales of cotton/ML is \$19,778,000/year.

This is additional to the water allocated by the NSW Government to environmental programs.

The reduced water supply has resulted in a significant decrease in production. Since the introduction of environmental water and buy-backs the average irrigation area has dropped to 37,339 hectares. With a high of 72,800 hectares in 2012/2013 associated with a period of significant flood events in the region. The loss of water and resulting reduction in production potential has cost the region an average gross production value of \$109,000,000 since 2007. The reduced cotton production value is in the order of \$1.09 billion. This does not include the loss to the region which would be in the order of \$2.37 billion using the multiplier effect of 2.178 for jobs, services and investment.

Moree is a major service centre in the region, supporting an evolving mix of dryland and irrigated agricultural production. Moree functions as a service centre for many other regional towns including Collarenebri and Mungindi. In 2001, there were a similar number of jobs held in the agriculture and agriculture supply sector and the non-agriculture private sector⁹. By 2011 however, employment in the agriculture and agriculture supply sector declined by 19%. Whilst some recovery occurred with increased employment in government services, total employment in the Moree area has dropped from 6,792 to 5,858 between 2001 and 2011¹⁰.

The effects of water recovery in the Moree community are intensified when considered in the context of the underlying social and economic conditions and when taking into account the flow-on effects to communities such as Collarenebri and the private business sector¹¹. Moree is a rural town dependent on agriculture, without a profitable agricultural industry many associated services and employers would cease to exist.

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⁶ Department of Primary Industries, 2016. "The contribution of primary industries to the NSW economy – Key Data 2016". NSW Government.

⁷ Department of Primary Industries, 2016. "The contribution of primary industries to the NSW economy – Key Data 2016". NSW Government.

⁸ Murray-Darling Basin Authority, 2016. "Northern Basin Review - Moree Community Profile". Licensed from the Murray–Darling Basin Authority under a Creative Commons Attribution 4.0 Licence.

⁹ Murray-Darling Basin Authority, 2016. "Northern Basin Review - Moree Community Profile". Licensed from the Murray–Darling Basin Authority under a Creative Commons Attribution 4.0 Licence.

¹⁰ Department of Infrastructure and Regional Development website. Accessed June 2017. Australian Government. http://regional.gov.au/regional/data/Home/Indicator?regionId=78e4311a-874c-e511-8d47-

¹¹ Murray-Darling Basin Authority, 2016. "Northern Basin Review – Technical overview of the Socioeconomic analysis". Licensed from the Murray–Darling Basin Authority under a Creative Commons Attribution 4.0 Licence.

Supplementary water is the result of dams overflowing or significant natural inflows in regulated rivers. When these "uncontrolled" flows exceed a pre-determined threshold, they can be made available to licence holders. Any water extracted is not debited against the licence holders regulated allocation and therefore supplements their normal regulated allocation. The provision of additional supplementary water allocations could be delivered to the Gwydir Valley, without any improvements to existing infrastructure. This would provide an immediate and significant boost to the regional economy.

Case Study – WJ&A Seery Partnership

WJ&A Seery Partnership is a family-operated business based in Moree since 1974. The Partnership have a total property holding of 19,560 which includes 8,990 Ha of land developed for irrigation. Due to the current water supply allocation available, an average of 3,113 hectares (35%) of this developed land sits idle each year. With a potential gross production value of approximately \$2,917/Ha, this is loss to the enterprise of \$9,080,620/year.

The 10-year average reliability for general security water in the Valley is approximately 31%. Not including opportunity capture of supplementary flows, this is equivalent to 16,298 ML of reliable water for the Seery Partnership. Average water-use for cotton production calculated by the Partnership is 7.3 ML per Ha which consists of water applied to the field. The average annual production from general security water is therefore in the order of 2,232 Ha. The long-term average yield allowing for seasonal variations is in the order of 11 bales per Ha. Long term production is therefore in the order of 24,552 Bales of cotton from general security water.

The actual 18-year long term average including cotton grown from supplementary water, floodplain harvesting and bore water is in the order of 43,147 bales per year for the Seery Partnership. This average is based on crops grown since 1999 and therefore allocations available prior to current water sharing plan restrictions and environmental allocations. The difference in annual production based on general security water from Copeton dam and the actual production when all other available water is captured and utilised is significant.

The following two scenarios explore the economic impacts of full allocations and the idealistic concept of unlimited water:

Full Allocation

The Partnership's current entitlements for surface water includes 52,575 ML general security and 22,496 ML supplementary water. The average water requirement for furrow irrigated cotton is 6.5 ML/Ha. To irrigate the total area available for cotton production at 6.5 ML/Ha, 58,435 ML is required. This is equivalent to 78% of the full entitlement held by the Partnership. The remaining 22% could be used for alternative winter cropping programs as part of a crop rotation to maintain soil condition and cropping efficiencies.

If full allocations were consistently available, the Seery Partnership would utilise all the land already developed for cotton irrigation. This would result in a Gross Production Value of \$26,223,830. The multiplier for agriculture is 2.178 resulting in an extended regional value of \$57,115,502.

The Seery Partnership currently employ an average of 55 people. If a reliable water supply was available delivering full allocations, an additional 25 full-time equivalent (FTE) jobs would be created. The multiplier effect for regional jobs is 1.828 resulting in an extended employment benefit of 45.7 FTE in the region.

Unlimited Water

Copeton dam has a design capacity of 1,364 GL¹². Access to the water captured in Copeton dam and available downstream of Copeton Dam in the form of surface runoff is controlled by the relevant Water Sharing Plans. In developing the Water Sharing Plans a long-term average annual extraction limit of 392,000 ML/year was calculated. This was to ensure that 66% of the total long-term average annual flow in the water source (estimated to be 1,421,000 ML/year) would be preserved and contribute to the maintenance of basic

¹² Water NSW Website. Accessed June 2017. http://www.waternsw.com.au/supply/visit/copeton-dam

Inquiry into the Augmentation of Water Supply for Rural and Regional NSW – Response to Supplementary Question ecosystem health, refer to Table 1. Since then, additional water has been removed from the productive water for environmental purposes.

Water Source Plan		Gwydir Regulated River WSP	Rocky Creek, Cobbadah, Upper and Lower Horton WSP
Water products	Priority of access	Allocated entitlement	Allocated entitlement
		ML/y	ML
Basic rights			
Stock and domestic rights		6,000	5.1 ML/day
Nati∨e title		none	0
Extraction shares			
Total licensed (long-term) extraction limit		392,000	not specified
Local water utilities	high	3,836	
High security access	high	19,293 unit shares	
General security access	medium	509,500 unit shares	5509
Supplementary access	low	178,000 unit shares	
Domestic and stock	high	4,245	
Environmental provisions*			
Total environmental share		**749,000	
Environmental allocation	high	45,000 unit shares	

Sources: DIPNR, 2004a; DIPNR, 2004b.

* The environmental flow provision for the Rocky Creek WSP is the total daily flow minus the total daily extraction limit and stock and domestic rights. The total daily extraction limit varies with the daily flow level.

** By limiting long-term average annual extractions to an estimated 392,000 ML/y this plan ensures that approximately 66 percent of the long-term average annual flow in this water source (estimated to be 1,141,000 ML/y) will be preserved and will contribute to the maintenance of basic ecosystem health.

Table 1: Summary of Surface Water Sharing Arrangements within the Gwydir Region.Source: Table 2.3 in CSIRO, 2007.

CSIRO have identified that the Valley has a current average surface water availability of 782 GL/year¹³. In the case that all of this water was available for collection and use and the appropriate area of land was developed to utilise this for cotton production, the potential exists to grow 1,329,400 bales of cotton if a production level of 1.7 Bales per ML was sustained. At an average irrigation rate of 6.5 ML/Ha, the crop would extend over an area of approximately 120,308 Ha or approximately 30,000 Ha of additional field area than is available at present. The gross production level from this 782 GL of water would be in the order of \$351 M. This would provide a community benefit in the order of \$764 M.

¹³ CSIRO, 2007. "Water availability in the Gwydir – A report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project. CSIRO, Australia.



Assumptions

In defining the question, a number of assumptions were made, these included:

- 1. The area is defined as the existing land developed for irrigation with the Gwydir Valley Region. This is equivalent to 90,000 hectares. This area was chosen as the most relevant boundary for the management of water with suitable available information. The potential for developing additional land was not explored as part of this exercise.
- 2. The idea of "water was not a concern" has been defined in this report as the water required to irrigate cotton across the entire developed area. For 90,000 hectares at an average of 6.5 ML/Ha this equates to 585 GL.
- 3. The "potential economic output" was defined as the Gross Production Value. This was calculated using average income and costs per hectare for furrow cotton production assuming all farming operations were contracted. The gross production value per hectare was multiplied by the total developed area to provide an economic value for irrigation in the region.
- 4. The regional GVP assumes no water limit, unlimited availability throughout the year and unlimited delivery constraints.
- 5. The calculations for water requirements do not include rainfall during the growing season.
- 6. The industry term 'per bale' is in reference to a ginned lint bale of 227kg. The price per bale (\$554) is the five-year average price for lint and seed (2010-2015).
- 7. A yield of 11 bales/Ha is achievable considering the long fallow, 'best practice' operations and a five-year average yield for the variety S74BRF in Cotton Seed Distributors (CSD) commercial trial results.
- 8. An average water requirement of 6.5 ML for furrow irrigated cotton and 1.25 ML for chickpeas. This was based on average water uses recorded by the NSW Department of Industry and information provided by the Gwydir Valley Irrigators Association.
- 9. All information provided on the WJ&A Seery Partnership was supplied by the partnership for use in this submission.

During the process of drawing together the information used to compile this report on potential production in the Gwydir Valley industry, several key data sources were used. Most of the data was extracted from Australian Bureau of Statistics (ABS) reports published in 2011. In most cases the most recent and most reliable data is quoted, but as the last comprehensive and most accurate ABS survey was conducted during the most recent census in 2011, much of the industry value and production data is drawn from the period 2010/11. The industry landscape has obviously changed between 2011 and 2017.

It has been a period of rapid change in the Australian agricultural industry following drought and the loss of significant export markets, while new markets were opened elsewhere. In using ABS data, several questions arose about the accuracy and relevance of the information, given that five years has elapsed since that information was collected. However, the authors agreed that in the absence of more accurate or recent data from another source, ABS figures would be used.

In reading the report, it will be apparent that although much of the data is quoted from 2011, more recent years are quoted where the data is regarded as relevant and reasonably accurate. The authors have used their best judgement in deciding which figures are most relevant, and hence some inconsistency in years reported can be found.

