



**Australian Government**  
**Department of Agriculture  
and Water Resources**

House of Representatives Standing Committee on Agriculture and Water  
Resources Inquiry into water use efficiency in Australian agriculture  
Submission by the Department of Agriculture and Water Resources

**Introduction**

1. On 9 February 2017, the House of Representatives Standing Committee on Agriculture and Water Resources established an inquiry into water use efficiency in Australian agriculture. The committee is to inquire into:
  - *the adequacy and efficacy of current programmes in achieving irrigation water use efficiencies;*
  - *how existing expenditure provides value for money for the Australian Government;*
  - *possible improvements to programmes, their administration and delivery; and*
  - *other matters, including but not limited to, maintaining or increasing agricultural production, consideration of environmental flows, and adoption of world's best practice.*
2. The Department of Agriculture and Water Resources (department) welcomes the opportunity to make this submission to the House Standing Committee on Agriculture and Water Resources.

**Water Use in Irrigated Agriculture**

3. The development of irrigation infrastructure in Australia can be traced back to the 1850s and had its beginning in the private development of weirs across rivers and diversion channels. Legislation in various state jurisdictions was introduced from 1886 and established the principles that streams were state property administered by state-controlled water agencies.
4. State governments assumed responsibility for the development of water supply infrastructure such as dams and large public supply schemes as well as water licences. This intervention sustained decades of rural economic development focused on growth and expansion.

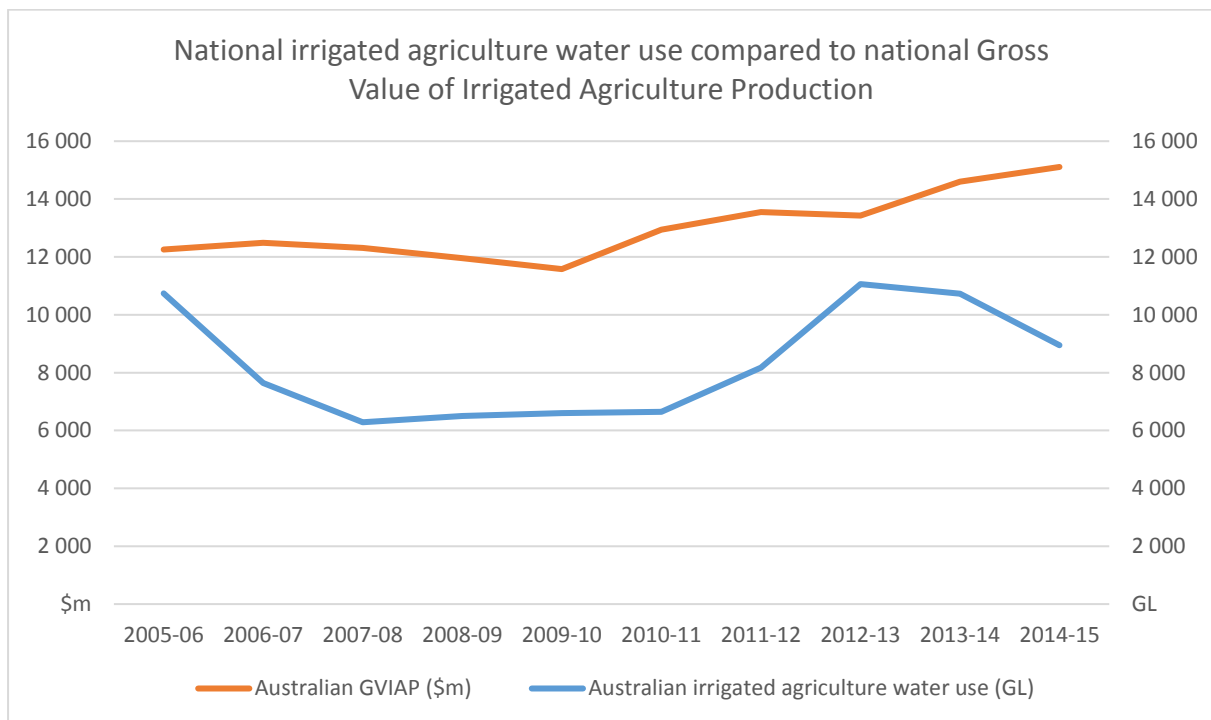
5. Rapid water resource development and growing demand for water began to take its toll on the environment and the focus of water resource management shifted in the 1980s to sustainability, with the Council of Australian Governments (COAG) Water Reforms Framework in 1994 and a permanent cap on water diversions established in the Murray-Darling Basin in 1997.
6. Concurrently, by the mid-1990s, rural water delivery infrastructure was in decline and suffering from a lack of investment in repairs, maintenance and upgrades. Irrigation infrastructure owners, be they governments or private operators, are responsible for appropriately investing in maintaining and upgrading their supply systems in order to support productivity growth. Some state governments began to divest themselves of ownership and management responsibilities for irrigation infrastructure through privatisation and corporatisation (Parker and Oczkowski 2003).
7. Rural water delivery in Australia was described as “inadequate, inefficient and unsuitable” and was characterised by excessive water losses (Engineers Australia 2005).
8. It was estimated that in 2008-09, water losses in the Murray-Darling Basin (Basin) amounted to 1,888 gigalitres (GL) or 34 per cent of water supplied by irrigation and rural water suppliers (ABS 2010). Noting the context of the ongoing Millennium drought and the relative inefficiency of supply channels during drought conditions, as well as the reality that some “losses” result in recharge.
9. Factors such as the state of rural water delivery infrastructure, prolonged drought conditions and environmental degradation, combined to create an overall climate that called out for significant national policy development involving all levels of government and substantial investment in modernising rural water systems. At the national level, policy reform was delivered through a number of policy frameworks including the National Water Initiative 2004 (NWI), the Howard Government’s 2007 National Plan for Water Security, the *Water Act 2007* (Cth), and the *Basin Plan 2012* (Cth).
10. The NWI, agreed by COAG in 2004, is Australia’s enduring blueprint for water reform. Through it, governments across Australia agreed on actions to achieve a more cohesive national approach to the way Australia manages, measures, plans for, prices and trades water. Under the NWI, governments have made a number of commitments, including to:
  - Prepare comprehensive water plans
  - Achieve sustainable water use in over-allocated or stressed water systems
  - Introduce registers of water rights and standards for water accounting
  - Expand trade in water rights
  - Improve pricing for water storage and delivery
  - Better manage urban water demands
11. The progress of governments in the implementation of the NWI was initially assessed on a biennial basis, with assessment conducted by the National Water Commission (NWC) in 2007, 2009, 2011 and 2014. Amendments to the *National Water Commission Act 2004* (Cth) in 2012 changed the assessment timeframes to a triennial basis. In 2015 the NWC was abolished by the *National Water Commission (Abolition) Act 2015* (Cth), with triennial NWI assessment functions transferring to the Productivity Commission under the *Water Act 2007*. The next triennial assessment of the NWI will occur in 2017.

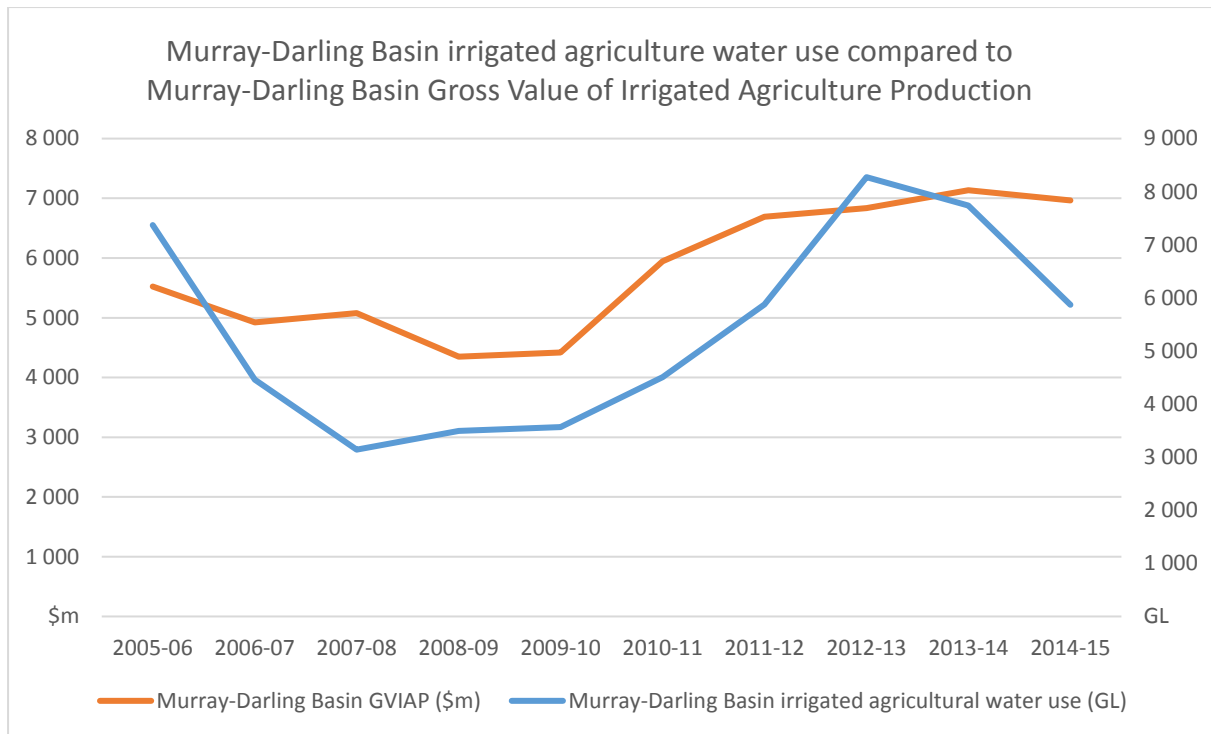
12. Australian Government policies and programmes to promote improved water use efficiency, which are underpinned by NWI principles, almost invariably lead to improvements in the productivity of water, with consequent improvements to local and regional economic performance. This can range from more reliable crop production in the face of variable water supply, improved management of water resources including through water metering; better land-use planning; better use of information for improving business efficiencies (such as use of medium-term weather forecasts); improved irrigation or industrial process scheduling to account for rainfall variability.

13. Recent key statistics about water use in irrigated agriculture include:

- In 2014-15, agricultural businesses were estimated to have used 9 million megalitres (ML) of water to irrigate 2.1 million hectares (ha) of crops and pasture, which represents a 17 per cent decrease in the volume of irrigation water used compared to 2013-14 (ABS 2016a). This in part reflects the lower availability of water due to lower inflows.
- In 2014-15, the total Gross Value of Irrigated Agricultural Production (GVIAP) rose by three per cent over the previous year to \$15.1 billion, with fruit and nuts (excluding grapes), dairy products and vegetables accounting for 56 per cent of total GVIAP in 2014-15 (ABS 2016b).
- In 2014-15, 66 per cent of Australia’s irrigation water use occurred in the Murray-Darling Basin, with agricultural businesses in the Basin using 5.9 million ML to irrigate 1.4 million ha of crops and pastures (ABS 2016a).

14. The two graphs below show GVIAP relative to irrigated agriculture water use at both the national level and within the Basin. There are a range of factors that influence GVIAP in addition to water use. Factors include climatic conditions, crop type, management practices, demand, commodity prices, farm inputs and exchange rates.





### Water use efficiency

15. There are a number of different ways in which water use efficiency can be defined including technical efficiency and economic efficiency.
16. Technical efficiency can arise from improvements in technology or the methodology employed by farmers or water delivery bodies, including for example moving from flood irrigation to spray or drip irrigation which results in maintaining or increasing production levels with less water.
17. Economic efficiency where higher value crops can be grown, multiple crops can be grown over a year or through the operation of water markets whereby supply and demand forces enable water to be traded and used to achieve higher value outputs.

### Adequacy and efficacy of current programmes in achieving irrigation water use efficiencies

18. Over the past decade the Australian Government, as well as state governments, has funded a range of activities aimed at increasing the efficiency of water use by irrigated agriculture including in the Murray-Darling Basin, Tasmania and Western Australia.
19. Australian Government investment follows three broad themes including:
  - Reducing existing over allocation of water systems through more efficient use of available water resources including through a range of Murray-Darling Basin programmes that recover water for the environment in ways that minimise socioeconomic impacts on Basin communities and industries
  - Capturing surplus water in systems to enable irrigation agriculture to expand through programmes such as the National Water Infrastructure Development Fund (NWIDF) and the Supporting More Efficient Irrigation in Tasmania programme

- Enhancing water security and resilience to meet the challenges associated with system and flow variability through programmes such as Strengthening Basin Communities. These challenges include climate variability and drought
20. The Australian Government is more than halfway through the rollout of more than \$15 billion of programmes to improve water use efficiency and management across Australia which is enhanced by the \$500 million NWIDF and the \$2 billion National Water Infrastructure Loans Facility (NWILF).
  21. Through its investments in water infrastructure including to improve water use efficiency throughout the Basin and across the nation, the Australian Government is working to boost economic development and productivity across rural and regional Australia (Refer to **Attachment A** for a full list of all Australian Government funded programmes).
  22. The department is committed to working with farmers, communities, industry and governments to enhance the sustainable, efficient and productive management and use of water resources and to help irrigators overcome the challenges of the 21<sup>st</sup> century including climate variability, drought and water scarcity.

#### Murray-Darling Basin

23. The department leads the Australian Government's contribution to the Basin Plan, under which the Australian and Basin jurisdictions are working towards providing responsible, long-term management of Murray-Darling Basin water resources for farmers, communities and the environment.
24. The Basin is Australia's most productive agricultural region, producing more than one third of Australia's food. Over three million people depend on the water resources of the Basin and as well as supporting people, the Basin is home to a wide range of industries particularly agriculture and some of the nation's most valuable environmental assets.
25. In the lead up to the new Millennium, over-extraction of the Basin's water resources was a fundamental issue and the Millennium drought, which occurred from the late 1990s to 2010, highlighted the difficulties Australia faced in securing its future water supplies.
26. In 2007, the Federal Parliament passed the *Water Act 2007* which established the requirement for the Murray-Darling Basin Authority (MDBA) to prepare the Basin Plan to restore the Basin's rivers and wetlands while supporting strong regional communities and sustainable food production.
27. The Basin Plan became law in 2012 and set new long-term average sustainable diversion limits (SDL) on the amount of water that can be extracted for consumptive use in the Basin. The SDLs are legally binding and commence from 1 July 2019. The MDBA has estimated that the Basin-wide long-term SDL for surface water is an average of 10,873GL per year. This represents a reduction in diversions of 2,750GL per year of surface water from the 2009 baseline diversion levels. This target is expected to be reduced as a result of the operation of the SDL adjustment mechanism (SDLAM) in 2017, as well as proposed amendments to the Basin Plan in 2017 due to the implementation of the recommendations of the Northern Basin Review. The groundwater recovery target is 40.4GL in the Upper Condamine Alluvium.
28. On 17 March 2017, the Murray-Darling Basin Ministerial Council reaffirmed its commitment to the Basin Plan and agreed to a plan to present to COAG that provides credible and balanced possible pathways to implement the Basin Plan, including:
  - Supply measures to offset the Basin Plan water recovery target of 2,750GL by 2019, using the SDLAM

- Constraints measures to address impediments to delivering environmental water
  - Efficiency measures to recover an additional 450GL by 2024, consistent with the Basin Plan legal requirements to achieve neutral or improved socio-economic outcomes
29. The Australian Government is providing more than \$13 billion to implement the Basin Plan and associated activities and has committed to 'bridge the gap' to achieve the required reduction in the SDLs through a combination of irrigation efficiency investments and water purchase.
30. The Australian Government has prioritised investment in productivity-enhancing water infrastructure rather than purchase of water entitlements, with more than \$8 billion being invested in infrastructure and water efficiency measures. This policy aims to minimise any adverse impact of water recovery as a result of the Basin Plan, as well as increasing the sustainability of irrigated agriculture across the Basin.
31. During the development of the Basin Plan, it was anticipated that funding of on and off farm infrastructure upgrades would recover around 600GL of water savings towards the 2750GL target. The success of the Australian Government's programmes, in conjunction with state recovery activities, estimates that almost 900GL of water savings will be achieved through infrastructure upgrades.
32. Key programmes in the Basin include the \$10 billion Sustainable Rural Water Use and Infrastructure Program (SRWUIP) and the South Australian River Murray Sustainability Program (SARMSP).
33. The objectives of the SRWUIP are to help secure a long term sustainable future for irrigated agriculture and communities, deliver substantial and lasting returns to the environment and improve the health of rivers, wetlands and freshwater ecosystems. This program funds over 50 distinct programmes and invests in rural water use, management and efficiency through on-farm and off-farm irrigation upgrades as well as projects that support rivers and wetlands and improved water knowledge and market reform.

#### Improved water knowledge

34. Improving water knowledge and the science that underpins it is fundamental to meeting the challenges facing contemporary water management in the irrigated agriculture sector. In an effort to better understand these issues, the Australian Government established programmes such as the Irrigation Hotspots Assessment Program and the Irrigation Modernisation Planning Assistance Program.
35. Funding for the \$2 million Irrigation Hotspots Assessment Program and over \$6 million for the Irrigation Modernisation Planning Assistance Program was provided through the SRWUIP. Together these programmes identified key areas of water loss and put in place modernisation plans for over 80 per cent of irrigation entitlements by volume, in the Basin. These plans have provided a road map for the long term viability of water delivery to irrigators and have been used as a basis for funding provided under other Australian Government water infrastructure programmes, such as the NSW Private Irrigators Infrastructure Operators Program (PIIOP).

## Off-Farm Programmes

36. Australian Government off-farm programmes delivered in the Basin aim to improve the efficiency and productivity of water use and management of private irrigation networks. These programmes deliver water savings by reducing the loss of water from irrigation networks and farms through seepage, evaporation and escapes and contribute to the Australian Government's water recovery task. It is important to note that in the absence of the Basin Plan, Australian Government investment in off-farm and on-farm programmes in the Basin would not be occurring at current levels meaning that water users would have to meet the cost of infrastructure upgrades independently.
37. Over 900 kilometres of irrigation network delivery channels across the Basin are being modernised through refurbishing, automation, reconfiguration and replacing existing open channels with pipelines. The benefits of these off-farm infrastructure upgrades will be felt by more than 10,000 individual irrigators and have significant impacts on their farm enterprise and lifestyle through improving water delivery reliability, timeframes and quality.
38. For example, the \$115 million Trangie Scheme project under PIIOP involved a range of works such as the installation of on-farm works for 20 farms, lining of channels with rubber and clay and installation of 229 kilometres of stock and domestic pipeline servicing 85 properties. As part of the project, 40 per cent of the scheme's water entitlements were transferred to the Australian Government. The key outcomes from modelling of the project include:
- An improvement in delivery efficiency to the farm gate from 65 per cent to 93 per cent
  - Increases in water delivery particularly in low allocation years and additional years of water delivery post project where no delivery was possible in similar conditions pre-project
  - Large farms with on-farm works are modelled to irrigate two additional cotton crops and produce an additional 46ha of cotton per year. Average pre-tax income was modelled to increase from \$132,000 to \$311,000 per year; cumulative equity over 14 years to increase from 35 per cent to 84 per cent; with return on assets managed to increase from 4.3 per cent to 6.4 per cent
  - Small farms with on-farm works are modelled to irrigate two additional cotton crops and produce an additional 10 ha of cotton per year. Average pre-tax income was modelled to increase from a loss of \$185,000 to revenue of \$82,000 per year; cumulative equity over 14 years to increase from 16 per cent to 72 per cent (off-farm income was required to support small farms prior to modernisation); with return on assets managed to increase from 3.6 per cent to 6.3 per cent
  - Overall, the farms in the Trangie scheme are modelled to have a collective pre-project loss of around \$61 million and post-project profit of around \$68 million across 14 years - a difference of \$129 million
39. The Australian Government has also invested \$103 million in the Sunraysia Modernisation Project (SMP) which is modernising irrigation infrastructure across the Mildura, Red Cliffs and Merbein irrigation districts in the Sunraysia region of northern Victoria.

40. The delivery of SMP is renewing the confidence of irrigators. For example, one of the irrigator families participating in the project has decided to bring dried off areas of their farm, taken offline during the Millennium Drought, back into production. This decision was based in part on increased system reliability and the installation of smart metering technologies that allow for more accurate water application measurement and monitoring. SMP will result in up to 490 ha being brought back into production, helping to achieve increased agricultural returns worth an estimated \$57.6 million over a 30 year period (GHD 2016).
41. Water delivered to irrigators in the Sunraysia region through open channels has been subject to many airborne contaminants resulting in the need for on-farm filtration practices as well as additional labour, operations and maintenance and inefficiencies in water and energy usage. The replacement of 8 kilometres of main open channels with low pressure pipeline under SMP is benefiting irrigators from reduced costs associated with improved water quality. Labour savings have been calculated at 31 hours per farm per irrigation season. Applying this saving at the project level results in annual labour savings of more than \$1.69 million per year (GHD 2016).
42. Through the modernisation of irrigation infrastructure under SMP, irrigators have access to water supply 365 days a year which is providing them with the opportunity to improve their crop returns and diversify into new crops and varieties. For example, a family that grows table grapes has been able to take advantage of the 365 day water supply and produce early season fruit varieties. Likewise, other irrigators have been able to establish high value permanent plantings such as almonds by utilising the 365 day water supply capability (GHD 2016).
43. As one of the department's main delivery partners, Murray Irrigation Limited has indicated that farmers involved in Australian Government funding programmes for upgrading off-farm and on-farm infrastructure report improved water flows and greater control over water that leads to improved crop outcomes. Murrumbidgee Irrigation also reported that its PIIOP Round One project created irrigation network improvements that have resulted in increased flow capacity and extended infrastructure life between 50 and 80 years.
44. The following are quotes from farmers who have benefitted from the off-farm programme:

*“The PIIOP project has already proven that it is of great benefit to our farming operation. Over three landholdings, we have reduced outlets from eight to three which has significantly cut our annual fees and irrigation time”*

*“This was a great opportunity to relook at how my entire landholding was serviced. I worked with Murray Irrigation to achieve an updated irrigation supply that I had been considering for a while. Thanks to the PIIOP project I can now gravity water the eastern part of my property which previously required pumping. I have gone from three outlets to one, have greater command and due to higher flows, a lot more options as to how I can irrigate. As a bonus, I have more than halved my outlet fees”*
45. Australian Government investment in on-farm and off-farm programmes under the Basin Plan is also having positive flow-on effects into local towns and communities. Increased farm opportunities and profitability is helping to secure the economic base of communities, allowing for more local jobs, businesses and services. For example, investment by Murrumbidgee Irrigation through PIIOP Round One resulted in increased business for local contractors and suppliers. This quantum of work for local businesses



can be expected to have a localised multiplier effect as they in turn spend a proportion of their increased revenue on other local goods and services.

46. Further, employment of contractors in the region to undertake the infrastructure upgrade works has also provided short-term economic flow on effects for the community and skill transfer opportunities.
47. Substantial Australian Government investments continue to occur across the Basin to improve irrigation water delivery systems. At almost \$1 billion, the Goulburn-Murray Water Connections Project Stage 2 is the largest Australian Government investment in irrigation infrastructure under SRWUIP. The project involves the modernisation of supply channels, replacement or removal of meter outlets, and establishing direct connections for customers currently connected to distribution and spur channels. It is estimated that this upgrade will increase system delivery efficiency from 70 per cent to 85 per cent. The water savings yielded by this project are making an important contribution to Victoria's commitments to bridge the gap.

#### On-Farm Programmes

48. There are over 2,000 projects across the Basin that are helping farmers modernise and improve their on-farm water use efficiency. The types of projects include laser levelling, reconfiguration of irrigation layouts, installation of new infrastructure such as recycling systems, piping, and drip or spray systems to improve in-field application systems. These programmes have made it possible to access significant volumes of water that would have otherwise been lost to seepage and evaporation.
49. Funding is provided to irrigators for on-farm works who in turn provide a portion of the water savings from the project to the Australian Government for environmental watering. On average, irrigators are retaining around 30 per cent of the water savings, providing them with an increase in the productive water available to manage their business operations.
50. For example, the redevelopment of surface irrigation system project in Deniliquin, under the On-Farm Irrigation Efficiency Program (OFIEP) in 2013 resulted in water savings of 210ML. The water savings were achieved through a range of upgrades including three kilometres of channel, nearly two kilometres of drain and the installation of a new water storage system. As part of the project, 120ML of the water savings were transferred to the Commonwealth Environmental Water Holder (CEWH), with the remaining 90ML retained on the farm. In addition, all of the project funds were spent with local suppliers, spreading the money through local communities.
51. Data from over 1,000 individual projects funded through OFIEP indicates that on-farm water use efficiency is expected to increase by an average of 18 per cent, based on the annual average volume of water used before project works were undertaken compared with the volume that would be required following infrastructure works.
52. Irrigators are evidencing increases to water use efficiency through a variety of outcomes including producing the same output with less water, through flexibility in the type of crop they are able to produce and/or through the quality of the produce grown. Infrastructure investments are also delivering tangible benefits at the farm gate beyond water use efficiency, such as increased ability for crop rotation, increasing crop diversification and improved soil management.
53. For example, funding provided to the Australian Processing Tomato Research Council (APTRC) under OFIEP, has resulted in the conversion of surface furrow irrigation to subsurface drip technology, reaping immediate benefits. On average, water use has improved from application rates of 8ML per ha to 5ML per ha. Benefits also extend to

yields from tomato crops which have increased almost two-fold to 100 tonnes per ha. These yields are due in part to the efficient placement of the required water and nutrients to the roots of the plants through the subsurface drip irrigation system which also benefit in lower fungal disease loads.

54. In addition, there is early evidence that infrastructure modernisation programmes are having positive socio-economic outcomes for farmers who participate. Lifestyle benefits and labour savings reported by irrigators include:

- remote system operation eliminating the need to get up at night to manually manage watering
- the ability to take advantage of night time off-peak electricity rates
- reduction in maintenance requirements
- increased labour efficiency

55. For example, funding provided under OFIEP has enabled an irrigator operating a vineyard in South Australia to upgrade components of his irrigation system. The existing irrigation system was inefficient, had considerable maintenance requirements and made it difficult for the irrigator to leave the vineyard. Upgrades to the irrigation system included a pre-programmable, radio-linked automated system to the farmer's house, resulting in less hours spent in the field, increased time available to manage other aspects of the business and a more sociable lifestyle. Turning water on and off in different areas of the property used to involve an hour-long round trip, however following the upgrades, this can be achieved within a matter of seconds (Water Matters 2017).

56. A survey of irrigators by the University of Canberra highlights the benefits that irrigators see in Australian Government-funded on-farm works. All respondents who received upgrades reported that it was useful for their farm enterprise, with a large majority of them saying it was very useful (just over 80 per cent) and the rest saying it was moderately useful. In addition, irrigators who had received on-farm water infrastructure grants reported better farm financial performance than those who had not received grants, and this effect was more pronounced once the time lag between receiving a grant and experiencing benefits from the investment is taken into account (Schirmer 2015).

57. As part of the reporting on project outcomes delivery partners such as Murray Irrigation and APTRC have highlighted the positive effects of the infrastructure investments to the broader community:

*"The flow-on effect of the on-farm funding continues past the farm gate. Suppliers, landformers, contractors, irrigation designers, parts manufacturers, and many more related businesses are supported through this funding. This then flows into the community and supporting businesses."*

*"As a result of this project sub-surface drip irrigation has now become more widely accepted through the region as an efficient form of irrigation for a range of crops, including processing tomatoes, maize and cotton."*

#### Strengthening Basin Communities

58. In June 2009 the Australian Government committed \$200 million to Local Municipalities in the Basin, through the Strengthening Basin Communities Programme, to assist them in community-wide planning for a future with less water and to invest in water saving

initiatives including cost effective water infrastructure that meets the needs of communities now and into the future. This programme was implemented through two separate components: a planning component and a water saving initiatives component.

59. The planning component provided grants for local governments in the Basin to assist in community-wide planning for a future with less water.
60. The water saving initiatives component provided competitive grants to enable local government authorities and urban water service providers to support projects that improve water security by reducing demand on potable water supplies.
61. For example, the Upper Lachlan Shire Council received \$4,375,000 for Crookwell Water Supply and Irrigation Improvements Programme which improved the water use efficiency within Crookwell by reducing water losses throughout the water supply system of the town. Project works included replacing existing potable water demands with “fit for purpose” water for the irrigation of town playing fields, installing water efficient irrigation systems on these town playing fields, providing a rebate program for installation of water efficient fittings and fixtures throughout the community and replacing the existing aged and inefficient town water treatment plant with an efficient, reliable and cost effective water treatment process. The project secured the community water supply achieving water savings in excess of 40ML per year, making available dam storage in the order of 50ML per year, and assisted in offsetting costs to allow Council to fund further water saving initiatives, in particular replacement of aged asbestos cement pipes which were known water leak areas.

#### Sustainable Diversion Limit Adjustment Mechanism

62. At the request of Basin water ministers in 2012, the SDLAM was included in the Basin Plan to allow for better social, economic and environmental outcomes that would have otherwise have been achieved by the Basin Plan.
63. The Australian Government has committed up to \$1.3 billion for supply measure projects under the SDLAM to enable more efficient use of environmental water to reduce water recovery from consumptive purposes while achieving equivalent environmental outcomes.
64. Supply measures may include environmental works (e.g. installation of infrastructure such as regulators and levee banks), changes in river operations (e.g. changes in the operating rules of dam releases) and evaporative savings (e.g. reconfiguring lakes or storage systems in ways that reduce evaporative losses).
65. More efficient use of available environmental water allows for higher SDLs, and, hence a reduction in the Basin Plan’s 2750GL environmental water recovery target, thereby reducing the social and economic impacts of water recovery.
66. Modelling of 19 of the 37 notified supply measure projects in November 2016 estimated the potential offset from these projects to be in the order of 400GL, however basin jurisdictions, who are responsible for developing supply measure projects, are continuing to work on their existing projects as well as investigate potential additional projects. It is anticipated that this work could result in an SDL offset beyond 500GL
67. To maximise the benefits of recovering water for the environment, the Australian Government has committed \$1.5 billion through the Water for the Environment Special Account to implement efficiency measures under the SDLAM up to 2024.
68. Efficiency measures provide an opportunity to achieve enhanced environmental outcomes through the recovery of 450GL of additional water for the environment in

ways that entail neutral or beneficial social and economic outcomes. Some examples of efficiency measures include replacing or upgrading less efficient methods of on-farm irrigation or lining channels to reduce water losses within an irrigation network.

69. Efficiency measures will initially be delivered through the Commonwealth Government On-Farm Further Irrigation Efficiency Programme (COFFIE). This programme will provide additional opportunities for irrigators in the Basin to seek funding for a range of irrigation infrastructure upgrades and other on-farm efficiency activities. Irrigators will transfer the water savings they are confident of achieving from the project to the Australian Government.
70. The first phase of COFFIE's development involves the delivery of pilots to test the programme design with up to \$35 million available for projects. A \$15 million pilot has commenced in South Australia. COFFIE will then be rolled out across the Basin to give as many irrigators as possible access to funding following completion of existing gap-bridging water recovery programmes.
71. In addition to the pilot schemes, an independent study has been commissioned by the Murray-Darling Basin Ministerial Council to report on potential strategies to ensure efficiency measures can be delivered with neutral or beneficial social and economic outcomes.

#### Northern Basin Review

72. The Basin Plan currently sets the water recovery target for the northern Basin at 390GL. In developing the Basin Plan in 2012 it was recognised that knowledge of the northern Basin's environmental water requirements was less advanced than the southern Basin, so the MDBA committed to undertaking further research into the SDLs for the northern Basin.
73. The Northern Basin Review delivers on that commitment and is comprised of three key components: environmental science, water recovery modelling and social and economic assessments. As a result of the review, the MDBA has recommended potential amendments to the Basin Plan, including that the water recovery target in the northern Basin be reduced from 390GL to 320GL with changes to the local and shared recovery targets across the Northern Basin. The proposed reduction is dependent on commitments from the Australian, Queensland and New South Wales governments to implement the toolkit measures, which are aimed at improving water management in the Northern Basin.
74. The MDBA has sought submissions from stakeholders on the potential amendments to the Basin Plan. The submission deadline has closed and the MDBA is currently considering the feedback that has been received as they finalise their recommendations. The MDBA will make a recommendation on the SDL for the Northern Basin and potential amendments to the Basin Plan are expected later in 2017.
75. A Northern Basin Taskforce has been established in the department to investigate how best to achieve the remaining water recovery in the northern Basin in ways that minimise the impacts on regional communities. The Northern Basin Taskforce is working with northern Basin state governments, industry and community stakeholders to provide advice on how to bridge the gap in ways that deliver socio-economic benefits to communities, such as better irrigation infrastructure.

## Water Programmes across Australia

76. Over the period 1999 to 2016, the Australian Government has contributed more than \$115 million to the Great Artesian Basin Sustainability Initiative (GABSI). A further \$10.7 million is committed to the final year of the fourth phase of GABSI which was announced by the Australian Government on 16 October 2014. Funding for GABSI has been used to improve the long-term sustainability of the Basin by capping and piping uncontrolled artesian bores, reducing system water loss and recovering groundwater pressure.
77. The Australian Government provided \$18.145 million towards the upgrade and augmentation of the Chaffey Dam. Under the project, Chaffey Dam's capacity of 62,000ML has been increased to 100,000ML and has ensured long-term water supply for Peel Valley irrigators and the majority of Tamworth's population.
78. Nationally, a range of key water information reports have been developed including the Western Australia and Tasmania CSIRO Sustainable Yields reports.
79. The Tasmanian study led to increased water knowledge and informed the development of nine new irrigation schemes, for which the Australian Government has contributed \$140 million in funding under the Supporting More Efficient Irrigation in Tasmania programme. The programme was completed in May 2016 and involved the construction of nine irrigation schemes and associated water storages which have provided an additional 71.638GL of irrigation water, at a projected 95 per cent reliability. The irrigation schemes include nine dams, 17 pumping stations and 452 kilometres of pipelines.
80. Australian Government funding is helping to expand agricultural production in Tasmania. The supply of highly reliable irrigation water through the programme is driving the generation of increased revenue for farmers as they move into higher value irrigation enterprises, such dairy, or intensify their existing irrigation enterprises. Farmers are now able to offer new, more skilled and ongoing employment. A total of 793 additional jobs are projected to be created as a result of the implementation of the nine schemes. Increased production also means increased demand for rural supplies and equipment, trades and technical expertise and services in all areas of farm management.
81. The Australian Government committed a further \$60 million under Tranche II of the programme which will help deliver 13,700ML of new water to agriculture throughout Tasmania. The additional investment is expected to generate a further 129 full-time jobs and unlock opportunities in the dairy, wine and fruit and vegetable industries.
82. The Australian Government invested \$6.6 million in the Gascoyne Irrigation Pipeline Project (GIPP). The funding was provided to address over allocation identified in the Western Australian CSIRO Sustainable Yields Report. The project involved the construction of a high-pressure irrigation water delivery system throughout the Carnarvon Irrigation Area, replacing existing buried asbestos cement pipes with high density polyethylene pipe. This was complemented with the installation of water meters and telemetry controls and the implementation of an on-line water accounting, consumption and reporting system.
83. The GIPP was completed in 2012 and resulted in the installation of 31 kilometres of high density polyethylene pipe that guaranteed water security for the Carnarvon horticultural district of 1200ha and 200 growers for the next 50 years. The GIPP has enabled water resources to be used more efficiently, more effectively distributed and

benefited the environment by reducing stress on water resources (Carnarvon Ministerial Advisory Committee 2015).

#### National Water Infrastructure Development Fund

84. The Australian Government has committed \$2.5 billion to build the water infrastructure of the future through the establishment of the NWIDF and the NWILF.
85. The NWIDF will provide funding over ten years to 2024-25 and is comprised of a feasibility component and a capital component.
86. The feasibility component of the fund will support the detailed planning necessary to inform investment decisions by governments on new or augmented water infrastructure such as dams, pipelines, weirs and managed aquifer recharge. The Australian Government has committed \$59.5 million to 39 feasibility studies, including approximately \$40.4 million for northern Australia in recognition of its unique circumstances, especially the lack of detailed information at a catchment level to inform new investments.
87. The \$440 million capital component is available to all state and territory governments to accelerate and co-fund the construction of economically viable water infrastructure that will provide water to underpin the growth of regional economies and communities. To be eligible to receive funding, projects must be compliant with NWI principles.
88. The NWILF is a \$2 billion loan facility that will provide state and territory governments with access to concessional loans to co-fund the construction of economically viable water infrastructure.

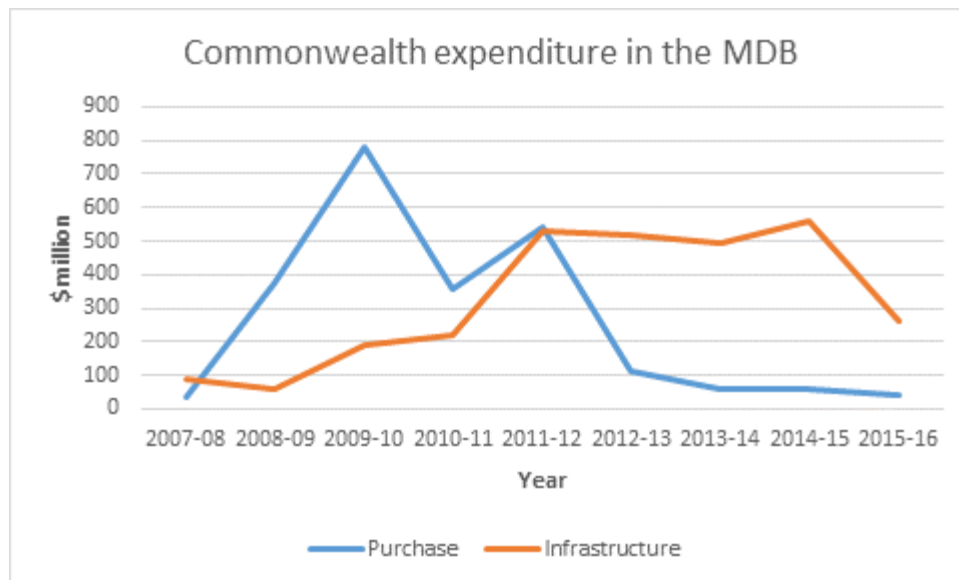
#### National Water Markets

89. Australian governments have worked together to improve water management since 1994. The approach taken by governments is set out in the NWI, the implementation of which helped facilitate the development of Australia's water markets which are internationally recognised as part of Australia's water reform success story.
90. Water markets have allowed for an efficient allocation of water rights amongst users as well as setting a price for water rights. This has in turn helped the development of water saving technologies by creating incentives for water to move to higher value use. This encourages more efficient water use and has a role in decision-making for irrigated crop production.
91. A range of water products tailored to the operational needs of users have emerged in Australia's water markets including multiple-year leasing, forward purchasing, and carryover arrangements. The flexibility made possible by markets helps irrigators adjust to seasonal variations in water availability, respond to new opportunities and continue to drive water to its highest value use. As a tradable commodity, farmers are able to make informed business decisions such as whether to use water to grow crops or sell their water on the market as an alternative income stream.
92. The markets have also facilitated the reallocation of water during drought periods. This was particularly valuable throughout the Millennium drought where agricultural productivity in the Basin only fell by 29 per cent with a drop in water availability of 53 per cent. Water markets have also been shown to benefit the national economy. For example, in 2012-13, the value of trade in Australian water markets was estimated to be \$1.4 billion (NWC cited in Commonwealth of Australia 2015).

## How existing expenditure provides value for the money for the Australian Government

### Water Programmes

93. The Australian Government's investment in water efficiency programmes has made it possible to access significant volumes of water that would otherwise have been lost to productive purposes through seepage and evaporation. In the Basin, these water savings are shared between the environment and farmers in ways that allow water to be recovered for the environment without lowering the productive capacity of participating farmers and irrigation districts.
94. The Australian Government is implementing the Basin Plan in a balanced way that ensures the continued viability of Australia's food and fibre producing communities. The Australian Government's approach to water recovery has been to prioritise investment in productivity-enhancing water infrastructure to promote water use efficiency as a means to return water to the environment and cap surface water purchases at 1,500GL, as legislated in the *Water Act 2007*. The graph below illustrates how Australian Government expenditure in the basin has shifted from water entitlement purchasing to greater investments in infrastructure projects.



95. The department's water recovery programmes are delivered in a manner that minimises any adverse socio-economic impacts associated with the Basin Plan and are aimed at assisting irrigators and irrigation communities to make more efficient use of the Basin's water resources. Australian Government investments in the Basin go beyond water recovery; they are strategic investments in the future of irrigation in the Basin.
96. Australian Government investment in infrastructure reflects a broad range of factors in determining value for money, such as the contribution these projects make to the long-term productivity of irrigated agriculture and strengthening regional communities. The commitment to prioritise water recovery through infrastructure brings with it the need to achieve good water recovery from these investments and ensuring value for money.
97. The Australian Government is working with Basin jurisdictions and key stakeholders to consider ways to maximise water savings that are made through existing and proposed

infrastructure projects. A larger water return from current and future infrastructure investments will reduce the scale of further potential water purchase, meaning that more water is retained for consumptive use by Basin irrigators and communities.

98. Competitive grants programmes are delivered through local delivery partners such as industry bodies and Catchment Management Authorities. Local delivery partners have established relationships with irrigators and are readily accessible to respond to local industry concerns and/or interest in projects.
99. Under the Australian Government's Water Recovery Strategy, the department only considers projects that assist in meeting Basin Plan targets and provide strong value for money when making decisions on how best to allocate remaining water recovery funds. The Australian Government has an appropriate level of regard to value for money, while maintaining its commitment to implement the Basin Plan in a manner that does not undermine the productive capacity of Basin communities and industries.

#### Benefits to the environment

100. Through its programmes and the implementation of the SDLs, the Australian Government is committed to restoring the Basin's rivers and wetlands to health. The Australian Government recognises the important role that a healthy, working river system plays in supporting strong regional communities and sustainable food production.
101. As at 28 February 2017, 2,038.5 GL of surface water had been recovered or was contracted to be recovered towards reaching the surface water SDLs under the Basin Plan. Of the 2,038.5 GL of water recovery to date, the volume of water entitlements in long term annual average yield actually held for environmental use is 1826.3GL, of which the CEWH currently holds 1,664.4GL and the States hold a further 161.9GL.
102. Water recovery to 28 February 2017 for Queensland groundwater is 2.7GL, requiring a further 37.7GL of water recovery to reach the 40.4GL target in the Upper Condamine Alluvium.
103. The CEWH is responsible for the management of environmental water acquired through Australian Government water programmes such as SRWUIP. As at 31 January 2017, over 6,289GL of Commonwealth environmental water has been delivered to rivers, wetlands and floodplains of the Murray-Darling Basin over the period 2008-09 to 2016-17. In addition to benefits to the environment, Commonwealth environmental water can help dilute flows water which aids salinity management to the benefits of a broad range of users including irrigators and industry.
104. Salinity has been recognised as one of the most significant environmental challenges facing the Basin since the mid-1980s. Salinity can impact upon water quality, land productivity and the longevity of infrastructure. An audit carried out in 1999 determined that without substantial intervention, contemporary management practices could cause three to five million ha of land to become salinised in the following 100 years, with the subsequent salt damage to agricultural productivity, roads and buildings in the Basin estimated to increase to \$1 billion a year over 100 years (Murray-Darling Basin Ministerial Council 1999; Murray-Darling Basin Ministerial Council 2015).
105. Commonwealth environmental water delivered through the Basin flushes salts out of the Murray Mouth and provides significant benefits alongside the suite of tools that the Australian Government is using to manage salinity. The Commonwealth Environmental Water Office (CEWO) has estimated that in 2015-16, 117,861 tonnes and 258,485 tonnes has been exported from the River Murray and the Lower Lakes in South Australia respectively as a direct result of environmental water delivery. Results from



the CEWO's Long Term Intervention Monitoring Program also indicate that environmental water has resulted in improved water quality within the River Murray by:

- Increasing the dilution of salt within river flows, reducing the likelihood of Basin Plan salinity targets (river channel) being exceeded
- Reducing the import of salt into the Coorong lagoons and Murray Mouth
- Improving water quality for consumptive/irrigation use, for example increased flushing of Lake Victoria and Lower Lakes, and increased flows through irrigation areas such as Lindsay River, Torrumbarry and Wakool River

#### Design and delivery of water programmes

106. Value for money is a core principle that underpins Australian Government investment in water programmes. Funding under these programmes is provided in accordance with the *Public Governance, Performance and Accountability Act 2013* that requires public monies to be used in an effective, efficient, economical and ethical manner.
107. Funding is provided through a range of delivery models, including through States as part of the Intergovernmental Agreement on Murray Darling Basin Reform 2008 and the Intergovernmental Agreement on Implementing Water Reform in the Murray Darling Basin 2013.
108. Funding to State governments is provided in accordance with Federal Financial Relations arrangements which aim to support the delivery of specified outputs or projects. This is achieved through the requirement for States to meet pre-determined projects milestones or performance benchmarks before an associated payment is provided by the Australian Government.
109. While a significant proportion of funding for programmes is delivered through States, the Australian Government also runs its own programmes which are delivered through a wide range of project partners including irrigation infrastructure operators, irrigation industry associations, industry commodity bodies, individual irrigators, catchment management (resource management) authorities and local governments.
110. Applications submitted by State governments or proponents under Australian Government water programmes are assessed in accordance with programme guidelines that align Australian Government objectives and anticipated programme outcomes. Applications are subject to robust due diligence processes that may include technical input from other Australian Government agencies, such as modelling advice from the MDBA, and private consultants.
111. At the project level, the department oversees the delivery of projects through established project management processes. Proponents that receive Australian Government funding must meet reporting requirements outlined in project agreements, including in many instances, reporting on potential ways to improve the delivery of the project. These lessons are captured by the department and are used to inform the design and delivery of subsequent programmes.

## **Possible improvements to programmes, their administration and delivery**

112. The department recognises the importance of continuous improvement and monitors programme delivery to identify and implement improvements to the design, methodology and administration of its programmes. To this end, the department welcomes any potential suggestions for enhanced performance that may be made by the Committee as a result of this inquiry.
113. The department is responsible for providing information on water entitlement purchases and investment in water-related infrastructure, while the MDBA reports on the impacts of Basin Plan implementation on social and economic conditions. In addition, the MDBA is also responsible for reporting annually on the effectiveness of the Basin Plan.
114. A framework for evaluating the impact of the Basin Plan on regional communities and industries has been developed by the MDBA. Reporting on the social and economic outcomes of the Basin Plan occurs every five years with responsibility shared between the MDBA and the department.
115. The department has Monitoring, Evaluation, Review and Improvement frameworks in place for all its programs including those that support the Basin Plan. The monitoring and evaluation in place for SRWUIP supports the objectives of the program and includes monthly reporting on water entitlements, collection of program information and statistics and case studies. It also includes opportunities to apply lessons learnt in previous grant rounds or programs.
116. COFFIE is aimed at assisting irrigators in the Basin to modernise their on-farm irrigation infrastructure while returning water savings to the environment. COFFIE builds on the department's experience in administering previous on-farm irrigation efficiency programmes such as the OFIEP and SARMSP.
117. As part of the design of COFFIE, the department has sought feedback from industry and participants in earlier programmes. Specific feedback was sought on the elements of previous programmes that had worked well, as well as those elements that could be improved in managing and undertaking projects. This feedback has been tested with Australian and State government officers and incorporated into the design of COFFIE.
118. The department released the draft design of COFFIE for public consultation and received 12 submissions and held 30 meetings with a range of stakeholders. Stakeholders at a number of these meetings noted that their previous feedback had been incorporated into the design of COFFIE and considered it to be an improvement on previous programmes. The department has subsequently initiated a pilot programme in South Australia, with initial feedback from participants indicating that the programme design is far more appealing and user friendly. This feedback is reflected in the increasing number of enquiries and projects in development with the delivery partner involved in the pilot.

### **National Water Use in Agriculture Research, Development and Extension Strategy 2015**

119. Through the then Primary Industries Ministerial Council, the Australian, State and Northern Territory governments, rural research and development corporations, CSIRO and universities are jointly developing the National Primary Industries Research, Development and Extension Framework to encourage greater collaboration and promote continuous improvement in the investment of research, development and extension resources nationally.
120. The National Research, Development and Extension Framework spans 14 primary industry sectors research strategies including beef, cotton and dairy and seven cross-

industry sector strategies including climate change and variability and water use in agriculture (National Water Use in Agriculture 2015).

121. The National Water Use in Agriculture Research, Development and Extension Strategy aims to more effectively deliver research, development and extension outcomes for irrigated and rain fed agricultural industries seeking to maximise water productivity, adapt to decreasing water availability, and increase the capability of water managers and users to help transform the way that water is used in agriculture (National Water Use in Agriculture 2015).
122. The National Water Use in Agriculture Research, Development and Extension Strategy has five priority objectives:
  - Modernise irrigation systems and practices by developing flexible irrigation strategies that are designed around soil, crop, irrigation supply (quantity and quality) and management constraints
  - Increase the productivity of water in rain-fed agriculture by better adapting to seasonal variability in rainfall and maximising its use, including to irrigated systems
  - Facilitate getting knowledge into practice and building human capacity by designing and implementing programmes that reduce the cost and increase the rate of adoption of new technologies by farmers
  - Improve the capacity to inform planning and policy related to agricultural water use
  - Manage water use in agriculture to minimise adverse impacts
123. The National Water Use in Agriculture Research, Development and Extension Strategy led to the development of the Smarter Irrigation for Profit project which was funded under the department's Rural R&D for Profit Programme (National Water Use in Agriculture 2015).
124. The Smarter Irrigation for Profit project aims to improve the profit of 3,000 individual irrigators across the cotton, dairy, rice and sugar industries by \$20,000-40,000 per year with the support of 16 R&D partners and up to 19 farmer-managed learning sites. The project consists of three components:
  - Practical, reliable irrigations scheduling technologies
  - Precise, low cost automated control systems for a range of irrigation systems
  - A network of farmer managed learning sites located in major regions
125. The expected outcomes of the project include:
  - A 10-20 per cent increase in water productivity, efficiency and farmer profitability
  - Adoption of new irrigation technologies and science application by farmers and irrigation professionals to improve farm profits
  - Improved cross-sector industry research collaboration with public and private sectors in four major irrigation industries providing a legacy platform for other sectors to also benefit

**Other matters, including but not limited to, maintaining or increasing agriculture production, consideration of environmental flows, and adoption of world's best practice**

Consideration of environmental flows

126. The department notes the recent announcement that the House of Representatives Standing Committee on Environment and Energy will be conducting an inquiry into the management of Australian Government environmental water resources.

Increased agricultural production

127. As noted earlier, the Australian Government is making significant investments through Tranche I and Tranche II of the Supporting More Efficient Irrigation in Tasmania programme and the NWIDF to help secure, and use Australia's water resource more efficiently to help boost agricultural production.
128. Under the Supporting More Efficient Irrigation in Tasmania programme, nine irrigation schemes were developed across the state that have the combined capacity to supply up to an additional 71,638ML of water each irrigation season to 127,282ha of land (Department of Primary Industries, Parks, Water and Environment 2016).
129. Investment through this programme has produced a range of benefits for Tasmanian farmers that centre on the creation of a highly reliable supply of irrigation water. This has given farmers and their lenders the confidence to invest up to \$345 million for the purchase of water entitlements and modern irrigation infrastructure (Department of Primary Industries, Parks, Water and Environment 2016).
130. The irrigation schemes have given farmers the opportunity to increase production through transitioning from dryland to irrigated farming as well by increasing the extent and intensity of existing irrigated enterprises. With this comes increased workforce opportunities including new, ongoing employment to meet the demands created through increased production, increased demand for skilled contractors such as technicians to install and service irrigation equipment and increased demand for rural supplies, equipment and technical expertise in different aspects of farm management (Department of Primary Industries, Parks, Water and Environment 2016).
131. For example, a farmer in the Midlands Water Scheme has been able to convert 330ha of land to dairy production as well as put a further 250ha of land under irrigation. To support these changes, the farming enterprise has purchased new 64-head centre-pivot irrigators, a pump station, stock water systems, calf sheds and a dairy manager's house. In addition, these changes have resulted in the enterprise tripling its staff numbers (Department of Primary Industries, Parks, Water and Environment 2016).
132. The Australian Government has committed a further \$60 million under the Tranche II of the programme to help fund the construction of five sustainable irrigation infrastructure scheme including the Southern Highlands, Swan Valley, North Esk, Scottsdale and Duck irrigation schemes.
133. The schemes delivered under Tranche II are seeking to provide water at 95 per cent reliability to irrigators and will benefit businesses within the regions. Supporting these schemes will enable the efficient use of water resources for economic development in the Tasmania, growing the state economy and creating jobs.
134. The potential created by these schemes has been recognised by private investors who have invested more than \$27 million through the purchase of water rights by irrigators as well as on-farm upgrades investments.

135. For example, the Southern Highlands Scheme involves the construction of the 7,600ML Southernfield Dam, 1 megawatt Shannon River pump station and 1.25 kilometre rising main to the dam, 58 kilometres of distribution pipeline and two booster pump stations. The scheme is located in one of Tasmania's driest farming regions and will provide 7,125ML of highly reliable water supply to approximately 8000ha of irrigable land. The Southern Highlands Scheme services an area that is suitable for growing poppies, seed crops and speciality niche crops. In addition, large-scale dairy conversions and cherry orchards and vineyards are likely to be established in the area (Tasmanian Irrigation 2015).
136. The Australian Government has also provided \$9.06 million for the Dial Blythe Scheme under the Economic Growth Plan for Tasmania. The Dial Blythe Scheme consists of two pump stations and approximately 42 kilometres of pipeline. The scheme is configured to supply water to 52 farms on the North West Coast over a 120 day irrigation season (Tasmanian Irrigation 2015).
137. As noted earlier, a vineyard irrigator in South Australia received funding under OFIEP to upgrade components of his irrigation system. In addition to the lifestyle and efficiency benefits discussed above, the upgrades also enabled the irrigator to expand and diversify his operations. This included an increase in yield from between 8 and 10 tonnes per acre to between 10 and 12 tonnes per acre over two seasons. Reduced maintenance following the upgrades also enabled the irrigator to diversify into avocados. (Water Matters 2017)

#### International engagement

138. The department engages internationally on a range of water issues through developing and managing bilateral relationships with key partners such as China, India, USA and Indonesia, contributing to the implementation and fulfilment of multilateral and regional agreements and arrangements and participating in high profile international forums through the Organisation for Economic Cooperation and Development (OECD), World Water Forums, the Food and Agriculture Organisation and the United Nations High Level Panel on Water.
139. In 2016, a High Level Panel on Water was convened by the United Nations consisting of 11 sitting Heads of State and Governments, including the Prime Minister of Australia, the Hon. Malcolm Turnbull MP. Australia's role in the High Level Panel extends to taking the lead on the Water Efficiency Initiative.
140. Participation in the High Level Panel enables Australia to share its world leading approaches and technology in sustainable water management practices with other countries facing their own unique challenges in managing their water resources.
141. Australia and other OECD members are working towards the goal of sustainable management of water resources. According to the OECD, an effective governance system is ultimately one that helps manage "too much" "too little" and "too dirty" water in a sustainable, integrated and inclusive way, at an acceptable cost, and in a reasonable timeframe. The OECD Principles on Water Governance are based on three mutually reinforcing and complementary dimensions of water governance:
- Effectiveness relates to the contribution of governance to define clear sustainable water policy goals and targets at all levels of government, to implement those policy goals, and to meet expected targets
  - Efficiency relates to the contribution of governance to maximise the benefits of sustainable water management and welfare at the least cost to society

- Trust and Engagement relates to the contribution of governance to building public confidence and ensuring inclusiveness of stakeholders through democratic legitimacy and fairness for society at large

## **Conclusion**

142. The department is grateful for the opportunity to make a submission and looks forward to working with the committee during the course of this inquiry.

## Reference List

- ABS 2010, [Water Account Australia 2008-09](#), cat. no. 4610.0., Australian Bureau of Statistics, Canberra
- ABS 2016a, [Water Use on Australian Farms, 2014-15](#), cat. no. 4618.0, Australian Bureau of Statistics, Canberra, accessed 8 March 2017
- ABS 2016b, [Gross Value of Irrigated Agricultural Production, 2014-15](#), cat. no. 4610.0.55.008, Australian Bureau of Statistics, Canberra, accessed 8 March 2017
- Carnarvon Ministerial Advisory Committee 2015, [Policy Settings \(pre March 2015\) for the Carnarvon Horticultural Precinct](#), accessed 17 March 2017
- Department of Primary Industries, Parks, Water and Environment 2016, *Supporting More Efficient Irrigation in Tasmania Final Program Report*.
- Engineers Australia 2005, *Infrastructure Report Card*. Canberra: Engineers Australia
- GHD 2016, *Lower Murray Water Sunraysia Modernisation Project Stage 1 (SMP1) Interim Benefits Report*
- Murray-Darling Basin Ministerial Council 1999, [The Salinity Audit of the Murray-Darling Basin](#), accessed 17 March 2017
- Murray-Darling Basin Ministerial Council 2015, [Basin Salinity Management 2030 BSM2030](#), accessed 17 March 2017
- National Water Use in Agriculture 2015, [National Water Use in Agriculture Research, Development and Extension Strategy 2015](#), accessed 15 March 2017
- Parker, K. and Oczkowski, E. 2003, Water Reform and Co-operation. *Journal of Economic and Social Policy*. Vol. 8:1, Article 3. Available at: <http://epubs.scu.edu.au/jesp/vol8/iss1/3>
- Schirmer, J. 2015, *Socio-economic outcomes of investment in on-farm and off-farm water infrastructure improvement: Regional Wellbeing Survey analysis*. Report prepared for the Department of the Environment, Canberra
- Tasmania Irrigation 2015, [2015 Annual Report](#), accessed 20 March 2017
- Water Matters 2017, *Diversity stems from irrigation efficiency gains*, [Issue 41](#), accessed 22 March 2017

### Australian Government Investment in Water Reform Projects<sup>1</sup>

#### 1. Sustainable Rural Water Use and Infrastructure Program (SRWUIP) – Infrastructure Component

Project Title	Short Project Description	Location	Type of Works	Australian Government Commitment / Expenditure <sup>2</sup> (\$m) <sup>3</sup>	Approx no. of projects/ activities	Status	Start	Finish
<b>Murray-Darling Basin gap bridging water infrastructure projects</b>								
Victoria State Priority Project - Goulburn Murray Connections Stage 2 project	The Goulburn-Murray Water Connections Project Stage 2 is a major modernisation of irrigation infrastructure across the Goulburn-Murray Irrigation District in Northern Victoria. It involves the modernisation of supply channels, replacement or removal of meter outlets, and establishing direct connections for customers currently connected to distribution and spur channels. The project has also funded a suite of water savings and environmental projects.	Northern Victoria	Upgrade channels. Replace/remove meter outlets. Direct connections.	956	1 project 5,000+ irrigators	Underway	Early Works 2009 Main from 2011	2020
New South Wales State Priority Project - Private Irrigation Infrastructure Operators Program in NSW	A Commonwealth-led grants program which aims to improve the efficiency and productivity of water use and management, both off and on-farm to help secure a sustainable future for irrigation communities.	Griffith, Deniliquin, Coleambally, Hay, Goodnight, Dubbo, Warren	Modernise channels and irrigation delivery infrastructure. Convert open channel to pipe. Upgrade pumps and on-farm infrastructure.	879	14 projects 514 individual irrigator sub projects (on farm and rationalisation)	Round 1 complete Rounds 2-3 underway	2010	2019
On Farm Irrigation Efficiency Program (including pilot projects)	The On Farm Irrigation Efficiency Program (including pilot projects) is a Commonwealth-led program delivered through local Delivery Partners such as industry bodies and Catchment Management Authorities. The program is assisting irrigators to modernise their on-farm irrigation infrastructure while returning water savings to the environment.	Southern connected MDB	Conversion of flood to drip/spray, Laser grading, System automation.	559	Over 1,500	Rounds 1-2 Complete Rounds 3-5 underway	2009	2019

<sup>1</sup> This table lists all major programs funded by the Australian Government since 2002. Actual expenditure for completed programmes may differ from initial commitment announcements due to projects terminating or other changes to programmes scopes. The table is current as at 28 February 2017.

<sup>2</sup> Funding amount listed is the maximum Australian Government commitment unless the program or project is completed, in which case the amount shown is actual expenditure.

<sup>3</sup> Funding amounts and are rounded to whole numbers.



Project Title	Short Project Description	Location	Type of Works	Australian Government Commitment / Expenditure <sup>2</sup> (\$m) <sup>3</sup>	Approx no. of projects/ activities	Status	Start	Finish
New South Wales State Priority Project – Nimmie-Caira Enhanced Environmental Water Delivery project	The Australian Government provided funding to NSW to purchase the land and water entitlements from 11 property owners in the Nimmie-Caira area. The NSW government will undertake extensive infrastructure works and develop long term land management arrangements in the area.	Barranald Hay Wakool	Reconfiguration. Construct stock and domestic pipeline.	180	1	Underway	2013	2019
Queensland State Priority Project – On Farm Water Use Efficiency	The project supports on farm irrigation modernisation, with a share of water savings coming to the Commonwealth for environmental use. The Qld Department of Natural Resources and Mines is the State agency responsible for implementing the project.	Condamine- Balonne Border Rivers St George Goondiwindi	Convert flood to drip/spray. Laser grading. System automation. Dam deepening	155	85	Underway through multiple funding rounds	2009	2020
New South Wales State Priority Project – Basin Pipes project	The project involves upgrading stock and domestic schemes to improve efficiency of water use.	NSW MDB	Stock and domestic infrastructure.	137	38	Underway	2011	2019
Victoria State Priority Project – Sunraysia Modernisation project and feasibility study	The project involved an integrated body of works to modernise irrigation infrastructure across the Mildura, Red Cliffs and Merbein irrigation districts in the Sunraysia region of northern Victoria. The project involved renewing or replacing open channels with low pressure pipelines, upgrading pumping stations and meters, automating channels and decommissioning redundant channels.	Goulburn- Murray Irrigation District (GMID) (Mildura)	Pump station upgrades. Convert channel to pipe. Meter upgrades. Channel automation.	103	1	Construction complete Feasibility study underway	2013	2017
Victorian Farm Modernisation project	The Commonwealth is providing up to \$100 million through the project to support on-farm irrigation infrastructure upgrades across the Goulburn-Murray Irrigation District in Northern Victoria. The project is delivered by Goulburn-Broken Catchment Management Authority.	GMID: Shepparton Echuca Swan Hill	Flood irrigation. Laser levelling. Convert flood to drip/spray. System automation. Channel remediation.	100	300	Underway	2013	2019
New South Wales State Priority Project – Sustaining the Basin: Irrigated Farm Modernisation project	The project provides investment in on-farm works and measures that lead to improved water use efficiency, assisting irrigation farmers to do more with less water.	NSW MDB	Convert flood to drip/spray. Laser grading. System automation.	120	70	Underway	Pilot 2009 Main 2012	2019

Project Title	Short Project Description	Location	Type of Works	Australian Government Commitment / Expenditure <sup>2</sup> (\$m) <sup>3</sup>	Approx no. of projects/ activities	Status	Start	Finish
New South Wales State Priority Project – NSW Metering project (including pilot)	The project involves installing or upgrading meters in NSW groundwater, unregulated and regulated water sources and replaces existing customer-owned meters with State Water-owned meters connected via telemetry.	NSW MDB	Install/upgrade meters connected via telemetry.	55	2 (pilot and main) 1428 meters	Completed	2010	2017
Small Block Irrigator Exit Grants <sup>4</sup>	The program provided funding to small block irrigators in the Murray-Darling Basin affected by drought the opportunity to exit the industry whilst remaining in their own homes and communities.	MDB-wide	Removal of plantings and production- related infrastructure. Retraining.	49	297	Completed	2009	2011
Victoria State Priority Project- NVIRP 2 On Farm Priority Project	The NVIRP 2 On- Farm Priority Project was aligned with the Goulburn-Murray Water Connections Project Stage 2 (formerly NVIRP2). The project supported on-farm irrigation infrastructure upgrades across the Goulburn-Murray Irrigation District and was delivered by Goulburn-Broken Catchment Management Authority.	Goulburn-Murray Irrigation District	Flood irrigation. Laser levelling. Convert flood to drip/spray. System automation. Channel remediation.	43	146	Completed	2011	2014
South Australia State Priority Project – Private Irrigation Infrastructure Program - SA	A Commonwealth-led grants program for irrigators in SA to undertake irrigation infrastructure efficiency improvements both on and off farm, with a share of the water savings to be used for environmental water purposes.	SA Murray: Loxton, Berri, Barmera, Morgan, Paringa	Upgrade and install mainline, pipes, pumps, efficiency technology.	14	29	Nearing completion	2010	2017
Irrigator-led Group Proposals	Decommissioning of inefficient off farm delivery infrastructure.	Deniliquin Horsham	Decommissioning	0.03 from SRWUIP	2	Completed	2011	2012

<sup>4</sup> Funding for infrastructure works under the Small Block Irrigator Exit Grants came from the SRWUIP infrastructure programme. \$49 million of additional funding was provided from the Water Purchase Programme to purchase the water entitlements from exiting irrigators at market value.

## 2. Other Murray-Darling Basin Water Recovery gap bridging projects

Project Title	Short Project Description	Location	Type of Works	Australian Government Commitment <sup>5</sup> (\$m) <sup>6</sup>	Approx no. of projects/ activities	Status	Start	Finish
South Australian River Murray Sustainability Program	A \$265m Commonwealth-funded programme delivered by the South Australian Government comprising four elements. The Department of Agriculture and Water Resources (DAWR) is responsible for oversight of the Irrigation efficiency improvements and SA water purchase program (\$120m), and Irrigation industry assistance (\$120m) components. The Department of Infrastructure and Regional Development has oversight of \$25m for Regional Economic Development.	SA Murray	Irrigation efficiency. Water purchase. Industry assistance. Regional economic development.	265	35 (Irrigation efficiency)	Underway	2013	2018
Water for Rivers <sup>7</sup>	The Joint Government Enterprise, trading as Water for Rivers, was a ten year (2002-2012) initiative of the Australian, NSW and Victorian Governments. The formation of the Joint Government Enterprise was a commitment under the corporatisation of the Snowy Mountains Hydro-electric Authority in June 2002 and reflected the agreement of all three Governments to deliver water for environmental flows in the Snowy River and the River Murray through the Snowy Water Inquiry Outcomes Implementation Deed.	Snowy River River Murray	Deliver environmental flows.	125	1	Completed	2002	2012
The Living Murray Initiative <sup>8</sup>	The Living Murray Initiative was managed by the Murray-Darling Basin Authority, jointly funded by the Commonwealth and Basin jurisdictions, to help improve the health of the River Murray, with a focus on six icon sites that are internationally significant wetlands supporting a rich biodiversity.	Six River Murray iconic sites	Deliver environmental flows.	400	6 sites	Completed	2004	2010

<sup>5</sup> Funding amount listed is the maximum Australian Government commitment unless the program or project is completed, in which case the amount shown is actual expenditure.

<sup>6</sup> Funding amounts rounded to whole numbers.

<sup>7</sup> In 2007 the Australian Government committed an additional \$50 million to Water for Rivers to contribute to the recovery of water entitlements that would meet the commitment of the Snowy Hydro Ltd shareholder governments (Commonwealth, NSW and Victoria) to provide 212 GL of annual average increased flows for the Snowy River. This additional funding augmented a previous Australian Government commitment of \$75 million to recover water entitlements for the River Murray. A total of 70 GL LTAAY of water was recovered for the River Murray, with 9 GL LTAAY contributing towards bridging the gap in Murray-Darling Basin, which is counted against State Government recoveries (the remaining water was recovered prior to 2009 and therefore is included in the calculation of the baseline diversion limit). The funded recovery programme under Water for Rivers ceased on 30 June 2012, however, final confirmation of the entitlements recovered is awaiting validation by NSW of water savings projects undertaken in the Murrumbidgee.

<sup>8</sup> In 2004, \$500m was committed over five years to recover an annual average of up to 500 GL of water for the environment. Funding commitment for water recovery increased to \$700m in 2006. The Commonwealth's total contribution was \$400m.

### 3. Sustainable Rural Water Use and Infrastructure Program (SRWUIP) – Murray-Darling Basin non gap bridging projects

Project Title	Short Project Description	Location	Type of Works	Australian Government Commitment (\$m)	Approx no. of projects/ activities	Status	Start	Finish
<b>Murray-Darling Basin non gap bridging projects</b>								
Commonwealth Environmental Water Office water holdings management	Funding provided for costs associated with managing water holdings for water entitlements that the Commonwealth is acquiring toward bridging the gap.	MDB	Management of water holdings.	Ongoing funding	Refer to the Department of Environment and Energy			
South Australia State Priority Project – Coorong, Lower Lakes and Murray Mouth Recovery project	This involves a series of projects and management actions to provide an enduring ecological response for the Coorong, Lower Lakes and Murray Mouth – a Ramsar Wetland area of international importance. A feasibility study investigated long-term management options for the area, including development of a long-term plan and business case. A suite of early works projects was completed. Funding was also provided for the removal of temporary regulators to allow the return of natural river flow. The majority of management actions associated with the main project have been finalised. Remaining actions, including the South East Flows Restoration project and Variable Lake Levels and Barrage Operating Strategy are underway and will be completed before 30 June 2019.	SA Coorong, Lower Lakes, Murray Mouth	Feasibility of long term management options. Install/remove temporary regulators. Environment based management actions.	160	7	Feasibility, early works and regulator works complete.  Main project underway	2009	2019
South Australia Riverland Floodplain Integrated Infrastructure project (also known as SA Regulators project)	The \$155 million project (delivered by the Murray-Darling Basin Authority), involves installation of regulators at the priority South Australian Murray wetland sites at the Pike and Katarapko floodplains to enable broader and more natural floodplain inundation. Salt interception schemes will be used to manage high levels of groundwater salinity. \$55 million was provided from SRWUIP.	SA Murray: Pike and Katarapko floodplains	Installation of regulators.	155	Refer to the Murray-Darling Basin Authority			
South Australia State Priority Project – Integrated Pipelines project	The project involved construction of three pipelines, including two potable pipelines servicing local communities and one irrigation pipeline.	Wellington, Currency Creek, Langhorne Creek, Pt Sturt/ Hindmarsh Island	Construct pipelines.	117	3	Completed	2009	2010
South Australia State Priority Project - Flows for the Future project	The Flows for the Future project aims to reinstate more natural flow patterns, through bypassing low flows at up to 500 strategically located dams and water course diversions, across the Angas and Bremer Rivers in the Eastern Mount Lofty Ranges Water Resource Area.	Eastern Mount Lofty Ranges	Deliver environmental flows	12	1	Underway	2017	2019

Inquiry into water use efficiency in Australian agriculture  
Submission 18

Project Title	Short Project Description	Location	Type of Works	Australian Government Commitment (\$m)	Approx no. of projects/ activities	Status	Start	Finish
Murray-Darling Basin Regional Economic Diversification Program	Funding for economic diversification projects to assist Basin Communities adjust to a more sustainable water future. The programme is being delivered by the Department of Infrastructure and Regional Development.	MDB-wide	Community assistance.	100	Refer to the Department of Infrastructure and Regional Development			
Wimmera-Mallee Pipeline project	The project replaced over 17,000km of inefficient open channel systems with 8,800km of pipeline, saving over 100 billion litres of water each year and helped ensure the water supply for around 36 townships and 9000 farms in the region.	Gippsland, Victoria	Replace channel with pipeline.	98	1	Completed	2007	2009
Australian Capital Territory State Priority – ACT Healthy Waterways project	The project involves implementing a water quality monitoring system to underpin and prioritise catchment management actions to improve water quality, including infrastructure intervention to intercept pollutants, nutrients and sediment entering rivers and lakes in the ACT and surrounding areas.	ACT	Water quality monitoring system.	85	1	Underway	2014	2019
Strengthening Basin Communities Program	<p>The Strengthening Basin Communities Program provided \$64 million through two separate components: a Planning component and a Water Saving Initiatives component.</p> <p>The planning component provided grants for local governments in the Murray-Darling Basin to assist in community-wide planning for a future with less water. Sixty-three grants were approved under Rounds 1 and 2 of the planning component.</p> <p>The Water Savings Initiatives component provided competitive grants to enable local government authorities and urban water service providers to support projects that improve water security by reducing demand on potable water supplies.</p>	MDB-wide	Strategic planning. Town infrastructure.	64	92	Completed	2009	2014
Murray-Darling Basin, Basin Plan Activities	Funding provided to the Murray-Darling Basin Authority to assist with implementing the Basin Plan.	MDB	Implement Basin Plan.	Ongoing funding	Refer to the Murray-Darling Basin Authority			
New South Wales State Priority Project – Healthy Floodplains project	The project involves licensing and controlling floodplain extractions and improving watering of key environmental assets across NSW.	NSW	Floodplain management.	50	1	Underway	2012	2018
Due diligence, compliance reviews and water conveyancing	Funding to contract expertise to evaluate project business case proposals, including from State Governments. Funds for program audit/compliance review costs, and conveyancing costs relating to transferring SRWUIP water savings to the Commonwealth.	MDB and Tasmania	Assessment; compliance auditing; water conveyancing.	up to 35	Many hundreds	Underway	2010	2019

Inquiry into water use efficiency in Australian agriculture  
Submission 18

Project Title	Short Project Description	Location	Type of Works	Australian Government Commitment (\$m)	Approx no. of projects/ activities	Status	Start	Finish
Supply Measures funding for Business Case Development	Funding provided to New South Wales, South Australia and Victorian governments to develop business cases for supply measure projects that provide offset water saving under the Sustainable Diversion Limit Adjustment Mechanism of the Murray-Darling Basin Plan.	SA, NSW and Victoria	Business Case development.	35	3	Completed	2013	2015
Orange City Pipeline project	The project involves construction of a pipeline between Orange and the Macquarie River. The pipeline will deliver 1,616 megalitres of water each year from the Macquarie River to the Suma Park Dam which will help the Orange community address any future shortfalls in the supply of drinking water. The dam will be topped-up by pumping during periods of good river flow, so that pumping is not required during drier times.	Orange	Pipeline construction.	20	1	Completed	2010	2015
Snowy River Repayment of Mowamba Borrow	Funding to repay the Mowamba Borrowing Account for the period where water flow was redirected from the Mowamba Weir into the Snowy River while the Mowamba Aqueduct was decommissioned, to allow for construction of a new outlet on Jindabyne Dam.	N/A	N/A	14	1	Completed	2010	2010
Environmental Works and Measures Feasibility project	A program to identify, develop and test the feasibility of environmental works and measures.	MDB	Feasibility study.	10	3	Completed	2011	2015
Hume Dam Remedial Works	Funding co-contribution to remedial works on the Hume Dam southern training wall. Funding was appropriated to the MDBA to deliver the project.	Hume Dam	Remediation of dam wall.	10	Complete (delivered by the Murray-Darling Basin Authority)			
Murray-Darling Basin Environmental Water Knowledge and Research Project	Funding to undertake an environmental water knowledge and research project, led by the Murray Darling Freshwater Research Centre, at aquatic asset sites in key geographical locations in the northern and southern Murray-Darling Basin. The project will provide information on how pressures such as invasive species, polluted runoff and reduced vegetation cover affect the ongoing health of water-dependent ecosystems in the Basin to enable better management of environmental water.  Delivered by the Department of the Environment.	MDB	Research project.	10	Refer to the Department of Environment and Energy			
Irrigation Modernisation Planning Assistance Program	This program provided funding to irrigation water providers to develop modernisation plans for their districts that outline how to achieve long term improvements in irrigation water use efficiency and assess options to adapt to a future with less water.	Predominantly MDB	Long term modernisation planning.	6	23	Completed	2008	2013

Project Title	Short Project Description	Location	Type of Works	Australian Government Commitment (\$m)	Approx no. of projects/ activities	Status	Start	Finish
	Around 80 per cent, by volume, of all irrigation water entitlements in the Murray-Darling Basin are now covered by a strategic infrastructure plan that can be used as the basis for longer term investments in rationalisation, upgrades and operations.							
Queensland State Priority Project - Coal Seam Gas Water study	A feasibility study aimed at undertaking a detailed analysis of the use of Coal Seam Gas water in the Qld Murray-Darling Basin.	Qld MDB	Feasibility study.	5	1	Completed	2009	2013
NSW Shepherding project	Funding for water Shepherding arrangements in NSW to improve the use of water entitlements purchased by the Commonwealth for the environment in unregulated streams, providing the capacity to deliver water to high priority environmental assets downstream without impacting on the reliability of supply to existing water users.	NSW	Water shepherding.	5	1	Underway	2010	2018
Toorale Water Infrastructure Works	This project involves the modification, demolition or decommissioning of dams and other structures at the Toorale property at the junction of the Warrego and Darling rivers in New South Wales for the purpose of facilitating downstream delivery of environmental flows.	NSW	Modification, demolition, Decommissioning.	4	1	Underway	2017	2019
Lithgow-Clarence Colliery Water transfer Project	The project involved upgrading the Clarence Water Transfer System, allowing the increased use of excess water from Clarence Colliery. The project improved the security of Lithgow's water supply by supplementing its potable water supplies and offsetting water that would ordinarily be drawn from Oberon Dam.	Lithgow, NSW	Water transfer/re-use.	4	1	Completed	2009	2013
Irrigation Hotspots Assessment Program	A project using a science-based approach to identify the nature, location and amount of water loss (known as hotspots) in existing channel and piped irrigation delivery systems across Australia.	Nationwide	Identify water loss hotspots.	2	12	Completed	2008	2011
SA River Murray Improvement Program Feasibility and Business Case Preparation	Funding was provided to South Australia to develop a feasibility study and business case for a proposed South Australian River Murray Improvements Program. In August 2013 the Australian Government entered into a new program agreement with South Australia to fund a new program, the South Australia River Murray Sustainability Program.	SA Murray	Feasibility and Business Case preparation.	0.9	1	Completed	2012	2013
National Water Commission Assessment of Reforms	Funding provided for the cost of assessment of water reforms under Water Management Partnership Agreements (WMPAs) with the States for State Priority Projects.	MDB	Assessment of water reforms under WMPAs.	0.6	1	Completed	2010	2012

Project Title	Short Project Description	Location	Type of Works	Australian Government Commitment (\$m)	Approx no. of projects/ activities	Status	Start	Finish
Liverpool Plains Regional Water Supply Strategy	Funding was provided to the Liverpool Plains Shire Council to undertake a design and scoping study, building on the work undertaken under the Strengthening Basin Communities program.	Liverpool Plains, NSW	Design and scoping study.	0.4	1	Completed	2014	2014
<b>SRWUIP Projects outside the Murray-Darling Basin or Nation Wide</b>								
Supporting more efficient irrigation in Tasmania	Funding provided to the Tasmanian government to develop nine irrigation schemes. A sub project involved a CSIRO study to estimate changes to future water yields and covered approximately 50,000 square kilometres.	Tasmania	Study on future water yields. Irrigation infrastructure.	140	9	Completed	2008	2016
Tasmania Irrigation Tranche II and III (feasibility study)	The project will develop four irrigation schemes in Tasmania to secure the state's water supply and deliver strong economic benefits to a large part of the community and a feasibility study to consider future infrastructure activities.	Tasmania	Build irrigation schemes. Consider new schemes.	61.8	4	Underway	2015	2019
Compliance and Enforcement Systems for Water Resource Management	A water reform initiative to develop a framework which aims to provide a nationally consistent approach by strengthening compliance and enforcement within each jurisdiction and addressing any gaps in their systems.	Nation-wide	Develop national framework.	55	1	Completed	2011	2016
Harvey Pipeline project in Western Australia	This project involved construction of a pipeline to replace existing open irrigation channels with a fully integrated piped irrigation system. Water savings are being used to improve security of critical urban water supplies in the Perth metropolitan region and providing benefits to the environment.	Harvey, WA	Pipeline construction.	35	1	Completed	2007	2008
National Water Market System project	A water reform initiative to strengthen Australia's water market through efficient management of improved state and territory water registers, water transactions and availability of market information. The project achieved enhancements to existing water registries, implementation of new interstate trading processes and registry interoperability, and development of a detailed system architecture and design for a common registry solution.	Nation-wide	Develop detailed system architecture and design for common registry system.	33	1	Terminated 30 June 2014	2009	2014
Meter Test Facilities project	Funding provided to establish meter test facilities to meet the pattern approval testing standard specifications required under the National Framework for Non-urban Water Metering.	Adelaide, SA Manly, NSW	Establish meter testing facilities.	4	2	Completed	2008	2014
Gascoyne Irrigation Pipeline Project in Western Australia	The project involved construction of a high-pressure irrigation water delivery system throughout the Carnarvon Irrigation Area.	Gascoyne, WA	Pipeline construction.	7	1	Completed	2010	2012



Project Title	Short Project Description	Location	Type of Works	Australian Government Commitment (\$m)	Approx no. of projects/ activities	Status	Start	Finish
National Hydrological Modelling Platform	The project developed and implemented a common framework and numeric model for groundwater and surface water interactions in river systems. In combination with other tools, it will increase the capacity of State and Territory departments and authorities to investigate whole of catchment impacts of land use change, climate change, water recovery and conjunctive use on catchment water yield and ensure a consistent approach for water modelling across the Basin. Phase 2 is underway and is being managed by the Murray Darling Basin Authority.	Nation-wide	Analyse and implement Source Integrated Modelling System.	5	2	Completed	2010	2015
Sustainable Yields Study of South West WA	The project investigated estimated changes to future water yields having regard to climate change and future development. This covered 39,043 square kilometres of surface water catchment and 37,186 square kilometres of groundwater management areas from Geraldton to Albany.	South West, WA	Study on future water yields.	5	1	Completed	2008	2010
Water for the Future Communications	Funding was made available for a national water education campaign to provide information on water reform to communities dependent on the MDB.	Nation-wide	Communication campaign.	4	1	Completed	2010	2011
Great Artesian Basin Shared Water Resources Assessment	Funding co-contribution towards the assessment of the shared water resource of the Great Artesian Basin. The report was launched in March 2013.	Great Artesian Basin	Shared water resource assessment.	3	1	Completed	2010	2013

#### 4. Sustainable Rural Water Use and Infrastructure Program – Murray-Darling Basin potential Supply Measure projects

Project Title	Short Project Description	Location	Type of Works	Australian Government Commitment (\$m)	Status	Start	Finish
<b>Murray-Darling Basin potential Supply Measure projects</b>							
Menindee Lakes Project	<p>The proposed NSW-led project involves reducing evaporation and improving water efficiency at Menindee Lakes, securing Broken Hill's water supply, protecting the local environment and heritage and returning water to the environment.</p> <p>There have been extensive technical investigations undertaken to support the project including hydrological modelling and geophysical assessments of the Menindee region for groundwater resources. Results of technical studies have been released publicly.</p> <p>An option for the project has been notified for the SDL adjustment process under the Basin Plan.</p>	<p>Menindee-Lakes including villages of Silverton, Sunset Strip and Copi Hollow.</p> <p>Broken Hill</p>	<p>Hydrological modelling of a range of options for estimated water savings.</p> <p>Pumps, pipes, augmentation of town water supply.</p>	181	<p>Investigation complete</p> <p>Planning and scoping underway</p> <p>Main project under negotiation</p>	2008	up to 2024
South Australia State Priority Projects - Riverine Recovery project <sup>9</sup>	The project involves investment in wetland and floodplain management and infrastructure to restore river operations.	<p>Pike floodplain - Renmark;</p> <p>Katfish Floodplain - Berri;</p> <p>Wetlands - SA Murray</p>	<p>Pike and Katfish floodplains: pump modification, regulators, levees, fishways.</p> <p>Wetland projects: regulating structures, habitat restoration, pump relocation.</p>	89	Underway	2009	2019

<sup>9</sup> When originally assessed for funding approval the water recovered through the Riverine Recovery Project was counted as 'gap bridging' (contributed to reducing levels of extractions and diversions in the Murray-Darling Basin). The Murray-Darling Basin Authority (MDBA) subsequently advised that the class of water entitlements offered under the project were not included in the estimate of baseline diversions in South Australia and therefore did not consider the water to be gap bridging. The Authority has indicated the Riverine Recovery project may be eligible for consideration as a Supply Measure project under the Sustainable Diversion Limit Adjustment Mechanism.

### 5. Sustainable Rural Water Use and Infrastructure Program (SRWUIP) – Water Purchase

Project Title	Short Project Description	Australian Government Commitment (\$m)	Status
Water Purchase Programme <sup>10</sup>	Funding to purchase water entitlements in the Murray-Darling Basin to reduce consumptive water use, provide water for the environment and through those measures ease transition to the Sustainable Diversion Limits in the <i>Murray-Darling Basin Plan 2012</i> .	2,973	Underway

### 6. Sustainable Rural Water Use and Infrastructure Program (SRWUIP) – Supply Measures

Project Title	Short Project Description	Australian Government Commitment (\$m)	Status
Investment in Supply Measures	Supply measures are works, river operations or rule changes that enable the use of less water while achieving equivalent environmental outcomes. Water savings identified through such projects would allow the 2,750 GL recovery target under the Basin Plan to be reduced by as much as 650GL, thereby reducing the social and economic impacts of water recovery.	1,265.5  (after \$34.5m provided for business case development - infrastructure component)	Project development underway

### 7. Enhanced Environmental Outcomes under the Water for the Environment Special Account

Project Title	Short Project Description	Australian Government Commitment (\$m)	Status
Water for the Environment Special Account	Murray-Darling Basin Authority modelling in developing the Basin Plan found that a combination of additional environmental water and improved capacity to deliver water through the system could increase the number of environmental targets achieved by the Basin Plan. Amendments to the <i>Water Act (2007)</i> establish the <i>Water for the Environment Special Account</i> and appropriates \$1,775m to fund the measures. The increased environmental outcomes will be achieved through easing constraints to environmental water delivery and recovery of an additional 450GL of environmental water (in addition to the 2,750GL) with neutral or beneficial social and economic impact for communities.	1,775	Funding available in Special Account from July 2014

<sup>10</sup> Previously known as the Restoring the Balance in the Murray-Darling Basin Program. The volume of environmental water for Murray-Darling Basin that can be recovered through this programme is capped at 1500 gegalitres. The Water Purchase Programme will recover the *residual* amount of water needed to 'bridge the gap' to the Sustainable Diversion Limit in the *Murray-Darling Basin Plan 2012*, after water recovery from investments in irrigation efficiency projects and adjustments arising from Supply Measures projects have been accounted for, up to 1500 gegalitres.

## 8. Urban Water Projects

### National Urban Water and Desalination Plan

Project Title	Short Project Description	Government Commitment (\$m)	Status
National Urban Water and Desalination Plan	<p>The NUWDP provides funding for urban water infrastructure and research that contributes significantly to improving the security of water supplies in Australia's larger cities, without adding to greenhouse gas emissions.</p> <p>This programme contributed funding to the Adelaide Desalination plant which generates 5.4 GL LTAAY per year gap bridging water.</p>	665	Nearing completion

### Green Precincts

Project Title	Short Project Description	Government Commitment (\$m)	Status
Green Precincts Fund	<p>The Green Precincts Fund was designed to prepare Australian communities for a future with less water; and to encourage local communities to better manage their water and energy use for current and future generations.</p> <p>The Green Precincts Fund's objectives were to support project initiatives that encourage water and energy savings measures at the community level.</p>	13	Completed

### National Water Security Plan for Cities and Towns

Project Title	Short Project Description	Government Commitment (\$m)	Status
National Water Security Plan for Cities and Towns	<p>The National Water Security Plan for Cities and Towns funded practical projects that saved water and reduced water losses in cities and towns nationally, predominantly in towns with populations of less than 50,000. It included the COAG water reform work program - Strategy on Water and Wastewater Services in Remote Communities (including Indigenous Communities) initiative projects. It also included the Chaffey Dam project.</p>	233	Complete

### National Rainwater and Greywater Initiatives

Project Title	Short Project Description	Government Commitment (\$m)	Status
National Rainwater and Greywater Initiative	Rebates up to \$500 were available for households that purchased rainwater tanks or greywater systems from 1 March 2009 to 10 May 2011.	8	Completed

### Water Smart Australia

Project Title	Short Project Description	Government Commitment (\$m)	Status
Water Smart Australia	Water Smart Australia Programme aimed to accelerate the development and uptake of smart technologies and practices in water use across Australia. Funding of \$897 million through the Department of the Environment from 2007-08.	1,400	Completed

## 9. Other Water Reform Activities in the Murray-Darling Basin

### Implementing Water Reform in the Murray-Darling Basin

Project Title	Short Project Description	Government Commitment (\$m)	Status
Implementing Water Reform in the MDB	Funding to Murray-Darling Basin States to support reforms covered by the Intergovernmental Agreement on Implementing Water Reform in the Murray-Darling Basin including the Basin Plan.	136	Underway

### Commonwealth Contribution under the Murray-Darling Basin Agreement

Project Title	Short Project Description	Government Commitment (\$m)	Status
Commonwealth contribution to the joint programs under the Murray-Darling Basin Agreement since 2012.	Funding for operations and natural resources management activities as agreed to by the Murray-Darling Basin Ministerial Council and implemented by the Murray-Darling Basin Authority on behalf of the jurisdictions.	Ongoing funding	Underway

### Bioremediation Revegetation Trials

Project Title	Short Project Description	Government Commitment (\$m)	Status
Bioremediation and Revegetation	<p>The Australian Government contributed funding over two years to South Australia to undertake large-scale seeding and planting on the exposed acid sulphate soils and promote naturally occurring sulphur-reducing bacteria, which repair and reduce the acidification process in the Coorong and Lower Lakes. The funded projects assisted with natural revegetation, weed management and soil stabilisation, to help improve the health of the Lower Lakes ecosystem.</p> <p>This funding was provided in addition to other environmental projects through SRWUIP.</p>	9	Completed

### Local Engagement Officers

Project Title	Short Project Description	Government Commitment (\$m)	Status
Local Engagement Officers	The Commonwealth Environmental Water Holder has six local engagement officers working within the Murray-Darling Basin, to assist members of the community to participate in environmental water planning and decision making. These six officers, alongside other officers of local land and water management agencies, work closely with all levels of government as well as local communities and businesses across a range of catchments for which they have responsibility.	5	Refer to the Department of Environment and Energy

## 10. Other Water Reform Projects and Activities

### Improving Water Information

Project Title	Short Project Description	Government Commitment (\$m)	Status
Improving Water Information (BoM)	The Bureau of Meteorology is responsible for the delivery of forecasting services, analysis and interpretation of national water information.	Ongoing funding	Refer to the BOM

### Raising National Water Standards

Project Title	Short Project Description	Government Commitment (\$m)	Status
Raising National Water Standards Program	<p>The Raising National Water Standards (RNWS) Program was an Australian Government initiative that supported projects to advance National Water Initiative (NWI) reforms by improving water management, capacity, knowledge, skills and innovation.</p> <p>The programme was administered by the National Water Commission and funded 178 projects directed at activities across three strategic investment areas:</p> <ol style="list-style-type: none"> <li>1. advancing the implementation of the NWI</li> <li>2. improving integrated water management across Australia</li> <li>3. improving knowledge and understanding of our water resources.</li> </ol>	214	Completed

### Great Artesian Basin Sustainability Initiative

Project Title	Short Project Description	Government Commitment (\$m)	Status
Great Artesian Basin Sustainability Initiative (GABSI)	Under the Great Artesian Basin Sustainability Initiative (GABSI), the Australian government is providing funds to address pressure decline in the Basin through the capping of uncontrolled bores and replacing inefficient bore drains with pipeline reticulation systems. The initiative is delivered through State agencies and is funded jointly by Australian and State governments. As at 30 June 2014, the Australian government has provided \$112.05 million over three phases of the Programme since it commenced in 1999. On 16 October 2014, the Australian government announced funding of \$15.9 million over three years, commencing in 2014-15, to continue GABSI into a fourth phase.	128	GABSI Phase 4 in progress

### Northern Australia Futures Assessment

Project Title	Short Project Description	Government Commitment (\$m)	Status
Northern Australia Futures Assessment	The Australian Government established the Northern Australia Water Futures Assessment to provide information needed to inform the development and protection of northern Australia's water resources, so that development is ecologically, culturally and economically sustainable. The geographical area considered stretched more than 3,000 km, from Broome in the west to Cairns in the east.	13	Complete

### Water Resources Assessment and Research Grant

Project Title	Short Project Description	Government Commitment (\$m)	Status
Water Resources Assessment and Research Grant	A grants programme to address national priority issues in relation to the sustainable use and management of water resources and implementation of the National Water Initiative. From 2011-12 to 2016-17 the funding has been committed to developing an Integrated Ecological Condition Assessment Framework as part of the national Aquatic Ecosystems Toolkit agreed by Commonwealth, State and Territory Ministers in 2012.	2	Underway

### Smarter Irrigation for Profit

Project Title	Short Project Description	Government Commitment (\$m)	Status
Smarter Irrigation for Profit project	<p>The National Water Use in Agriculture Research, Development and Extension Strategy led to the development of the Smarter Irrigation for Profit (SIrP) project which was funded under the department's Rural Research and Development for Profit Programme (National Water Use in Agriculture 2015).</p> <p>The SIrP project aims to improve the profit of 3,000 individual irrigators across the cotton, dairy, rice and sugar industries by \$20,000-\$40,000 per year with the support of 16 R&amp;D partners and up to 19 farmer-managed learning sites. The project consists of three components:</p> <ul style="list-style-type: none"> <li>• Practical, reliable irrigations scheduling technologies</li> <li>• Precise, low cost automated control systems for a range of irrigation systems</li> <li>• A network of farmer managed learning sites located in major regions</li> </ul>	4	Underway



## 11. Other Major Water Funding Investment

### National Water Infrastructure Development

Project Title	Short Project Description	Government Commitment (\$m)	Status
National Water Infrastructure Development Fund	<p>The National Water Infrastructure Development Fund (the Fund) will provide \$500 million to state and territory governments to support the identification and development of water infrastructure, including the construction of dams and/or pipelines, wastewater reuse and managed aquifer recharge. The fund has two parts: the feasibility component (\$59.5 million) and the capital component (\$440.0 million). Up to \$209.5 million of the Fund is targeted to northern Australia.</p> <p>Under the feasibility component the Australian Government is providing funding for 39 feasibility studies, including 16 studies in northern Australia. This includes \$25 million provided through the White Paper on Developing Northern Australia for the Ord Stage 3, Nullinga Dam and CSIRO-led Northern Australia Water Resource Assessments (NAWRA) feasibility studies.</p> <p>The capital component will make available capital funding to co-fund the construction of water infrastructure, in partnership with state and territory governments and their private sector partners. The government has committed \$247.5 million to co-fund the construction of Rookwood Weir (QLD); Dungowan Dam (NSW); Macalister Irrigation District (VIC); South West Loddon Pipeline (VIC); and McLaren Vale (SA).</p>	500	Underway
National Water Infrastructure Loans Facility	<p>The National Water Infrastructure Loan Facility (Facility) will provide concessional loans to state and territory governments to co-fund the construction of water infrastructure projects, stimulating and accelerating investments in major water infrastructure in regional areas (including public/private partnerships). This will include, but is not limited to, the construction of dams, pipelines and managed aquifer recharge projects that are economically viable and will generate affordable water to grow regional economies.</p> <p>The Facility will make available \$2 billion over ten years (to 2025-2026) in loans directly to state and territory governments.</p> <p>Construction of new water infrastructure will help drive the development of regional economies including in the agriculture and resources industries (such as mining and energy). Access to affordable water will be a key influence over the extent to which Australia's farm and food sectors can realise export growth opportunities and meet growing demand from population growth.</p> <p>The Facility will initially be administered by the department and then transferred to the Regional Investment Corporation once it is established.</p>	2,000	Underway