



**TO:** GOVERNANCE COMMITTEE (GC)  
**FROM:** GEORGE OAMEK, EXECUTIVE DIRECTOR'S OFFICE (EDO)  
RENATA RIMSAITE, WATER FOR FOOD INSTITUTE, UNL  
**SUBJECT:** POSSIBLE REVISIONS TO THE CNPPID IRRIGATOR LEASE  
**DATE:** AUGUST 25, 2020

This memorandum focuses upon the current and potential future water lease program between the PRRIP and CNPPID irrigators and describes the status of the program and possible revisions to reduce future costs. Per the 2018 agreement between PRRIP and CNPPID, the PRRIP must communicate pricing changes to CNPPID prior to October 1 or terminate the agreement prior to October 15. As a result, the GC needs to discuss and act on the future of this program at the September 2020 meeting.

### Historical Perspective

The CNPPID irrigator lease program pays irrigators to fallow irrigated lands during years of full surface CNPPID water allocations, with the leased water stored in Lake McConaughy's Environmental Account (EA). The PRRIP had a lease agreement with CPNRD for surface water supplies prior to developing the irrigator lease program, but the CNPPID irrigator lease was the first time a lease was transacted directly with irrigators involving removing land from irrigation.<sup>1</sup>

The CNPPID irrigator lease program was initiated during the 2016 crop year and has been in effect for each year since.<sup>2</sup> Payments have been fixed at \$220 per acre for 9 inches of surface water per acre (0.75 acre-feet per acre), effectively \$293 per acre-foot. The PRRIP's offer price was the result of several considerations:

- The PRRIP had recently struck-out in attempts to lease from the short-lived CPNRD groundwater market at bid prices lower than \$220 per acre.
- Corn prices dropped from \$7.00 per bushel in 2012 to slightly under \$4.00 per bushel by 2015. However, price expectations remained in the \$4.00 to \$4.50 per bushel range in 2015-16, making \$220 per acre for irrigation water reasonable in light of these expectations.
- Irrigated land rental prices during this period were near \$220 per acre.
- It is reasonable to state that there was some apprehension among the irrigators in initially dealing with an untested environment-oriented quasi-government agency. It was assumed that some premium above the water's economic value would be needed to encourage participation. However, the level of this premium was unknown in 2015, but may be dropping over time as the lease program becomes established.

Despite what was considered at the time a relatively generous price, irrigators did not rush into it. Of the 2,000 acres the PRRIP originally targeted for leases, only 1,037 acres initially enrolled for the 2016 crop year. It took 3 years for the irrigator lease program to reach full enrollment of 2,000 acres under the original water leasing agreement. As trust has been gained and corn prices continue to drop, the irrigators

<sup>1</sup> Although the leases are between the PRRIP and the individual irrigators, the PRRIP pays CNPPID \$10,000 annually to administer the program, which includes sign-up activities, monitoring, and enforcement, as needed.

<sup>2</sup> The irrigator lease can be implemented in a given year only if CNPPID is providing a full water delivery allocation to irrigators.



and the PRRIP have become willing partners. Currently, the program is fully subscribed after expanding to allow up to 3,000 acres and will likely remain popular as long as corn prices are low.

### Issues Moving Forward

The main benefits of the irrigator lease program have been establishing a good relationship between the PRRIP and the irrigators, plus the water supply itself. Offsetting these major benefits are drawbacks requiring careful consideration.

- Most importantly, the irrigator leases are the PRRIP's most expensive source of water. Currently, they are over double the cost of surface water leases under negotiation with CPNRD and NPPD and have become an inappropriate benchmark in these negotiations.
- The leases are annual in nature and only in full allocation years. This reduces the certainty and the value of the supply compared to something more multi-year in nature.

Although the PRRIP expects that the irrigator leases would be on the high side of overall average water cost, there is also a strong need to average-down future water expenditures to keep the PRRIP financially viable over time. As a result, potential changes in terms may be necessary to reduce this program's cost.

### Future Benefit of the Irrigator Lease Program

It appears both the PRRIP and the irrigators can benefit from continuing the lease program if mutually agreeable terms can be developed. The PRRIP would benefit from the water supply itself and the potential option of expanding the program in the future. The irrigators will continue to benefit from the revenue boost provided by the lease payments.

It is important to note that the PRRIP does not currently know how critical the irrigator lease program may be in the future. The Water Action Plan shows that water supply goal of 120,000 acre-feet or more could be met without the irrigator lease program. However, this conclusion depends on several other water alternatives working out as planned and that future water needs are not significantly expanded beyond those currently identified. A major part of the irrigator lease program's value is the potential for future expansion as water needs develop or change. Eliminating the irrigator lease program would preclude a potentially reliable and flexible future water supply option, or at minimum, make the program more difficult to re-start at a later date.

Other significant benefits that the lease program brings to the PRRIP include:

- High degree of flexibility when combined with storage.
- Diversification of the PRRIP's water portfolio.
- A high, but competitive cost for water compared to infrastructure-based water projects depending on increasingly uncertain high river flows.
- Flexibility in negotiations and terms with regard to innovative water transfers, such as those considered by Colorado in their ATM programs (Alternative Transfer Methods). These innovations might include dry year options, wet year options, and other interruptible types of leases.



Offsetting these benefits are two cost considerations, one being the aforementioned expense and the second being the influence volatile crop prices may have on negotiated lease prices. Since 2005, corn prices have gone from \$2.00 per bushel to \$7.00 per bushel (2012) back down to their current level near \$3.00 per bushel. It is reasonable to assume that similar swings could be experienced during the next 15 years. With that in mind, some allowance for this volatility will be required in the lease terms.

### Irrigator Concerns

In light of the above concerns, the PRRIP met with eight irrigators participating in the program, plus CNPPID staff, on July 29, 2020, to discuss the current lease program and its possible future. Major “take-aways” from the meeting are as follows:

- The current lease program has become an increasingly popular source of revenue as corn prices have dropped.
- The program is achieving its desired results – removing less efficient acreage from irrigation, such as pivot corners and other hard-to-irrigate parcels. In some cases, it has allowed the operator to take their pivot off-line for a year for either replacement or major repairs.
- Irrigators would prefer the leases be multi-year in nature to provide a longer-term planning horizon. Terms of 3 to 5 years were discussed. Varying terms were also discussed, such as some proportion of leases being 3-5 years in length and some on an annual basis. Whether price would vary with the term was questioned but not discussed in detail.
- With respect to price, the irrigators appeared to accept that future prices would be lower than \$220 per acre. But not much lower, of course. Although there was no intention of asking irrigators about what prices they would accept in this forum, they did question the process in which PRRIP would use to arrive at a price. In response, the PRRIP indicated that it could either (1) set the price and hope that enough irrigators accept it to meet our acreage goal, or (2), use an alternative method, such as a reverse auction, to solicit what price the irrigators would accept to lease water to the PRRIP. These methods are discussed in greater detail in following sections.
- In the context of a multi-year lease, the irrigators were concerned about changing economic conditions. Specifically, they cited a “flex lease” concept as desirable because the lease price would be responsive to commodity prices, specifically the price of corn. For example, a 5-year lease may be defined by a base price, say \$150 per acre, and change, or flex, over time in proportion to the change in corn prices over the following 5 years. Conceptually, the PRRIP agreed that any multi-year lease would have to be responsive to crop prices. However, the PRRIP’s concern is for the case in which corn prices may double over the course of a year or two and whether there is a way to attenuate these rapid price swings, such as using moving average crop prices.
- There appeared to be a slight preference among the group for the PRRIP to set the price rather than to participate in a reverse auction. It should be noted that the irrigators were relatively well-informed about how a reverse auction works. At this point, they appear somewhat more comfortable reacting to PRRIP’s price than proposing one of their own.
- The irrigators stressed the value of developing a long-term relationship with the PRRIP. The PRRIP could not have said it better.



Overall, the long-term goals of the irrigators and the PRRIP appear fully consistent. Of course, this depends on reaching agreement on a base lease price and how to adjust the price over time in response to commodity price changes.

### Future Directions

There are several alternatives for moving forward with the irrigator lease program, not including eliminating the program or leaving it as is. The PRRIP, CNPPID irrigators, and CNPPID staff all see value in the program but appreciate that the PRRIP cannot continue to pay the current price. Also, all agree the value of the program could be higher if at least a portion of the leases were multi-year in nature. From this perspective, the future issues are:

1. What is the revised base lease price and how is it arrived at?
2. In the case of multi-year leases, how would the price adjust over time?

### Revised Lease Price

As indicated above, the PRRIP can either set the lease price and hope enough irrigators accept it or implement an alternative method, the reverse auction, and let the irrigators reveal how much they will accept for their water. Both are discussed below. Regardless of the method used, it is important that the annual lease price be consistent across irrigators and lease terms. For instance, all irrigators offering 5-year leases are paid the same; all offering one-year leases are also paid the same, but not necessary the same as the 5-year offerors.

### PRRIP Sets the Lease Price

It is essential that the method(s) used to set the lease price be sensible and transparent, but also desirable they have some basis, or tie, to the economic value the water generates in irrigation. There are several methods that fulfill these needs, but a good example would be valuation based on the difference in rental values for irrigated and dryland cropland in the area. This difference should adequately represent the value the irrigation water provides on an annual basis. Since it is market based, factors such as yields and expected crop prices are already implicitly accounted for within the rental prices.

The University of Nebraska annually publishes cropland values and rental rates by region, providing a consistent measuring stick over time. Figure 1 shows the time series of cropland rental rates for Central Nebraska over the period 1981 through 2019<sup>3</sup>.

<sup>3</sup> <https://agecon.unl.edu/2020-nebraska-farm-real-estate-report>



**Figure 1. Cropland Rental Rates for Central Nebraska**

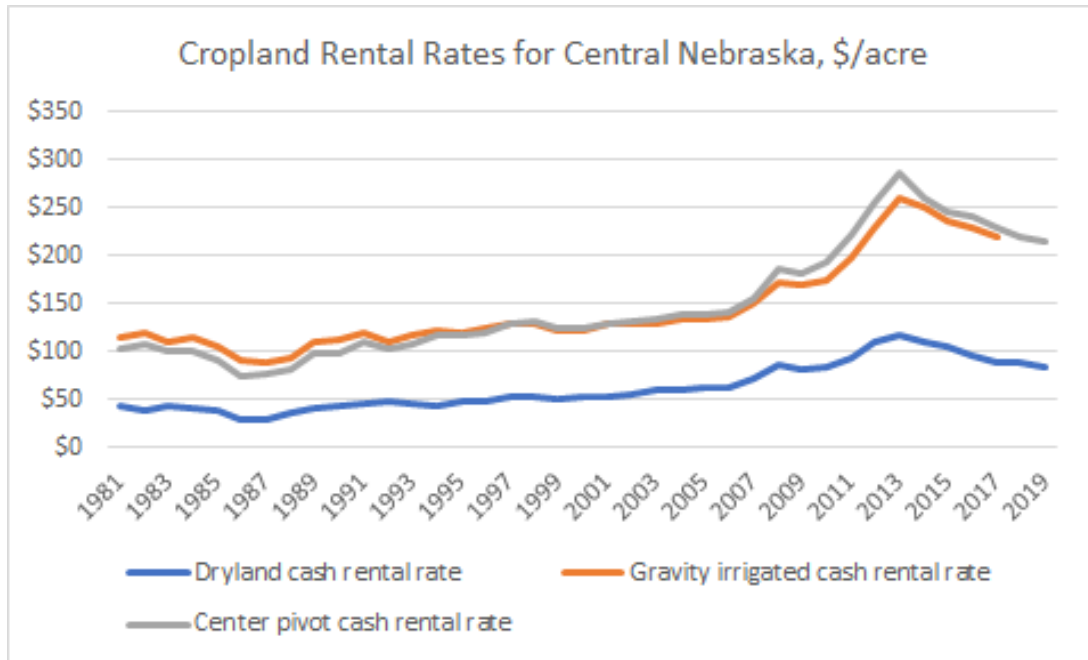
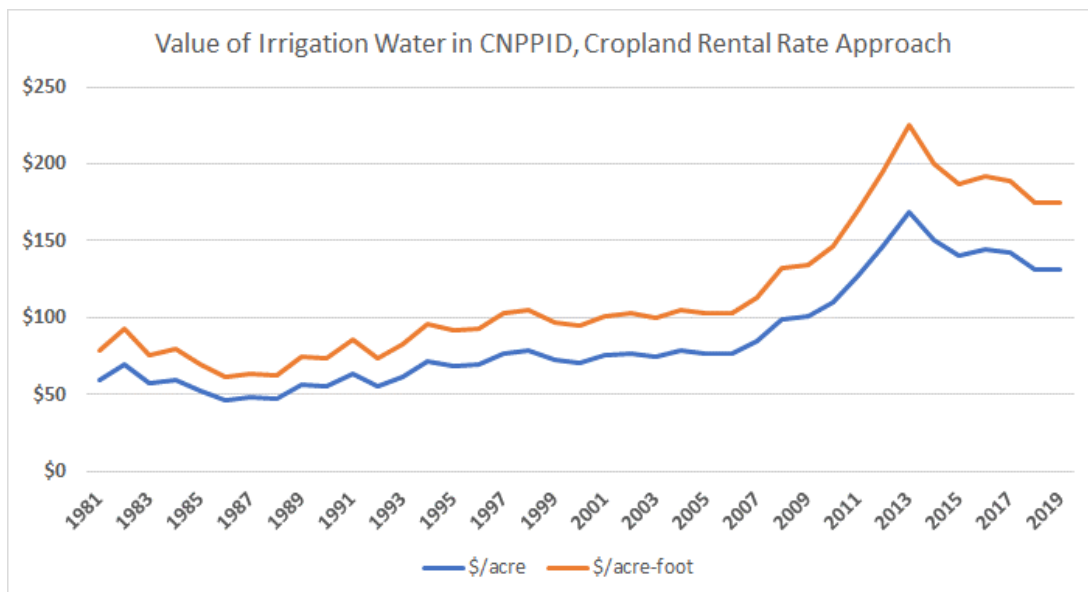


Figure 2 shows the difference in rental rates between center pivot irrigated and dryland cropland in Central Nebraska, on a per acre basis and on a per acre-foot basis, assuming a 0.75 acre-foot per acre water allocation. This difference represents the additional economic value provided by the irrigation water, providing a rational starting point for setting a water lease price. For 2019, the difference was \$131 per acre, or \$175 per acre-foot.

**Figure 2. Implied Value of Water Using the Cropland Rental Rate Approach**





### Lease Price is Determined by Reverse Auction

The reverse auction is a measure of an irrigator's willingness-to-accept, measuring how much the irrigator would take for leasing a portion of their irrigation water. The City of San Antonio, for instance, has leased groundwater for over a decade from nearby Edwards Aquifer irrigators through this process. In addition, prices paid for the NRCS's Conservation Reserve Program (CRP) are "discovered" at the regional level through reverse auction. Further, the short-lived CPNRD groundwater lease market used this process to derive the local supply curve for groundwater. From an economics standpoint, the reverse auction is suited for a market with few buyers and many sellers, which accurately describes PRRIP's situation for leasing from irrigators.

The benefit of a reverse auction is that it relieves the PRRIP from the responsibility of pricing irrigator lease water by using a competitive approach and economic efficiency. It is intrinsically fair to irrigators because they set the price themselves. Offsetting this benefit is that there may be an educational component involved in familiarizing irrigators with the concept and the possible, but remote, chance the irrigators collude to drive the price up. The PRRIP could put bounds on maximum prices paid or otherwise restrict the market to its available budget.

### Example Reverse Auction

A hypothetical example applied to the CNPPID irrigators best explains how a reverse auction would work here. Assume that the PRRIP announces a desire to lease irrigation water from 1,000 acres of CNPPID cropland. This translates to 750 acre-feet based on a 0.75 acre-foot per acre allocation. The PRRIP asks that irrigators submit sealed bids of how many acres they would be willing to dry-up and at what price they would have to receive to do it, on a \$/acre basis.

Further, assume that 15 irrigators submit sealed bids. Table 1 shows the unsealed bids for this hypothetical transaction. Each bidder submits a price and acres associated with that price. One can observe that the bid prices range from \$71/acre to \$214/acre for quantities ranging from 25 to over 151 acres.

Table 2 ranks these bids from lowest to highest. Note the cumulative number of acres associated with each ranked price. Figure 3 is the resulting graphical relationship between the bid prices and the cumulative quantity of water.

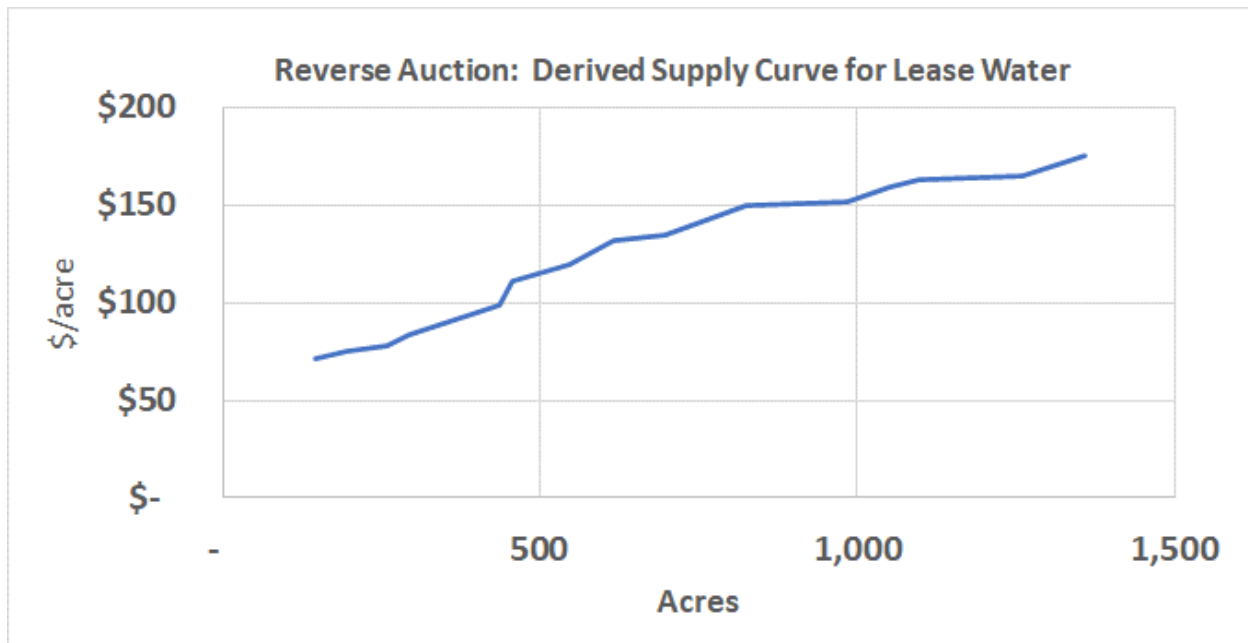
**Table 1. Results of Unsealed Bids for a Reverse Auction**

Unsealed bids		
Bidder	Bid, \$/acre	Acres offered for following
1	\$ 150	130
2	\$ 84	35
3	\$ 71	147
4	\$ 135	80
5	\$ 111	21
6	\$ 163	48
7	\$ 120	90
8	\$ 132	70
9	\$ 78	62
10	\$ 165	160
11	\$ 99	142
12	\$ 152	160
13	\$ 75	49
14	\$ 159	65
15	\$ 175	101
Total		1,360

Figure 3 represents the PRRIP's supply curve for irrigation water, or more specifically, for irrigated acres. If the PRRIP desires water from 1,000 acres, one finds the price in Figure 3 corresponding to 1,000 acres. From this hypothetical example, it appears 1,000 acres corresponds to a price of about \$150 per acre, or \$200 per acre-foot. As such, all bidders below the 1,000 acre cap would be paid \$150 per acre.

**Table 2. Unsealed Bids Ranked**

Unsealed bids			
Bidder	Bid, \$/acre	Acres offered for fallowing	Cumulative acres
3	\$ 71	147	147
13	\$ 75	49	196
9	\$ 78	62	258
2	\$ 84	35	293
11	\$ 99	142	435
5	\$ 111	21	456
7	\$ 120	90	546
8	\$ 132	70	616
4	\$ 135	80	696
1	\$ 150	130	826
12	\$ 152	160	986
14	\$ 159	65	1,051
6	\$ 163	48	1,099
10	\$ 165	160	1,259
15	\$ 175	101	1,360

**Figure 3. Irrigated Acres Supply Curve Associated with Hypothetical Reverse Auction.**





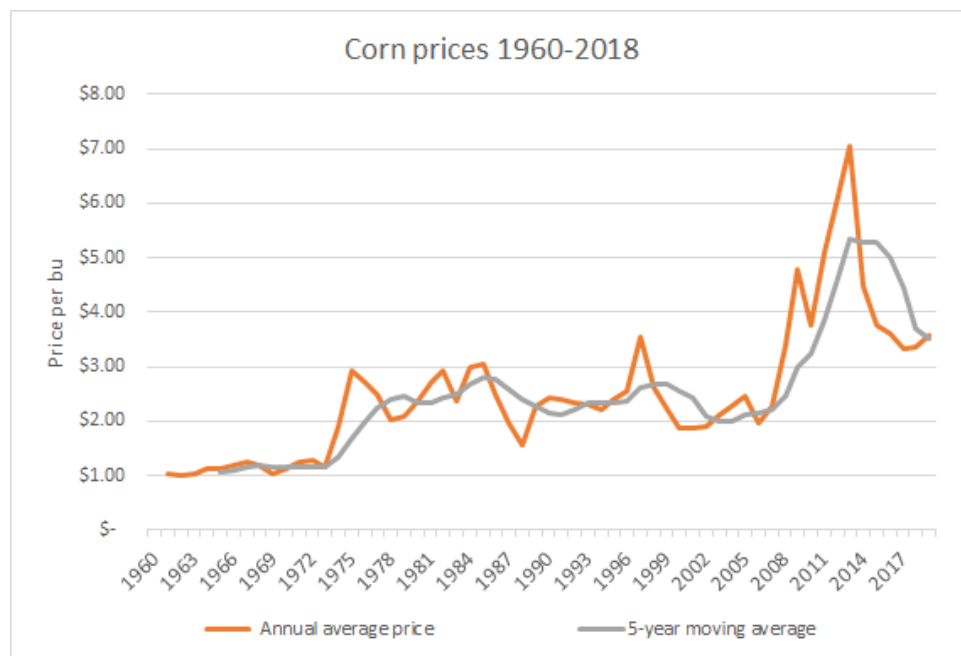
### Adjusting the Price in a Multi-Year Lease

Under a cash rent arrangement for cropland, a lease that flexes with crop price means that the lease price will change in direct proportion to the change in crop price during the intervening period. So, if farmland rents for \$240 per acre with an assumed base price of \$3.50 per bushel for corn, an increase in corn price to \$4.00 per bushel over the term of the lease will increase its price to about \$274 per acre ( $(\$4.00/\$3.50)*\$240 = \$274$ ). Conversely, if corn price drops to \$3.00 per bushel, the lease price drops to \$206 per acre, through this same process.

Several CNPPID irrigators suggested that the lease price, whatever that be, adapt this flex provision in some fashion. The PRRIP agrees with this concept but has concerns with applying it the same as for cropland leases. As mentioned above, corn prices can change dramatically within a given crop year and across years. If the corn price doubled from one year to the next, the PRRIP's lease cost would similarly double. Although some volatility is to be expected, this rapid of change would be detrimental to PRRIP's finances.

However, a longer-term outlook on corn price may dampen sharp swings in the lease price. A 5-year moving average index of corn price, rather than current corn prices, removes the extreme highs and lows out of potential adjustment. This can be illustrated by comparing annual corn prices against 5-year moving average corn prices, as shown in Figure 4.

**Figure 4. Annual Corn Prices for Nebraska and Their 5-Year Moving Average**



As a point of interest, the 5-year moving average corn price index closely tracks with actual historical changes in irrigated cropland rental rates, implying that it is a valid proxy for changes in the value of irrigation water. Other types of price adjustments, or indices, are available do not track the movement of cropland rental prices as well.



### Possible GC Action

Regarding the GC, the CNPPID irrigator lease program offers a wide range of possible actions. Three courses are identified below, with appreciation that combinations of these actions are possible.

#### 1. Terminate the Irrigator Lease Program

The lease program can be terminated at the discretion of the GC. Notice must be given prior to October 15<sup>th</sup> for the upcoming crop year.

#### 2. Continue the Program through 2021

As per current agreement, maintain the current program through the 2021 crop year, either maintaining the current price, \$220 per acre, or reducing the price to a level based on the water's average profitability in irrigation. This defers any long-term decisions about the lease program until the 2022 crop year.

#### 3. Extend the Program by Offering Multi-Year Leases with a Reduced Price

This would involve the PRRIP offering multi-year leases of 3 to 5 years, either in addition to, or in place of, annual leases. Price levels offered to the irrigators would be less than current price levels and based upon either

- The estimated profitability generated by the irrigation water, as estimated but the PRRIP
- A reverse auction framework

A moving average price index linked to commodity prices will serve as the basis for adjusting the lease price in multi-year leases.