

Socio-economic effects of Commonwealth water recovery in the Murray–Darling Basin

Insights from the Regional Wellbeing Survey
(2013-2016)



© Commonwealth of Australia 2018

Ownership of intellectual property rights

Unless otherwise noted, copyright (and any other intellectual property rights, if any) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

Creative Commons licence

All material in this publication is licensed under a Creative [Commons Attribution 4.0 International Licence](#) except content supplied by third parties, logos and the Commonwealth Coat of Arms.

Inquiries about the licence and any use of this document should be emailed to copyright@agriculture.gov.au.



Cataloguing data

This publication (and any material sourced from it) should be attributed as: Australian Government Department of Agriculture and Water Resources 2018, *Socio-economic effects of Commonwealth water recovery in the Murray–Darling Basin: Insights from the Regional Wellbeing Survey (2013-2016)*, Canberra, February. CC BY 4.0.

This publication is available at agriculture.gov.au/publications.

Department of Agriculture and Water Resources
GPO Box 858 Canberra ACT 2601
Telephone 1800 900 090
Web agriculture.gov.au

The Australian Government acting through the Department of Agriculture and Water Resources has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Agriculture and Water Resources, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on any of the information or data in this publication to the maximum extent permitted by law.

Acknowledgements

Thanks to Dr Jacki Schirmer from the University of Canberra for her insights and contributions to this report.

Contents

Summary	4
Introduction.....	5
1 On-farm irrigation infrastructure	6
1.1 Participation.....	6
1.2 Overall outcomes	6
1.3 Scale of upgrades	7
1.4 Farm productivity and profitability	7
1.5 On-farm labour	8
1.6 Farm costs.....	8
2 Off-farm irrigation infrastructure.....	9
2.1 Survey context.....	9
2.2 Overall outcomes	9
2.3 Farm productivity and profitability	10
2.4 Farm costs.....	10
2.5 Timing of off-farm irrigation infrastructure works.....	11
3 Water Sale to the Government.....	12
3.1 Survey context.....	12
3.2 Participation.....	12
3.3 Sale of water entitlements.....	12
References.....	14

Figures

Figure 1 Positive survey responses of SRWUIP participants on the effect of on-farm irrigation upgrades.....	7
Figure 2 Survey responses of irrigators located in SRWUIP off-farm irrigation areas on the effect of off-farm irrigation infrastructure upgrades.	10
Figure 3 Survey responses of Basin irrigators on the effect of sale of water entitlements to the government.	13

Summary

Between 2013 and 2016, irrigators across the Murray–Darling Basin were asked about their views and experiences of Commonwealth water recovery programs, as part of the University of Canberra’s annual Regional Wellbeing Survey. The purpose was to better understand one aspect of the socio-economic effects of water reform; the direct experiences of irrigators involved in or affected by upgrading on- and off-farm irrigation infrastructure, and in selling water entitlements to the government. It is important to note that the survey findings are based on opinions rather than an analysis of the impacts and outcomes of the Commonwealth water recovery programs.

Key findings include:

- More than 80 per cent of irrigators who upgraded on-farm irrigation infrastructure with support from Commonwealth programs reported positive effects on their farm, particularly on water use efficiency, timing of water delivery, on-farm workload and farm productivity and profitability. Some irrigators reported a negative effect on their power costs and farm debt.
- Around half of the irrigators who are located in regions where Commonwealth off-farm irrigation infrastructure investment has occurred felt this investment had positive effects on their farm, primarily through improving the timing of water delivery and water use efficiencies. However, many felt it increased farm costs, particularly costs of water delivery.
- Sale of water entitlements to the government had varied effects on Basin irrigators, with farmers who remained in irrigated agriculture reporting benefits to irrigation efficiency, while also reporting that allocation prices and water delivery costs acted as barriers to farm management.

Introduction

This report summarises key findings from three reports produced by the University of Canberra, which examined irrigators' views and experiences of Commonwealth water recovery programs.

The Australian Government has committed more than \$13 billion to implement the Murray–Darling Basin Plan (Basin Plan) and associated activities, such as enhancing the sustainability of irrigated agriculture and, in the process, recovering water for environmental purposes. The majority of the Australian Government's \$13 billion investment—more than \$8 billion—is being made available to upgrade irrigation infrastructure and achieve water efficiency improvements.

The Sustainable Rural Water Use Infrastructure Program (SRWUIP), among other Australian Government programs, improves the efficiency of Basin irrigators' water use by upgrading on- and off-farm irrigation infrastructure to obtain water savings.

The SRWUIP—in combination with water purchasing by the Australian Government (the Restoring the Balance program)—are the main mechanisms through which the Commonwealth has recovered water for the environment in the Murray–Darling Basin.

Since 2013, the University of Canberra has annually conducted the 'Regional Wellbeing Survey' (RWS), in which up to 13,000 people living in regional areas complete a detailed survey about their lives and the social and economic changes occurring in their communities. This includes between 800 and 1,000 irrigators each year, of which between 600 and 850 live in the Basin. This survey asks questions on a wide range of topics. During 2013 to 2016, these topics included asking irrigators about their experiences of Commonwealth water recovery infrastructure investments, as well as about their farm performance and barriers to farm development. The resulting dataset enabled analysis of views of irrigators about water recovery, and comparison of irrigators who had and hadn't received support to upgrade on-farm irrigation infrastructure, and who lived in regions with and without Commonwealth off-farm irrigation infrastructure investment.

In 2015, the department commissioned the University of Canberra to produce a report using the 2013 and 2014 survey data, to analyse information on the socio-economic effects of SRWUIP investments. This was followed by two further reports from similar data obtained in 2015 and 2016 respectively.

This report summarises key findings of these three reports. All results refer to data from the 2016 survey, unless indicated otherwise. For detailed information about the results and the survey methods, please refer to the original reports.

This report examines one aspect of the socio-economic effects of water reform—the direct experiences of irrigators involved in or affected by upgrading on- and off-farm irrigation infrastructure, and in selling water entitlements to the government. It is noted that there are many other socio-economic outcomes of water reform on a wide range of groups in the Murray–Darling Basin. This report should therefore be understood to contribute to understanding only part of the socio-economic effects of Basin water reform.

1 On-farm irrigation infrastructure

On-farm irrigation infrastructure investments help farmers upgrade and improve their farm water use efficiency. As part of actions contributing to the Basin Plan, grants have been provided through Australian Government programs to support farmers to upgrade their on-farm irrigation infrastructure. As part of the grant, irrigators are required to transfer at least 50 per cent of the water savings obtained to the government, providing water that can then be used for environmental watering and contributing to the water recovery task under the Basin Plan. For example, the On-Farm Irrigation Efficiency Program (OFIEP) provides grants to Basin irrigators to undertake works such as laser levelling, reconfiguration of irrigation layouts, and installation of new infrastructure such as drip or spray systems. On average, irrigators participating in the OFIEP are retaining around 30 per cent of the water savings and the remaining 70 per cent is transferred to the government. These programs have made it possible for farmers to obtain significant water savings that would have otherwise been lost to seepage and evaporation, with an objective of achieving return of water to the environment while also enabling irrigators to maintain farm productivity.

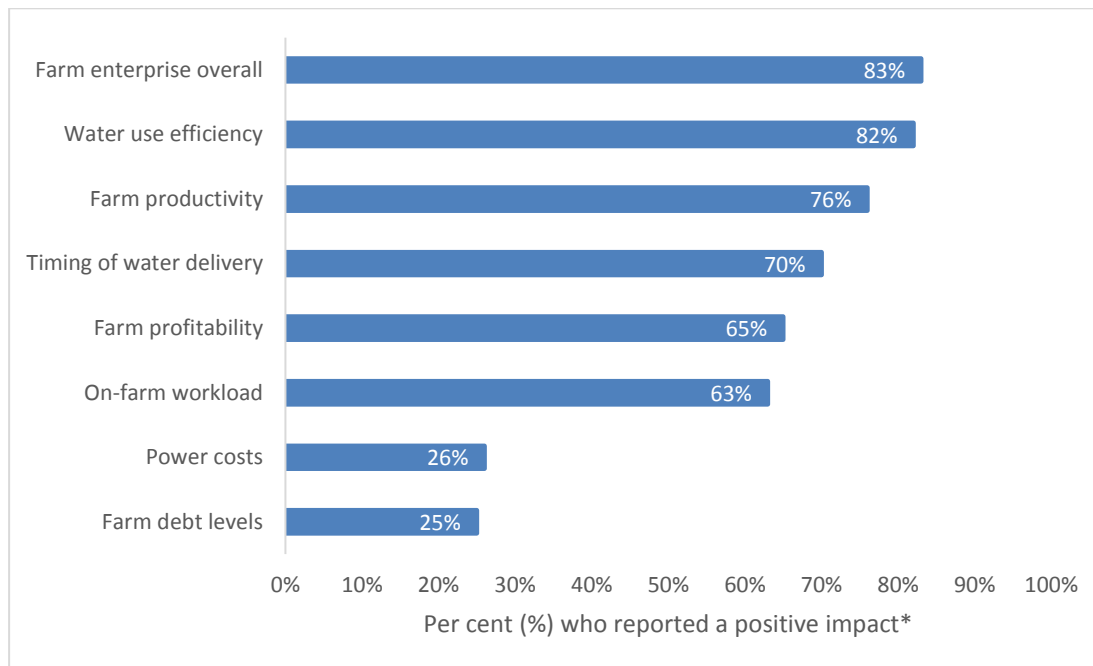
1.1 Participation

Overall, 32 per cent of Basin irrigators who had upgraded their on-farm irrigation infrastructure since 2008 did so with a Commonwealth grant through the SRWUIP program. SRWUIP grants were mostly received by irrigators in the southern Murray–Darling Basin, with variations across the irrigation districts.

1.2 Overall outcomes

Irrigators were asked about the effects of on-farm irrigation infrastructure upgrades on their farm. Overall, 83 per cent of irrigators who received a SRWUIP grant said the upgraded irrigation infrastructure was positive for their farm overall. Over half of SRWUIP grant recipients reported positive effects on water use efficiency (82 per cent), farm productivity (76 per cent) and profitability (65 per cent), timing of water delivery (70 per cent) and on-farm workload (63 per cent) (Figure 1). They were less positive about the effect on power costs and farm debt, with 43 per cent reporting increased power costs and 38 per cent reporting increased farm debt (versus 26 per cent and 25 per cent reporting positive effects, respectively) (Figure 1). These results remained similar over the years.

Figure 1 Positive survey responses of SRWUIP participants on the effect of on-farm irrigation upgrades.



* Note, in this context, a 'positive impact' on on-farm workload, power costs and farm debt levels means a reduction in those factors.

1.3 Scale of upgrades

Many irrigators upgrade their irrigation infrastructure on their farm without the help of a government grant. The survey found that those who access a SRWUIP grant undertook significantly larger scale irrigation upgrades. SRWUIP participants were much more likely (49 per cent) than those who upgraded without a grant (29 per cent) to upgrade over 60 per cent of their on-farm irrigation infrastructure. Additionally, respondents who received SRWUIP grants were more likely to report positive effects on their efficiency of water use (82 per cent compared to 67 per cent who upgraded without a grant) (Figure 1). This means that SRWUIP grant recipients increased on-farm water use efficiencies much more rapidly than would otherwise have occurred without a grant.

1.4 Farm productivity and profitability

When asked how upgrading their on-farm irrigation infrastructure affected farm productivity and profitability, 76 per cent of irrigators who received SRWUIP grants reported increased farm productivity, and 65 per cent reported positive effects on farm profitability (Figure 1). These positive outcomes can occur as a result of the same factors that help achieve water use efficiency. For example, 70 per cent of SRWUIP grant recipients reported that timing of water delivery had improved due to the irrigation upgrades, compared to 57 per cent who upgraded without a grant. This improved timing can boost both productivity and profitability by enabling farmers to better target water delivery to crops when it can most benefit crop growth, and being better able to match water delivery timing with weather conditions. Additionally, those who upgraded their on-farm irrigation infrastructure (with or without support from a grant) were more likely than those who had not to report expanding their farm enterprise, increasing the volume they produced, and intensifying production on their land.

In addition to asking irrigators their views about effects on profitability, the farm financial performance reported by irrigators who had and had not upgraded on-farm irrigation infrastructure was compared. Those who upgraded on-farm irrigation infrastructure were more likely to report making a farm profit than those who had not upgraded, as long as they were not experiencing other challenges such as reduced price or demand for their produce. This suggests that irrigation upgrade works support improved profitability under normal market conditions, but not when farmers are experiencing market-related challenges. For example, in the 2016 survey, this finding applied predominantly to dairy farmers who experienced a substantial market downturn. In 2015, a similar finding occurred for wine grape growers who were experiencing significant market downturn.

1.5 On-farm labour

A large proportion of SRWUIP participants (63 per cent) found that irrigation upgrades reduced their on-farm workload (Figure 1). This may be due to the reduction in labour required to manage irrigation activities on the farm. In addition, a large proportion of SRWUIP participants (70 per cent in 2015) reported that local contractors were engaged to carry out the irrigation upgrades (compared to 40 per cent who upgraded without a grant).

1.6 Farm costs

Irrigators had mixed views on the effects of irrigation upgrades on their farm costs. Some irrigators said that irrigation upgrades increased their power costs (39 per cent in 2015 and 43 per cent in 2016), and farm debt levels (31 per cent in 2015 and 38 per cent in 2016). However, some irrigators said that irrigation upgrades decreased their power costs (30 per cent in 2015 and 26 per cent in 2016), and farm debt levels (26 per cent in 2015 and 25 per cent in 2016). Many reported neutral effects in which costs neither increased nor decreased. Of the respondents who reported decreased farm costs and farm debt in 2015 and 2016, between 80 and 100 per cent felt the upgrade was positive for their farm overall. Of the respondents who reported increased farm costs and farm debt, around 80 per cent still felt the upgrade was positive for their farm overall, suggesting that the positive effects on factors such as timing of water delivery outweighed negative effects on costs or debt for most irrigators.

2 Off-farm irrigation infrastructure

The Australian Government, with the support of state and territory governments, funds major irrigation infrastructure upgrades in irrigation districts across the Basin to achieve water use efficiencies. This increased water use efficiency then enables the transfer of water entitlements for use in environmental watering, helping to achieve the water recovery goals of the Basin Plan. These projects achieve water savings through reducing the seepage or evaporation of water as it is transported by 'off-farm' irrigation infrastructure between regions and farms. Water recovered for the environment in this way is sourced from reduced transmission losses, and as such has no adverse impacts on pre-existing water availability for irrigated production. Over 900 kilometres of irrigation network delivery channels across the Basin are being upgraded through actions that increase efficiency of water use, including refurbishing, automation, reconfiguration and replacing existing open channels with pipelines. The Australian Government has also funded off-farm system rationalisation projects where irrigation channels are removed from delivery networks to make them more efficient.

2.1 Survey context

Off-farm irrigation upgrades funded by SRWUIP were mostly undertaken in the southern Murray–Darling Basin. Analysis of RWS data therefore focused on comparing the experiences of southern Basin irrigators only when analysing the effects of off-farm irrigation infrastructure investment.

As off-farm irrigation infrastructure projects vary in their scale, location and timing, and sometimes affect some irrigators in an irrigation district more than others, not all irrigators were aware of off-farm irrigation infrastructure investment occurring in their region. To address this, irrigators were asked if they knew about off-farm irrigation infrastructure activity, and only questioned about this activity if they were aware of it.

The specific locations of off-farm irrigation infrastructure investments can also create challenges for identifying effects, as different regions may be experiencing socio-economic stresses unrelated to the Basin Plan. For example, a large amount of investment has occurred in the Goulburn–Murray Irrigation District, where most irrigated dairy farming occurs in the Murray–Darling Basin. Dairy farmers experienced significant market stress in 2016, affecting their farm profitability and farmer confidence. Therefore, some of the survey analysis compared dairy farmers and other farmers to better identify effects of irrigation infrastructure investment against the effects of downturn in dairy markets.

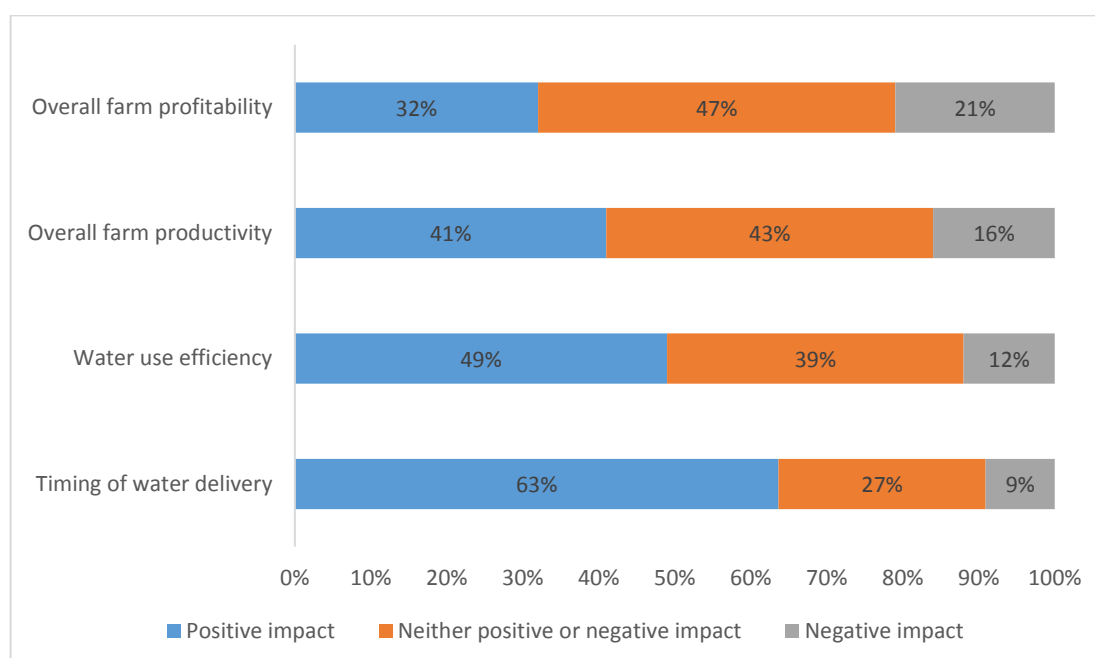
2.2 Overall outcomes

Overall, around half of irrigators located in SRWUIP off-farm irrigation areas (irrigation districts where major Commonwealth funded upgrades have occurred) felt that off-farm irrigation infrastructure works were positive for their farm overall. Nevertheless, many irrigators believe the off-farm irrigation infrastructure upgrade works result in increased costs to them through increases in costs of water delivery. With water delivery costs being an outcome of a complex range of considerations, it is out of the scope of the analysis underpinning this report to assess the extent to which increases in water delivery costs in these regions have resulted from off-farm modernisation works versus other factors.

2.3 Farm productivity and profitability

Off-farm irrigation infrastructure works may change how farmers receive water, depending on the type of works undertaken. In particular, some types of works enable more rapid and better timed water delivery to farms, and can support improved on-farm water use efficiency and off-farm water savings. In total, 63 per cent of irrigators located in SRWUIP off-farm irrigation areas reported that off-farm irrigation infrastructure upgrades had improved the timing of water delivery, and 49 per cent felt their on-farm water use efficiency had improved (Figure 2). This is likely to have contributed to 41 per cent of irrigators reporting an increase in on-farm productivity, and 32 per cent reporting increased on-farm profitability as a consequence of off-farm irrigation infrastructure works (Figure 2). However, concerns over issues such as changes in the cost of water delivery meant that some irrigators felt off-farm irrigation infrastructure works negatively affected their farm profitability (21 per cent), and farm productivity (16 per cent) (Figure 2).

Figure 2 Survey responses of irrigators located in SRWUIP off-farm irrigation areas on the effect of off-farm irrigation infrastructure upgrades.



2.4 Farm costs

Many irrigators (51 per cent) in SRWUIP off-farm irrigation areas felt that off-farm irrigation infrastructure upgrades had negative effects on the cost of water delivery. More generally, off-farm SRWUIP investments have often occurred in irrigation districts in which the costs of water delivery are increasing as a result of a number of other factors unrelated to the off-farm irrigation upgrades. This may be contributing to concerns about effects of off-farm irrigation infrastructure investment on costs of water delivery, with irrigators struggling to cope with even small increases, due to the combined effect of multiple factors on their costs.

Increasing costs of accessing irrigation water are an important concern more broadly, with 56 per cent of non-dairy irrigators in SRWUIP off-farm irrigation areas reporting that increases in the fixed costs of holding a water entitlement were a barrier to their farm development (56 per cent compared to 45 per cent in other irrigation areas). In addition, 49 per cent said that high

prices of temporary water were a barrier (compared to 37 per cent in other irrigation areas) and 57 per cent found that high water delivery costs were a barrier (compared to 48 per cent in other irrigation areas).

2.5 Timing of off-farm irrigation infrastructure works

Off-farm irrigation infrastructure projects are large in scale and complexity, typically taking a number of years to complete. Many of the projects are still in the construction phase, making it difficult for irrigators to assess the flow-on effects for their farm. Additionally, the kind of effects experienced on-farm differ substantially depending on the type of works undertaken. In general, irrigators living in districts in which off-farm irrigation upgrades were not yet complete, were less positive about the effects.

The proportion reporting positive effects increased between 2015 and 2016 (41 per cent in 2015 to 54 per cent in 2016), while negative views decreased over the same period (20 per cent in 2015 to 13 per cent in 2016). In addition, there was an increased proportion of irrigators reporting positive effects on farm productivity (30 per cent in 2015 to 41 per cent in 2016) and farm profitability (18 per cent in 2015 to 32 per cent in 2016). This is possibly due to the higher proportion of off-farm irrigation works that had been completed in 2016 compared to 2015.

3 Water Sale to the Government

The recovery of water for the environment under the Basin Plan is achieved through both the purchase of water entitlements from willing sellers and through the recovery of water savings as a result of on-farm and off-farm upgrades to irrigation infrastructure. Significant water purchasing was undertaken between 2007 and 2013. The Australian Government legislated a 1500 GL cap on water purchase in 2015, and is now focusing its Basin water recovery efforts on on-farm and off-farm irrigation infrastructure upgrades.

3.1 Survey context

The RWS asked irrigators if they had participated in selling water entitlements to the government at any point since 2007. Those who had sold entitlements were asked about the effects it had on their farm. Whilst this enables assessment of how irrigators who sold water experienced the process, it does not assess how the sale of water by some irrigators may have affected other irrigators in the same irrigation district, or local communities.

Irrigators were also asked if they had transferred entitlements to the government, a process which occurs when entitlements are transferred in return for an on-farm irrigation infrastructure grant. Many irrigators did not view sale and entitlement transfer differently. The following analysis is based on irrigators who reporting selling entitlements so it excludes some who likely sold entitlements but labelled this sale a 'transfer'.

3.2 Participation

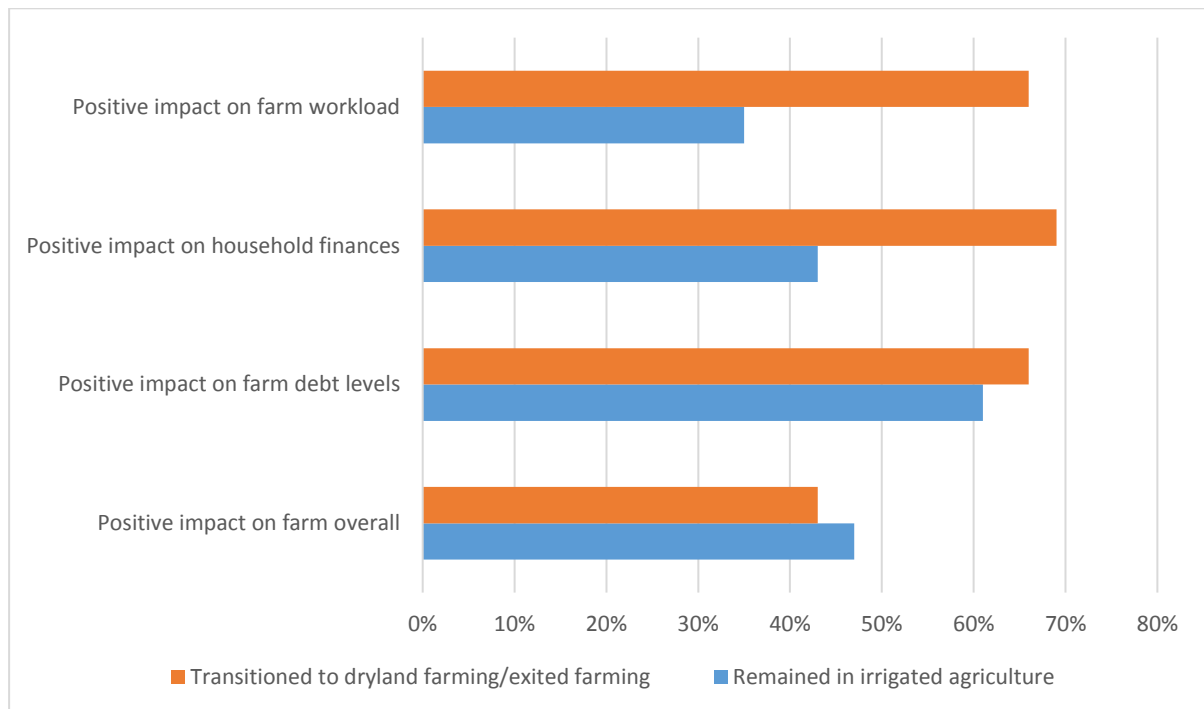
The RWS and other reports (Wheeler et al. 2014) estimate that around one in five Basin irrigators sold water entitlements to the government between 2007 and 2015. The volume and nature of these sales varied. Of those who sold entitlements, an estimated 60 per cent sold part of their entitlements and continued to irrigate, while 10 per cent sold all their entitlements and switched to dryland farming and 30 per cent exited farming altogether (Wheeler 2014). The RWS sample in 2015 predominantly examined the views of irrigators who had sold entitlements but remained in farming, and a small proportion of those who exited farming.

3.3 Sale of water entitlements

The proportion of entitlements sold varied amongst irrigators. 42 per cent of irrigators who sold their water entitlements and remained in irrigated agriculture sold two-thirds or more of their entitlement holdings, while 36 per cent sold less than a third of their holdings. The funds obtained from these sales were most often used to reduce farm debt (51 per cent who sold) and to invest in improving the farm (29 per cent who sold).

The effects of selling water entitlements to the government varied for farmers depending on whether they switched to dryland farming, exited farming or remained in irrigated agriculture.

Figure 3 Survey responses of Basin irrigators on the effect of sale of water entitlements to the government.



3.3.1 Remained in irrigated agriculture

Of irrigators who sold entitlements and remained in irrigated agriculture, nearly half (47 per cent) reported that selling entitlements had a positive effect on their farm overall, while 61 per cent reported positive effects on farm debt levels (Figure 3). This group was more likely to be investing in on-farm irrigation efficiency (67 per cent) compared to those who had not sold entitlements (54 per cent).

Irrigators who had sold entitlements to the government were more likely than other Basin irrigators to report challenges related to water costs. In particular, many irrigators reported that barriers to managing their farm effectively included reduced water allocation, high costs of accessing water allocation on the market, and costs of remaining entitlements (such as water delivery costs). In 2016, irrigators who sold their entitlements were significantly more likely to report that high prices for temporary water allocation acted as barriers to managing their farm effectively (68 per cent who sold compared to 43 per cent who did not), as was a lack of available water allocation to buy on the market (48 per cent who sold compared to 28 per cent who did not). They were also likely to report having decreased the area of land they irrigated in the last 12 months (52 per cent who sold compared to 28 per cent who did not in 2016).

3.3.2 Transitioned to dryland farming or exited farming

Irrigators who sold entitlements and transitioned their farm to dryland farming or exited farming reported more positive outcomes overall than those who remained in irrigated agriculture (Figure 3). In particular, over 65 per cent of these farmers reported a positive effect on their household finances, farm debt levels and farm workload (Figure 3).

References

Schirmer, J 2017, Water Reform: Socio-economic effects of investment in water infrastructure, report prepared for Department of Agriculture and Water Resources, University of Canberra, Canberra.

Schirmer, J 2016, Water Reform: Assessing effects of investment in water infrastructure and water entitlement purchase, report prepared for Department of Agriculture and Water Resources, University of Canberra, Canberra.

Schirmer, J 2015, Socio-economic outcomes of investment in on-farm and off-farm water infrastructure improvement: Regional Wellbeing Survey analysis, report prepared for Department of Agriculture and Water Resources, University of Canberra, Canberra.

Wheeler, SA, Zuo, A, & Bjornlund, H 2014, 'Investigating the delayed consequences of selling water entitlements in the Murray–Darling Basin', *Agricultural Water Management*, vol. 145, pp. 72–82.