

Capacity to Pay submissions review

Analysis of stakeholder response
to willingness/capacity to pay as
part of WaterNSW's (rural) 2017
Determination



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Executive Summary

Agripath has been engaged to estimate the Willingness to Pay for WaterNSW's Rural Bulk Water Services in the North Coast and South Coast valleys. This information is aimed to be used as part of IPART's Determination of water prices in these areas from 1st July 2017. IPART's Draft Report on the aforementioned issue was released on 14 March 2017, followed by a public hearing and invitations for submissions from stakeholders on the North and South Coasts in particular.

This report is further to the scoping study completed by Agripath and Draft Report released by IPART, addressing the stakeholder submissions relating to capacity or willingness to pay.

Willingness to pay is defined as the readiness of stakeholders to utilise irrigation water, up to a point or range (in dollars per ML of water), above which irrigation is deemed too expensive and use of irrigation water declines in favour of not irrigating.

In definition of the original scope, Agripath and IPART discussed two possible methodologies that could be used to determine the willingness to pay:

- Substitution with alternative feed sources such as bought in hay or silage.
- Determining the point at which a producer "breaks even" from additional use of irrigation.

Substitution involves calculating the cost to produce irrigated pasture, per kilogram of dry matter, versus the substitution of grass in the diet, as bought-in feed (e.g. hay or silage).

The *breakeven* point of irrigating would be determined by calculating the marginal revenue, then subtracting the marginal cost, to determine the marginal return of using one megalitre (ML) of water.

After discussion with IPART about the availability of data to complete a marginal return study, the substitution option was decided on as the simpler of the two.

Agripath acknowledges that the "break even" analysis methodology (ie calculating the point at which Marginal Revenue = Marginal cost) is not only a valid methodology, in comparison to using the simpler "substitution" method employed, it is considered a preferred methodology where sufficient data is available.

Agripath considers the data that has been forthcoming under this review process to indeed be reliable and hence Agripath recommends that this "break even" point methodology being used, in preference to the upper limit of Willingness to Pay, previously indicated by Agripath under the "substitution" method.

Based on Agripath's study determining the willingness to pay, IPART worked out a capacity to pay with upper (capacity to pay for irrigation water) and lower limits (avoided cost to WaterNSW if not providing the service, close to zero). This has been referred to as the efficient pricing band, and was used to determine draft prices rather than aiming for full cost recovery (FCR). The resulting midpoint of this efficient pricing band has been utilised to set draft usage prices and hence fixed prices.

Several submissions in response to IPART's Draft Report, express an opposition to the upper limit of the Willingness to Pay. Specifically, Toonumbar Water Users Group (TWUG) have outlined an

alternative methodology to determine the upper limit, based on the breakeven point of irrigating (i.e. marginal return). Richmond Wilson Combined Water Users Association (RWCWUA) have completed their submission in conjunction with Toonumbar Water Users Group.

The submission from TWUG is reasonable, and based on the information provided appears a representation of the marginal return for an average irrigator in the North Coast area. Additionally, Agripath finds IPART's setting of capacity to pay based on a 'reasonably efficient' farm, with an efficient irrigation system, to be above the majority of the irrigators of the relevant valleys.

As outlined in detail in Agripath's original analysis, producers are in fact no longer *willing to pay* for irrigation water, as shown by water usage levels at current pricing. The majority of producers, are reluctant or unable to invest in irrigation infrastructure due to:

- Modest profitability
- Current debt levels and/or
- Uncertainty about the future cost of water

The Marginal Return Analysis completed by the Toonumbar Water User's Group would further explain the low level of water usage in that system.

While there would be individual farms that have efficient irrigation systems, and a high willingness to pay, Agripath is of the opinion that in order to encourage higher use (from both existing and new stakeholders), the upper limit should be set closer to the *typical* irrigator of the valleys.

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Scope

The following scope has been set by IPART for this review.

Task 1: Review of stakeholder's responses to IPART's draft decisions on setting prices in valleys below full cost recovery, in particular regarding capacity to pay estimates.

Review the arguments raised in submissions to IPART's Draft Report on:

- The level at which the upper limit of the efficient pricing band, i.e. capacity to pay, has been set.
- The use of capacity to pay estimates that are based on the costs that a 'reasonably efficient' farm, with an efficient irrigation system would face.
- How capacity to pay has been calculated.

Agripath's willingness to pay scoping study

Agripath's approach was to quantify the cost of irrigated pasture production per kilogram of dry matter (\$/kgDM), and compared this to the cost per kilogram of dry matter of bought-in feed such as hay or silage. **Where these costs of producing home grown feed under irrigation reach parity, with the cost of feeding the herd bought-in feed, this is the point at which the irrigator is no longer willing to pay for irrigation water.** The dairy farmer is motivated to grow feed under irrigation when irrigating pasture is cheaper in \$/kgDM than bought-in feed.

Agripath's findings suggested at current costs there is only eight cents difference per kilogram of dry matter between the cost of irrigated pasture production and bought-in feed. Other factors in willingness or capacity to pay are reflected in irrigator behaviour, such as a lack of water markets and of low *current and projected* usage of irrigation water on the regulated North Coast and South Coast systems.

These include:

- Individual irrigators do not consistently rely on irrigation, often with long periods of little to no irrigation water being required to grow pasture.
- Due to future viability uncertainty, there is also a lack of investment in irrigation infrastructure which could increase the efficiency of irrigation.

Based on the scenarios provided in the Willingness to Pay scoping study, the theoretical *willingness to pay* ranges from **\$17/ML to \$166/ML**. This range was determined for a *less efficient* irrigator through to an *efficient* irrigator. While the efficient irrigator appears to have a large cushion before capacity to pay is reached, this irrigator is not the average of the coastal valley irrigators. With this in mind, the range indicates the willingness to pay threshold is being approached, and in some cases, will have already been reached at current prices – particularly for the *typical* irrigator, who is already at their capacity to pay at *current prices* (\$70/ML on the North and \$80/ML on the South Coast, at 100% usage).

Agripath found the perception of irrigators on the North Coast and South Coast being 'priced out' of irrigating to be a relevant concern, and that any future increase in water prices from current levels and current fixed and usage charges, would be expected to lead to decline in overall usage.

The capacity or willingness to pay is influenced by the ability to invest, to have confidence in a payback period on the investment, and confidence in the certainty of water pricing. For example, an irrigator may be weighing up several investments on farm such as:

- 1) new irrigation infrastructure, with a 7-year payback period,
- 2) new feeding facilities with a 7-year payback period,
- 3) or new plant for feeding fodder, with a 6-year payback period.

The rational farm manager will calculate a return on each of these investments and/or an expected payback period for each. The absence of pricing certainty will in turn provide additional uncertainty for this investment, increasing the perceived hurdle rate (return at which the investor is willing to take on the risk).

IPART's capacity to pay and its 'upper limit'

In March 2017, IPART released its Draft Report and Draft Determination of WaterNSW's prices to apply from 1 July 2017. In setting prices for the Draft Report, the Tribunal adopted and extrapolated Agripath's estimates of capacity to pay to estimate the upper limit of the efficient pricing band for valleys below full cost recovery (i.e., the North Coast and South Coast valleys), based on the costs a 'reasonably efficient' farm would face.

The upper limit of the efficient pricing band is calculated as between the HS and GS upper limit, and the midpoint between this and the avoided cost (lower limit) is taken as the midpoint of the efficient pricing band, and as such the usage price. This usage price is then utilised along with the pricing formula (i.e. proportion of fixed to usage), to determine fixed price.

For specifics on draft water prices calculated through this method, please refer to IPART's draft report.

IPART's setting of capacity to pay based on a 'reasonably efficient' farm, with an efficient irrigation system is fair for those who fit the description modelled, i.e. those with efficient irrigation systems. Agripath understands most irrigation users in the North Coast and South Coast valleys would not be classed as *efficient*, due mainly to irrigation systems that are older style or lower capital (for example, bike-shift or traveller irrigators), which require more labour and electricity/fuel to irrigate with than more efficient systems such as centre pivots.

In terms of the upper limit, because of the stated differences between a 'reasonably efficient' irrigator and a typical or average irrigator in these coastal valleys, conservatism on setting the upper limit based on an efficient irrigation system would be advised.

Review of submissions relating to capacity to pay

Overall submissions regarding the capacity to pay pricing model are a step in the right direction for water pricing in the North Coast and South Coast districts, however several are of the opinion that the upper limit has been set too high. **Anecdotally, current prices appear to be already at the upper limit of capacity to pay as reflected simply in the lack of use of irrigation water and the absence of temporary water trading markets in the North Coast and South Coast.**

The Bega Valley Water Users Association submission reflects this, commenting they believe the upper limit on the South Coast to be closer to \$40/ML and hence the midpoint closer to \$20, relating this to average usage (outside the scope of this review).

Richmond Wilson Combined Water Users Association (RWCWUA) in conjunction with Toonumbar Water Users Group (TWUG) have put forward submissions around the North Coast pricing, regarding fixed and usage prices respectively. The TWUG submission extrapolates data from the 2015-16 Dairy Farm Monitor Project and Agripath findings to calculate a Marginal Return, then estimates the recommended usage using a 'midpoint' approach similar to that of IPART. The calculation of the Marginal Profit (or Marginal Return) is as demonstrated below. The final three rows, in italics, are changed slightly from TWUG's approach in that depreciation has been removed from Agripath's irrigation cost, as in the Dairy Farm Monitor Project depreciation is included in fixed (not variable) costs.

Table 1: Commentary on the method used by Toonumbar Water Users Group to calculate Marginal Return (and thus capacity to pay).

| Marginal Return calculation, with depreciation taken out. | | | Source and Notes |
|---|--------------------------------|------------------------------|---|
| Item | Assumption/Calculation | | |
| Water use efficiency | 1ML = 1tDM | | IPART Report. Taken as assumption of 'reasonably efficient' irrigator, pg139. |
| Feed utilisation to product | 1tDM = 75kgMS | 144,064kgMS/1,918tDM | Dairy Farm Monitor Project 2015-16, Individual Report. Total kg of milk solids produced = 144,064 kgMS (pg13). Total feed fed = 1,918 tDM (pg11). |
| Income as milk price per kgMS | \$7.65/kgMS | | Dairy Farm Monitor Project 2015-16. Average of North group, pg14. |
| Marginal Revenue | $\$7.65 * 75\text{kgMS} =$ | \$574/ML | |
| Variable costs not inc irrigation | \$4.09/kgMS | | Dairy Farm Monitor Project 2015-16. Average of North group, calculated as Total Variable Costs less Irrigation (as the variable cost in question), pg17. Ranges from \$2.38-\$5.36/kgMS. |
| | $* 75\text{kgMS}/\text{tDM} =$ | \$307/ML | Ranges from \$180-\$400/ML. |
| Cost of irrigation | $\$0.25-\$0.29/\text{kgDM} =$ | \$250 to \$290/ML | Agripath Report. Cost of production at WUE of 1tDM/ML, pg16. |
| <i>Cost of irrigation less depreciation</i> | $\$0.23-\$0.27/\text{kgDM} =$ | $\$230$ to $\$270/\text{ML}$ | Agripath workings on depreciation based on 'typical irrigator'. |
| Marginal Cost inc irrigation | $\$307 + \$250 =$ | \$557/ML | |
| Marginal Profit | $\$574 - \$557 =$ | approx \$17/ML | At current costs. |

These workings suggest that, at current milk prices and costs, there is a nominal marginal return of \$17, which is very close to break even for the user.

Utilising detail of the calculations provided by TWUG, the following sensitivity around Marginal Cost, using dollars per megalitre, was performed based on the range of variable costs per megalitre for the North group of the Dairy Farm Monitor Project.

Table 2: Sensitivity on range of variable costs (excluding irrigation, Dairy Farm Monitor Project 2015-16), and irrigation costs (excluding depreciation, Agripath Report), in \$/ML.

| | \$/ML Cost | Variable cost excluding irrigation | | | | |
|------------------------------|------------|------------------------------------|-----|-----|-----|-----|
| | | 200 | 250 | 300 | 350 | 400 |
| Irrigation excl. dep'n | 230 | 430 | 480 | 530 | 580 | 630 |
| | 240 | 440 | 490 | 540 | 590 | 640 |
| | 250 | 450 | 500 | 550 | 600 | 650 |
| | 260 | 460 | 510 | 560 | 610 | 660 |
| | 270 | 470 | 520 | 570 | 620 | 670 |

The intersection of \$300/ML variable costs (not including irrigation) from Dairy Farm Monitor Project plus the \$250/ML in Irrigation costs from Agripath's report shows the approximate midfield of total variable costs, comparable with TWUG's example above. It must be noted that not all dairies in the Dairy Farm Monitor Project irrigate, and the lower cost do not necessarily correlate with higher profits.

The range of irrigation costs, from 25c to 29 c/kgDM, are modelled on a *typical* irrigator. **The typical irrigator, per Agripath's illustration, is defined as having functional infrastructure that is neither outdated nor the very latest technology.** For example, if an item of irrigation infrastructure investment was purchased for \$50,000, which is depreciated over 10 years, using 200ML/year, it has a depreciation cost per ML used of \$25, or 2.5c/kgDM at 1tDM/ML. As discussed in the initial Agripath Report, most of the irrigation infrastructure in the North Coast and South Coast valleys are older systems, which are more labour intensive and less efficient at irrigating. Agripath also noted that stakeholders indicate there is hesitation to put forward the capital outlay required to upgrade irrigation systems (to centre pivots, for example), due to a lack of certainty around current and future water pricing and markets. The lower capital expenditure and depreciation below reflect this.

With this in mind, and at the request of IPART, Agripath recommends the following parameters be used as a guide to defining the cost of irrigation for a *typical* irrigator, noting there will be a large range amongst irrigators based on their irrigation efficiency, and there is not sufficient data to comment on an individual irrigator.

Table 3: IPART's assumptions for a 'reasonably efficient' irrigator and Agripath's assumptions for a more typical irrigator on the North Coast and South Coast.

| Parameter/assumption | Reasonably efficient irrigator (IPART) | Typical irrigator (Agripath) |
|---------------------------|--|------------------------------|
| WUE | 1000 kgDM/ML | 1000kgDM/ML |
| Pasture utilisation | 67.5% | 67.5% |
| Wastage of bought-in feed | 10% | 10% |
| Electricity | 560kW/ML ie, \$82.56/ML | 560kW/ML ie, \$82.56/ML |
| Capital Expenditure | \$60,000 | \$50,000 |
| Asset life | 10 years | 10 years |
| Depreciation | \$30/ML | \$25/ML |
| Labour | \$16/ML (1.5ML/hr) | \$24/ML (1ML/hr) |

Regarding the use of marginal return methodology, the adoption of the average pasture utilisation of 67.5%, from the North Dairy Farm Monitor Project, is thought to be appropriate in calculating a marginal return. This is evidenced anecdotally and supported by Agripath's conversations with stakeholders during the report research, and the resulting estimates for the typical irrigator.

Agripath is in favour of utilising the Marginal Return method to estimate capacity to pay for rural bulk water, providing there is quality data to do so. Based on the data provided in submissions and during the Draft Report process, it would appear there is adequate data to model the irrigation decisions of the *typical irrigator* to provide a reasonable reference point to be considered in setting coastal valley water prices. Where the irrigator has knowledge of both marginal revenue and marginal cost, it can be assumed they will use this breakeven point to calculate the point at which they no longer use irrigation water to grow additional livestock fodder.

The data above in turn affects the submission put forward by the Richmond Wilson Combined Water Users Association, in relation to the fixed to usage formula, which is outside the scope of this review.

Conclusion

The original two methods discussed between Agripath and IPART, prior to completion of Agripath's 2017 study to determine willingness and capacity to pay for irrigation water, were:

- 1) substitution with alternative feed sources and
- 2) breakeven position as determined by Marginal Return.

Agripath determined the range of willingness to pay was from \$17/ML for a less efficient irrigator up to \$166/ML for a highly efficient irrigator. In response to IPART's draft report release detailing their capacity to pay's upper limit set as for a 'reasonably efficient' farm, with an efficient irrigation system, submissions expressed that the upper limit needs further review. Toonumbar Water Users Group outlined an alternative method to calculate capacity to pay, through Marginal Return (i.e. the breakeven point). The details used by this group to determine that the current prices are approximately at breakeven have been sourced from IPART and Agripath's reports in question, and from the Dairy Farm Monitor Project. The Dairy Farm Monitor Project sources are based on the Northern NSW group average, which (while not all irrigators) is considered a reliable dataset on which to calculate average marginal return. Agripath has slightly adjusted the calculations set out by TWUG by taking depreciation out of the variable irrigation cost.

Agripath recommends that the capacity to pay is based on a *typical* rather than *reasonably efficient* water user in each valley, as most users are less than reasonably efficient based on current data. Agripath also is in favour of the review process using the Marginal Return model alongside or alternatively to the substitution of feed sources method, in circumstances such as this, where there is accurate data to do so.

Appendix: Stakeholder response to capacity to pay

The following stakeholder submissions *referring to capacity to pay* have been reviewed and summarised. For the full documents of these submissions, please go to: <https://www.ipart.nsw.gov.au/Home/Industries/Water/Reviews/Rural-Water/Prices-for-WaterNSW%e2%80%99s-Rural-Bulk-Water-Services-from-1-July-2017-formerly-State-Water-Corporation?qDh=3>

Bega Valley Water Users Association (BVWUA)

- “Believe the ‘capacity to pay’ upper band limit to be closer to the \$40 mark with the midpoint closer to \$20. This is reflected in the reduction in usage from the previous 2010 determination of 5804ML to the average usage of 3781ML over the last 8 years.”
- “Question why the ‘capacity to pay’ for high security customers set at around \$70, is less than general security customers.”
- “If the fixed cost was increased to \$13/ML for general security and \$26ML for high security and the usage was reduced to \$20/ML the revenue generated by entitlement holders based on current usage of 3,781ML would be \$287,468. If as predicted, the halving of the usage price resulted in an increase of usage to the 2010 IPART annual forecast of 5,804ML, the revenue generated would be \$327,928 very close to the \$318,207 currently generated.”

Hunter Valley Water Users Association (HVWUA)

- “Support and refer IPART to NSWIC recommendations for Coastal Valley water charges.”
- “Frustrated and concerned that IPART is proposing to defer a looming cost crisis in the production of food and fibre in Coastal Valleys for another four years by not revisiting the framework that determines water charges for NSW Coastal Valleys.”

NSW Farmers Association (NSWFA)

- “Specific concerns include: the inappropriate and bloated regulatory asset base (RAB) in the Peel, North Coast and South Coast valleys, that is increasing usage charges, incentivising users to exit the market, and jeopardising the existence of a functioning water market in the region.”
- “Recommend: IPART undertake a review of the viability of the Peel, North and South Coast valleys to more closely align water prices to capacity to pay, recognising the impact of previous price determination in shrinking the user base.”
- “Recommends that the NSW Government explicitly abandon the policy imperative for full cost recovery in the North Coast and South Coast valleys.”
- Note “these valley water markets are in danger of failure, due to the self-perpetuating problem of increasing water prices that drive users out of these valleys, which in turn increases water prices for remaining users.”

NSW Irrigators Council (NSWIC)

- “To not fundamentally review the current cost and pricing situation – does nothing to address the current lack of irrigation cost sustainability for the coast.”

- “The current pricing structure and level of prices has already driven WaterNSW’s customers away from utilising their entitlements. What is needed is an incentive to increase usage – which equally will decrease the required CSO by the NSW Government – and an incentive to attract other customers or businesses to share the costs. This points to the urgent need for cost reductions to make water use more affordable and attractive to new customers.”
- “Considers it critical that IPART considers amending the timeframe around the coastal valley pricing review in order to truly find a long term sustainable cost/services solution for WaterNSW.”
- “Recommends that IPART initiate a separate review on the preliminary options for NSW Coastal Valleys as outlined in its Issues Paper, which sit outside WaterNSW’s regulated water charge review.”

Richmond Wilson Combined Water Users Association (RWCWUA)

- Their “submission is best read in conjunction with the submission made by Toonumbar Water Users Group”.
- “Believe the figure used to set the upper limit was incorrect as demonstrated in the Toonumbar Water Users submission”
- “Support the Toonumbar Water Users proposed variable charge of \$18.87 and we recommend that the fixed price should be \$8.91.” – please see submission for calculations.
- “Recommendation would see the fixed to variable cost ratio very close to 90:10. This recommendation does not reduce the income to Water NSW and in fact is likely to increase it as the reduced usage charge makes it more likely that licence holders will use water.”

Toonumbar Water Users Group (TWUG)

- “Support the submissions from Richmond Wilson Combined Water Users Association and Bega Valley Water Users Association Ltd.”
- “Do not agree that the comparison to bought in feed can be used to estimate capacity to pay for bulk water. Economic survival depends upon profitability not just the ability to find an alternative source of feed.”
- “The upper limit of “the efficient pricing band” needs to consider not just the cost of bought in feed but also the profitability of using that feed. We believe a far better indicator of capacity to pay would be the marginal profit from using an extra ML of water. A business should continue to increase its water usage to a point where the marginal revenue is equal to the marginal cost. At this point the marginal profit is 0 and any further use of water will create a negative return.”
- Use figures from the Agripath Report and the Dairy Farm Monitor Project NSW 2015/16 to calculate marginal cost and marginal revenue – please see submission for calculations.
- “At current prices, there is no incentive to continue to irrigate. From these figures the upper level of the Efficient Price Band is the current cost.”
- “\$18.87 ... becomes the recommended usage price for Toonumbar”
- “Suggest is \$8.91 for the fixed cost ... Calculations for [fixed cost] are detailed in the Richmond Wilson Combined Water Users Association’s submission.”