HELVETAS
PAKISTAN

COST - RETURN ANALYSIS OF RICE CROP WITH IMPROVED PRACTICES

DISTRICT SHEIKHUPURA

PAKISTAN

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Executive Summery

This study is conducted for Water Productivity (WAPRO) project implemented in Muridke *tehsil* of district Sheikhupura Punjab Pakistan. It is a comparison between the findings from early 2017 and end 2018 based on 21 farmers systematically selected from head, mid and tail of the channels. These farmers were noted to be practicing conventional rice production methods in 2017 before project interventions. Baseline information on costs and revenues was collected from these farmers in 2017. During the study period these farmers were facilitated by WAPRO project and switched to a number of improved on-farm practices including water efficient techniques. The current study compares the difference between 2017 and 2018 (two cropping seasons) based on economic returns from the improved rice production practices.

Under WAPRO project, multi-stakeholders join hands to enhance water productivity in rice and cotton in a Public-private partnership model. WAPRO has introduced an innovative approach to increase water productivity in rice through Push-Pull-Policy approach. Data for this study were collected through Focus Group Discussions and individual interviews with 21 farmers during the month of December 2018 after the harvesting and completion of paddy related operations. The objective of the analysis is to assess the impact of adoption of improved irrigation practices, mainly including application of laser land leveling and also Alternate Wetting and Drying techniques, and other agronomic practices on rice productivity[1].

The study provides information on net revenue gain for all three categories of farmers i.e. head middle and tail of the channels. The study also provides results for overall weighted per acre net revenue and overall increase in the household income over the baseline conducted in 2017 and recommends for up scaling of these practices due to a strong business case for the individual farmers (increased net revenues) with reduced demand for irrigation water and more paddy per unit area.

The analysis is based on per acre inputs and output of rice crop which shows that net per acre revenue received by farmers has significantly increased. The average per acre net increase in net revenue recorded in comparison from the baseline conducted with the fixed sample farmers is Rs.11422 at head, Rs.8646 at middle and Rs.4441at the tail farms of the channel (an increase of 122%, 154% and 190% respectively). The increase in revenue is mainly attributed to efficient irrigation practices and adoption of better agronomic practices.

[1] This analysis is not based on application of direct seeding of rice (DSR).

1. Introduction

Water Productivity (WAPRO) project is funded by Global Programme on Food Security (GPFS) of the Swiss Agency for Development and Cooperation (SDC) and multiple international companies. Global WAPRO is led by Helvetas Swiss Intercooperation (Helvetas). The rice component in Pakistan is implemented in Muridke *tehsil* of district Sheikhupura Punjab Pakistan by MARS Food (MARS) in partnership with Rice Partners (pvt.) Limited while Helvetas Pakistan is a policy partner. Under WAPRO project, multi-stakeholders join forces to enhance water productivity[2]. WAPRO has introduced an innovative approach to increase water productivity in rice through Push-Pull-Policy[3] approach. The push component addresses the knowledge gap of farmers with respect to techniques leading to water productivity. This component represents the usual approach of development cooperation by bringing a change of agronomic technologies through extension. The approach is useful, but incentives are lacking for the farmers to adapt their traditional ways of rice cultivation at a larger scale. The Pull component addresses this very issue of incentives. The producers (rice farmers) are motivated to change production and irrigation practices, the buyers of the product support this change by improved market incentive including immediate cash payment on factory gates and inclusion of farmers in a systematic programme for farmers' advisory. The Policy component supports learning and disseminating knowledge in order to support enabling water policies to improve water governance. A crucial ingredient of good water governance is awareness of stakeholders on rights and obligations. The policy component contributes to this end through facilitating discussions among multi-stakeholders (push and pull actors as well as up-takers) in workshops and meetings and documenting success stories. The water stewardship[4] approach brings water users and managers together to agree on a negotiated and joint action and a water use plan.

This study was commissioned by Helvetas as a follow up to the study on cost-return analysis conducted in 2017[5]. Data for this study were collected during December 2018 after two seasons of harvesting and other paddy related operations were completed. The purpose of repeating the study in 2018 was to compare the impact of change of practices on the farmers (especially improved irrigation techniques) and draw conclusions for future dialogue with the farmers and other up-takers (e.g. government and other private companies in rice).

2. Objective of the study

The objective of the study is to assess impact of adoption of improved irrigation practices including laser land leveling, Alternate Wetting and Drying (AWD) tubes and other advisory services offered through the WAPRO project on rice productivity and net income. The impact has been derived through comparison between baseline results of cost and revenue led in 2017 and 2018 (two cropping seasons) since the selected farmers switched to WAPRO project practices of water productivity in rice cultivation.

[2] Water productivity is to increase yields/value of a crop, while maintaining existing water application or decreasing from the existing quantity of water applied per unit area.

[3] https://www.helvetas.org/en/switzerland/what-we-do/how-we-work/our-projects/global/water-productivity-WAPRO

[4] Rather than waiting for policy changes that may come as top down approach, the water users (farmers who need water for agriculture, but also villagers who need water for household purposes) jointly agree on a reasonable way to share available water resources and agree on plans to improve local water situation.

[5] Economic Baseline of Rice Farmers in Muridke, Sheikhupura district – Pakistan, July 2017.

3. Methodology

In order to assess the financial return of the investment on improved irrigation techniques in rice cultivation in the selected villages of tehsil Muridke, Focused Group Discussions (FGDs) and individual interviews of 21 selected rice producers were conducted during December 2018. The target rice producers were the same farmers whose data were collected in 2017 and analyzed as a baseline[6] at head, mid and tails of the channels.

Three FGDs and detailed interviews were conducted at Joyianwala, Saikhum and Kathianwala villages. The individual interviews of 21 farmers were carried on the channels under the Joyianwala Minor in a way that 7 farmers each were interviewed at head, middle and tail of the channels.

The farmers interviewed are those who adopted land leveling and Alternate Wetting and Drying (AWD) tubes along with advisory services through WAPRO project. The analysis is mainly based on inputs applied for the production of rice crop including land rent and output of paddy rice and paddy stalks. The analysis is based on the market-based prices of inputs and output per acre. In addition to the farmers, the staff of RPL and Helvetas were also interviewed for collecting data on support being provided by WAPRO and for triangulation of information. The data collected were analyzed using MS-Excel for quantitative analysis while other information was analyzed qualitatively.

The net return per acre was estimated using the following equation:
NR = GR-TC
Where

- NR is net returns gained from the production of paddy rice in Rs.
- GR is the gross revenue computed by multiplying the paddy and stalk quantity produced with the prices of paddy rice and rice stalk received by the produce respectively and adding up both.
- TC is the sum of the variables cost i.e. cost of inputs used and fixed rental value of land reported by the farmers.

4. Results

Following results were obtained Based on the data/information collected and analyzed during the study using quantitative methods:

4.1 Farming Operations and Inputs

The details of cost variables were collected for the analysis. This is the basis for further analysis in this study:

4.1.1 Land preparation and cultivation

The following inputs are used for land preparation and cultivation:

a. Rotavator (Dry Ploughing)

A rotavator is a useful piece of machinery for soil preparation. This versatile piece of farming equipment is a motorized machine which uses rotating blades to turn soil. The cost of the rotavator operation if owned is Rs.600 per acre and if rented the cost is Rs.800[7] per acre. However, dry ploughing is done 3 to 4 times.

[6] Economic Baseline of Rice Farmers in Muridke, Sheikhupura district – Pakistan, July 2017.
[7] For currency reference, 1 USD = 138 Pak Rupees. 1 Euro = 157 Pak Rupee. 1 Swiss Frank = 138 Pak Rupee

b. Disc ploughing (Dry Ploughing)

The disc plough is designed to work in all types of soil for functions such as soil breaking, soil raising, soil turning and soil mixing. Disc ploughing is conducted 1 to 2 times. The cost of the disc ploughing operation if owned is Rs.600 per acre and if rented the cost is Rs.800 per acre per turn. However, farmers mostly prefer rotavator dry ploughing.

c. Dry Planking

Planking is done to crush the hard clods to smoothen the soil surface and to compact the soil lightly. Thus, the field is made ready for sowing after ploughing by harrowing and planking. The planking is done with a total cost of Rs.500 per acre..

d. Laser Land Leveling (LLL)

Laser Land Leveling is a process of smoothening the land surface from its average elevation with a certain degree of desired slope using a guided laser beam throughout the field. It has two major benefits: one, improving water productivity and two, increased effective area under crop within per unit area. It is done once in 2 or 3 years and costs Rs.3000 per acre. Thus, if we take the assumption that LLL is conducted once in 2 years, an average per acre cost per season is Rs.1500.

e. Wet ploughing & Wet planking

The wet ploughing and planking are done to plough and level the land in wet conditions. Wet ploughing is done twice while wet planking is done once. Per ploughing cost is Rs.1000 per acre totaling Rs.3000 per acre.

4.1.2 Seed and Seed Treatment

The seed rate applied is 1 kg per acre and it costs Rs.133 at head and middle while 1.2 kg per acre[8] at the tail. The seed treatment is done to secure viability of seed and it costs Rs.100 per acre.

4.1.3 Transplantation

The transplantation cost of rice crop from nursery to the field is Rs.4000 per acre which includes cost of nurseries and transplanting.

4.1.4 Fertilizers Application

a. DAP

DAP is used by all farmers in the production of rice. The average cost of DAP was Rs.4000 per bag of 50 kg during the rice growing season in 2018. However, if farmyard manure is applied, then DAP application is adjusted accordingly.

b. Urea

Urea fertilizer is also used by all the farmers in the production of rice. Usually 1 bag of 50 kg is applied per acre. The average cost of Urea was Rs.1500 per bag during the rice growing season in 2018.

c. Zinc

As a result of advisory services from WAPRO, the farmers are now applying Zinc to their rice crop to improve its nutritional quality. Usually 2 bags of zinc are applied per acres. However, at the tail end, some farmers used 1to 2 bags per acre. The cost of zinc is Rs.800 per bag of 3 kg.

[8] Tail farmers apply higher seed rate to cover the risk of failed germination.

d. Farmyard manure (FYM)

Those farmers are mostly applying FYM who possess animals. In case of availability of FYM in bulk, the application of chemical fertilizer is reduced accordingly. A trolley of FYM carrying 250 kg weight costs Rs.2500 on average. In majority of the cases, farmers use fertilizers and supplement FYM that is available from their own animals or procured from villages. On an average, 100 kg application has been recorded per acre.

4.1.5 Plant protection measures

a. Weedicides

It was reported that weedicides are applied in the cost range of Rs.800 to Rs.1000 per acre.

b. Insecticides/Pesticides

It was reported that application of insecticides/pesticides depends upon the nature and severity level of pests and diseases attack on rice crop. However, during the rice growing season 2018, the pesticides application ranged from Rs.2000 to Rs.2500 per acre.

4.1.6 Irrigation

There are three types of costs involved for irrigation:

Pumping groundwater: One is the cost incurred for running tube wells to pump groundwater.

- The canal water availability reported at head was 75 to 85% of requirement and rest was met through tube well operation. In total 20 irrigations are applied.
- The farmers at middle of the channel were also better off as they were able to get around 50-70% of irrigation water requirements out of canal water and the rest from the tube well. On an average 20 irrigations are applied during the season.
- The situation at the tail end was wretched. They received very little quantity of water, averaging 10-20%, from canal to irrigate their rice crop. Thus, they mostly depended on tube wells to irrigate their lands under rice crop.

The tube well running cost reported is averaged at Rs.148 per hour.

Irrigation application costs: It was reported that no specific labour hours were used for irrigation fields. The labour hired on monthly or daily basis during rice growing season was used also for supervising irrigation activity along with other activities. Hence part of crop supervision cost may be attributed to supervising irrigation (see 4.1.7).

Water charges (Abiana): The farmers pay water charges to representative of Irrigation Department at the rate of Rs.130 per acre whether they receive adequate water or not.

4.1.7 Labour

As stated above, at least one multi-purpose labour is engaged on the basis of monthly salary for every 10 acres rice area on an average. Such a labour is paid minimum Rs.12,000 in cash along with 40kg of rice once during the season and some other benefits. On an average, labour is paid Rs.15,000 per month. Farm owners may also hire labour on daily-wages bases or also use family labour. An average per day calculation has been based on Rs.400 per day.

4.1.8 Land (fixed input)

The land rent at the head and middle of the channel is Rs.22,000 per crop season while at the tail end it is Rs.20,000 per crops season. It was reported during field visits that land rent has jumped

upwards during the period of the study. This may be due to improved productivity of rice per acre noted during the last two seasons as well as due to a general increase in land prices due to an overall inflation in the economy.

4.1.10 Harvesting

The respondent farmers are using combined harvester to harvest their rice crop. Several combined harvester units are available in the market during rice harvesting season on competitive rates. Market price for hiring combined harvester is Rs.3500 per acre.

4.1.11Transportation

All the 21 farmers selected for the study are now the contract farmers of RPL. They sell their rice to RPL subject to specified range of moisture contents. The transportation costs to fetch rice to RPL gate was also paid by RPL. However, for the purpose of analysis and keeping in view the short term transportation support from RPL, transportation cost has been included. Such a cost from farm to market may slightly vary from location to location. However, an average transportation cost for the purpose of analysis is Rs.20 per maund of rice (40kg).

4.2 Output – The Crop

There are mainly two types of products i.e. paddy rice and rice stalks from rice cultivation - those have commercial value as per the following details.

4.2.1 Paddy rice

An average output of paddy rice reported is as follows:

- At head 40 maunds[9] per acre.
- At the middle 38 maunds per acre.
- At tail 36 maunds per acre.

RPL procured paddy rice from contract growers in the range of Rs.1800 to Rs.2200 per 40 kg depending upon the moisture content and market price (figures prevailing in November – December 2018). However, the weighted average derived for the purpose of analysis is Rs.2000 per maund. It is noted that this price is 26% higher than the price farmers reported in the baseline study.

4.2.2 Rice stalk

The price of rice stalk reported by the farmers at head and middle was Rs.2000 per acre while that at tail was Rs.1500 per acre.

4.3 Calculations of costs and revenues

The net return per acre has been estimated using the following equation:

$$NR = GR-TC$$

Where

- NR is Net Return gained from the production of paddy rice in Pak Rupees.
- GR is the Gross Revenue computed by multiplying the paddy and stalk quantity produced with the prices of paddy rice and rice stalk received by the produce respectively.
- TC is the sum of the variable cost i.e. cost of inputs used and fixed rental value of land reported by the farmers.

The results of the analysis are produced in the table below:

[9] One maund = 40 kg

Table 1: Cost and Revenue per acre from Rice cultivation (2018)

Location at Channel	Cost /per acre (Rs.)	Revenue /acre (Rs.)	Net Revenue /acre (Rs.)
Head	61202	82000	20798
Middle	63753	78000	14247
Tail	64718	71500	6782
Overall average	**63224**	**77167**	**24142**

Source: Field data for the current study 2018

These calculations reveal that the farmers at head have received maximum net revenue followed by the farmers at middle and tail of the channels. This is explained by the fact that mid and tail farmers are more dependent on tube well water and therefore bear a higher cost, even after saving number of irrigations as a result of improved practices and irrigation efficiency. With the passage of time when their paddy production is further improved with more improvement in irrigation efficiency, their revenue figures have a potential to increase higher. Even after discounting paddy price inflation from 2017, the net revenue increase figures are positive and higher by 84%, 112%, 162% than the baseline for head, mid and tail end respectively.

5. Comparison of Results of Current and Study Conducted in 2017

This chapter compares and analyses the results of 2017 and 2018 studies (two seasons).

RPL farmers

This section analyzes cost-revenue analysis for RPL farmers. There is one favour to RPL contract farmers which are not available to non RPL farmers[10] i.e. RPL contract farmers' transportation costs to bring paddy from the field to RPL mill is covered by RPL.

A comparison of cost and revenue between baseline assessment and current assessment of the farmers adopting improved agronomic practices is given below in summary:

Table 2: Per Acre Costs and Revenue Comparison between Baseline and Current Study

Location at Channel	Current figures (PKR) 2018		Baseline figures (PKR) 2017		Increase over baseline (PKR)		Increase over baseline (Rs.)	Increase over baseline (%)
	Costs	Gross Revenue	Costs	Gross Revenue	Cost	Gross Revenue	Net revenue	Net revenue
Head	61202	82000	45749	55125	15453	26875	11422	122%
Middle	63753	78000	47949	53550	15804	24450	8646	154%
Tail	64718	71500	51209	53550	13509	17950	4441	190%

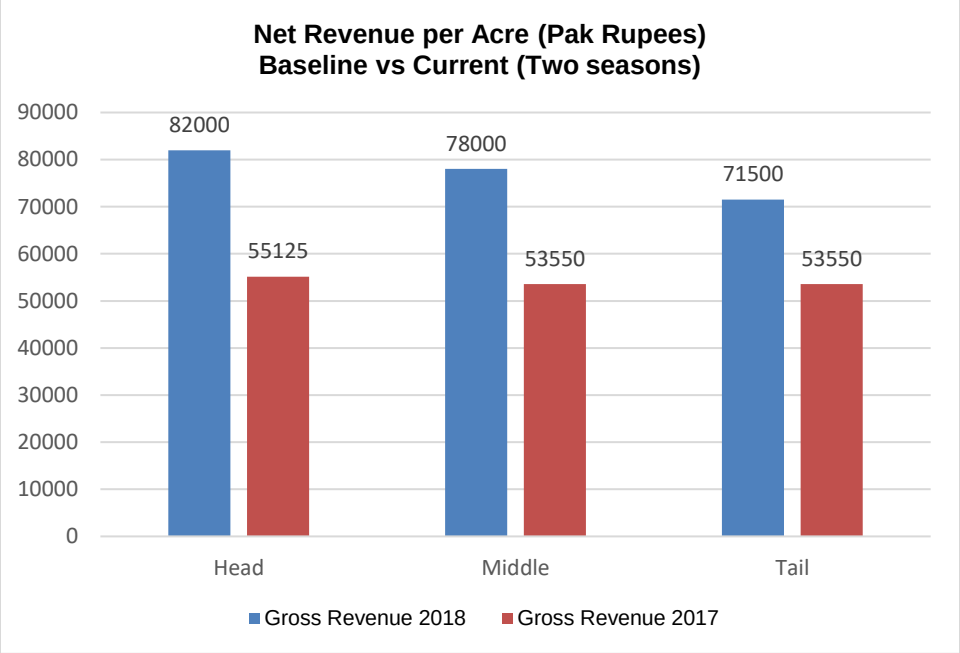
Source: Baseline Survey conducted in 2017 and the data collected in December 2018 after two seasons. The details are given in Annexure-1.

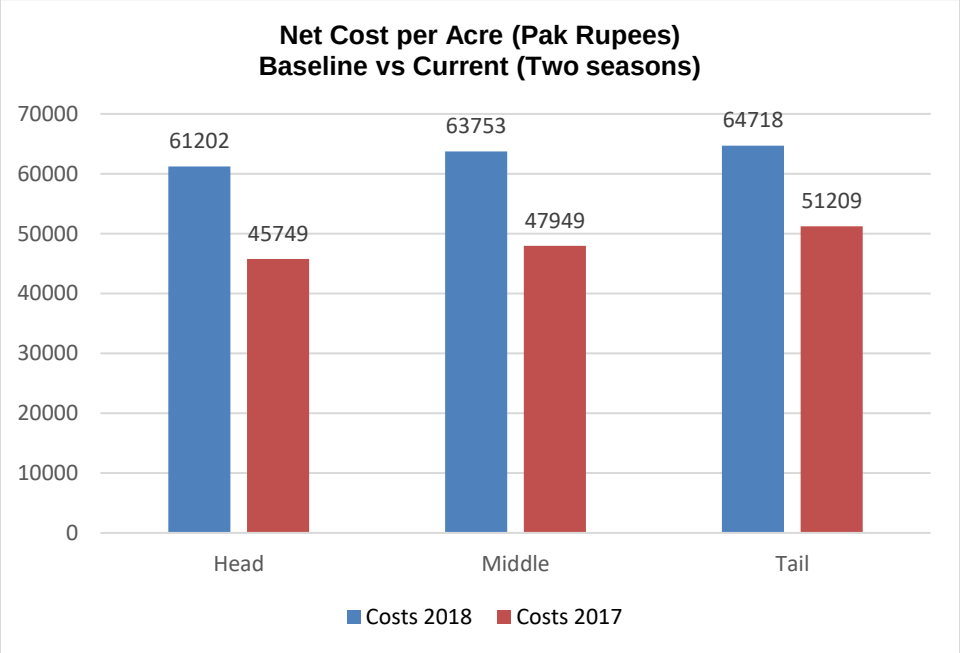
The above comparison shows that the farmers who have adopted WAPRO programme, have significantly improved their net revenue per acre at all levels on the water channel. The maximum net revenue increase was revealed at head of the water channel (Rs.11422), followed by middle (Rs.8646) and at tail (Rs.4441).

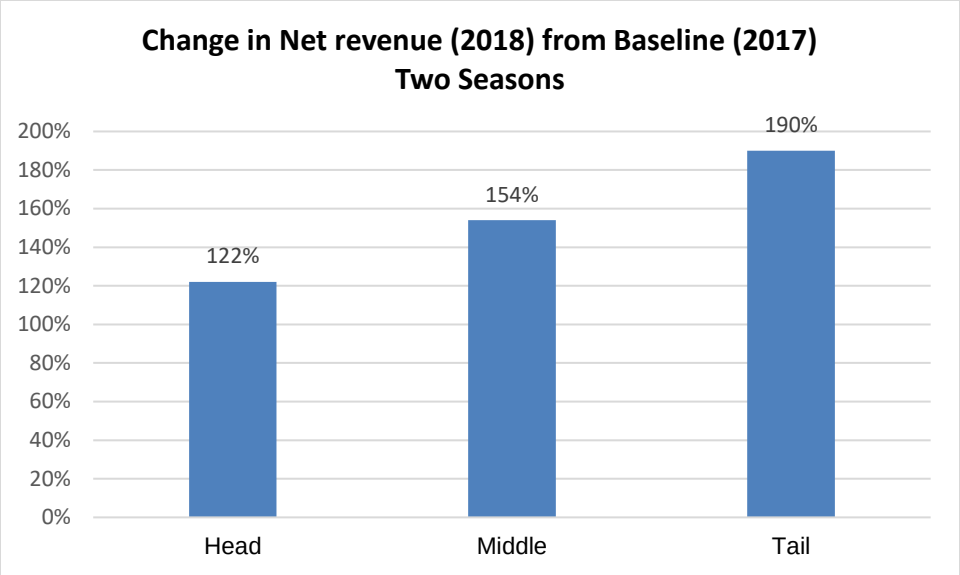
[10] This does not include an intensive agronomic assistance and advice to the farmers on face to face basis in the field or through mobile text messages. We assume that non RPL farmers will learn from RPL farmers and also this service will be available also from the government extension support system in the long run. RPL's advisory service is open to RPL and non RPL farmers. Costs paid / covered in cash however is something which non RPL farmers cannot bring from elsewhere. This is where RPL farmers have an advantage to be RPL contract farmers.

In percentages, it is 122% for head, 154% at mid and 190% at tail which means that the increase in net revenue was the maximum at the tail although little in terms of Rupees. This is because the tail end benefited the most from irrigation efficiency practices due to saving on tube well use.

A comparison of net revenue between baseline and the current study is reflected in the graphic form below in figure 1 for visual impact:







Main drivers of revenue increase

The main drivers of net revenue increase are as follows:

i. Optimization of irrigation water used for rice cultivation is an important factor for productivity improvement. By using AWD tubes, they maintained optimum moisture requirement as against general flooding in traditional practices. This is evident from the fact that there was a decrease in tube wells operational hours at all the three locations on the channels. This reduction mattered to a great extent for the mid and tail end farmers who spent a lot of resources for pumping groundwater as demonstrated by the Table 2.

ii. Laser land leveling proved beneficial and contributed in productivity improvement on two accounts. One, leveling helped uniform irrigation that brought uniformity in the crop throughout the field resulting in better yield. Two, the laser leveling increased the effective area under rice crop through removal of up and downs in the field and that helped improve productivity of the rice crop.

iii. The consultative services from the project related to timely application of fertilizers, weedicides, pesticides, zinc application, maintaining appropriate moisture content at harvesting, etc. improved the productivity and quality of rice. By adhering to appropriate moisture contents at harvesting time, the project beneficiary farmers ensured minimum rejection of their crops from RPL[11].

iv. The transportation cost is born by the RPL if the paddy quality (particularly moisture contents) is according to their parameters. The saving in transportation cost adds to the revenue[12].

It is also pertinent to mention here that the farmers were highly appreciative of WAPRO project for making them aware and engaging them in optimizing water use in rice cultivation through laser land leveling and AWD methods. Now they apply less water per acre and their productivity is also improved.

6. Conclusion

It is also pertinent to mention here that the farmers were highly appreciative of WAPRO project for making them aware and engaging them in optimizing water use in rice cultivation through laser land leveling and AWD methods. Now they apply less water per acre and their productivity is also improved.

[11] In case of RPL contract farmers

[12] This however reduces the economic viability of the case for non RPL farmers. Therefore, separate calculations have been made for non-RPL farmers to analyze profitability of improved practices even in non RPL cases for wider replication.

The study revealed that the farmers who have adopted efficient irrigation techniques and advisory services promoted by the WAPRO project have significantly gained in terms of output and income. The 21 farmers included in this analysis cultivated rice on an area of 598 acres. The overall increase in the household economy of 21 farmers, over the baseline, tunes to more than Rs.10 million during rice season of 2018. The result of the study proves economic viability of water efficient techniques and agronomic practices promoted by the WAPRO project and adopted by the rice producers. This example builds a good case for up scaling for the benefit of rice farmers and good economic return for the government as a whole since rice is an important revenue generation crop for the country.

The farmers during the discussions referred to following areas that helped them increasing the quantity of paddy rice per acre along with improvement in the quality of their produce:

i. Optimum water application to rice crop through use of AWD tubes. This technology has saved 15 to 24 percent water along with improvement of yield.

ii. Laser land leveling has been very beneficial. This technology has reduced water application time per acre. The technology has resulted in water saving along with saving in irrigation related time particularly tube wells running hours and labour. Beside water saving, the leveling increased rice effective area. That may be one of the reasons for increased per acre yield of paddy rice over the previous years.

iii. The WAPRO advisory services through personal visits of experts and through cell phone messages has been very helpful in taking agronomic and plant protection measures timely and optimally.

iv. The experts even provided advisory services about determining optimum moisture level before paddy harvesting. This has helped improve the quality of produce that fetched good price compared to past.

Annex 1

Costs and Net Revenue Comparison between Baseline and Current Per Acre at Head

Variables	Baseline			Current			Difference (Current-Base)
	Units	Rate	Total	Units	Rate	Total	
Dry Ploughing (No.)	4	657.14	2628.56	4	800	3200	571.44
Dry planking			0.00	1	500	500	500.00
Wet Ploughing (No.)	2.14	785.71	1681.42	2	1000	2000	318.58
Wet Planking (No.)	1	785.71	785.71	1	1000	1000	214.29
Laser Laveling (acre)	1	1600	1600.00	1	1500	1500	-100.00
Transplantation (acre)	1	3500	3500.00	1	4000	4000	500.00
Seed Rate (kg)	1	130	130.00	1	133	133	3.00
Seed Treatment (Rs.)	1	75	75.00	1	100	100	25.00
Canal Water Irrigation (Charges in Rs.)	1	100	100.00	1	130	130	30.00
Tube Well Irrigation (Hours)	14.52	126	1829.52	6	148	888	-941.52
Labor (Man Days)	16.4	330	5412.00	21.5	400	8600	3188.00
DAP (kg)	32	36	1152	36	80	2880	1728
Urea (kg)	80	30	2400	50	30	1500	-900
FYM (kg)	35	7	245	100	10	1000	755
Zinc (kg)	0	0	0	6	267	1602	1600
Weeds Control (acre)	-	-	664	-	-	936	272
Pests Control (acre)	-	-	2900	-	-	2198	-702
Harvesting Cost (acre)	1	2800	2800	1	3500	3500	700
Transportation cost	35	20	700	40	20	800	100
Variable Cost			**28603**			**36467**	**7864**
Interest Rate (acre)	On v. cost	0.075	2145			2735	590
Total Variable Cost			**30749**			**39202**	**8453**
Fixed Cost (Land Rent) (acre)	1	15000	15000			22000	7000
Total Cost			**45749**			**61202**	**15453**
Grain Yield (monds)	35	1575	55125	40	2000	80000	24875
By Product (acre)			0	1	2000	2000	2000
Gross Income			**55125**			**82000**	**26875**
Net Income			**9376**			**20798**	**11422**

Costs and Net Revenue Comparison between Baseline and Current Per Acre at Middle							
Variables	**Baseline**			**Current**			**Difference (Current-Base)**
	Units	**Rate**	**Total**	**Units**	**Rate**	**Total**	
Dry Ploughing (No.)	3.86	600	2316.00	4	800	3200	884.00
Dry planking	0	0	0.00	1	500	500	500.00
Wet Ploughing (No.)	1.43	714.29	1021.43	2	1000	2000	978.57
Wet Planking (No.)	1.1	500	550.00	1	1000	1000	450.00
Laser Laveling (acre)	1	3000	3000.00	1	1500	1500	-1500.00
Transplantation (acre)	1	3928.57	3928.57	1	4000	4000	71.43
Seed Rate (kg)	1	130	130.00	1	133	133	3.00
Seed Treatment (Rs.)	1	35	35.00	1	100	100	65.00
Canal Water Irrigation (Charges in Rs.)	1	100	100.00	1	130	130	30.00
Tube Well Irrigation (Hours)	32.75	180	5895.00	24	148.00	3552	-2343.00
Labor (Man Days)	12.57	330	4148.10	21.5	400	8600	4451.90
DAP (kg)	28.5	36.33	1035	36	80	2880	1845
Urea (kg)	64.5	29.71	1916	50	30	1500	-416
FYM (kg)	25.25	5.5	139	100	10	1000	861
Zinc (kg)	0	0	0	6	267	1602	1600
Weeds Control (acre)	-	-	686	-	-	841	155
Pests Control (acre)	-	-	2270	-	-	2042	-228
Harvesting Cost (acre)	1	2800	2800	1	3500	3500	700
Transportation cost	34	20	680	38	20	760	80
Variable Cost			**30650**			**38840**	**8190**
Interest Rate (acre)			2299			2913	614
Total Variable Cost			**32949**			**41753**	**8804**
Fixed Cost (Land Rent) (acre)	1	15000	15000			22000	7000
Total Cost			**47949**			**63753**	**15804**
Grain Yield (monds)	34	1575	53550	38	2000	76000	22450
By Product (acre)			0	1	2000	2000	2000
Gross Income			**53550**			**78000**	**24450**
Net Income			**5601**			**14247**	**8646**

Costs and Net Revenue Comparison between Baseline and Current Per Acre at Tail							
Variables	**Baseline**			**Current**			**Difference (Current-Base)**
	Units	**Rate**	**Total**	**Units**	**Rate**	**Total**	
Dry Ploughing (No.)	4.17	600	2502.00	3	800	2400	-102.00
Dry planking			0.00	1	500	500	500.00
Wet Ploughing (No.)	2.67	700	1869.00	2	1000	2000	131.00
Wet Planking (No.)	1.17	716.67	838.50	1	1000	1000	161.50
Laser Laveling (acre)	1	2800	2800.00	1	1500	1500	-1300.00
Transplantation (acre)	1	3750	3750.00	1	4000	4000	250.00
Seed Rate (kg)	1.2	130	156.00	1.2	133	160	3.60
Seed Treatment (Rs.)			0.00	1	100	100	100.00
Canal Water Irrigation (Charges in Rs.)			100.00	1	130	130	30.00
Tube Well Irrigation (Hours)	50.63	180	9113.40	40	148.00	5920	-3193.40
Labor (Man Days)	8.54	330	2818.20	21.5	400	8600	5781.80
DAP (kg)	37.16	55	2044	50	80	4000	1956
Urea (kg)	41.7	24	1001	55	30	1650	649
FYM (kg)	27.8	4	111	100	10	1000	889
Zinc (kg)			0	6	267	1602	1600
Weeds Control (acre)	-	-	767	-	-	800	33
Pests Control (acre)	-	-	2300	-	-	2037	-263
Harvesting Cost (acre)	1	2833.33	2833	1	3500	3500	667
Transportation cost	34	20	680	35	20	700	20
Variable Cost			**33683**			**41598**	**7916**
Interest Rate (acre)			2526			3120	594
Total Variable Cost			**36209**			**44718**	**8509**
Fixed Cost (Land Rent)(acre)	1	1500	15000			20000	5000
Total Cost			**51209**			**64718**	**13509**
Grain Yield (monds)	34	1575	53550	35	2000	70000	16450
By Product (acre)			0	1	1500	1500	1500
Gross Income			**53550**			**71500**	**17950**
Net Income			**2341**			**6782**	**4441**

Annexure 2

List of farmers

S.No.	Name of Farmer	Area
Head of the Channel		
1.	Riasat ali	Joiyanwala
2.	Ali Akbar	
3.	Muhammad Abbas	
4.	Shahid Ali	
5.	Muhammad Ashiq	
6.	Muhammad Riaz	
7.	Farooq Ahmad	
Middle of the Channel		
8.	Mukhtiar Hussain	Saikham
9.	Khizar Hayat	
10.	Asghar Ali	
11.	Zulfiqar Ali	
12.	Aqib Javed	
13.	Shaukat Ali	
14.	Ikhlaq Ahmad	
Tail of the Channel		
15.	Amanullah	Kathianwala
16.	Liaqat Ali	
17.	Irshad Ahmad	
18.	Mulazam Hussain	
19.	Ali Ahmad	
20.	Muhammad Irfan	
21.	Saqib Hussain	