Comparative Economics Of Users and Nonusers Of Dharabi Dam Pakistan

Muhammad Aamir Khan and Bilal Mansoor and Aftab Hanif

PMAS Dept of Economics and Agri.Economics

8. September 2009

Comparative Economics of users and nonusers of Dharabi Dam, Pakistan

Muhammad Aamir khan [*], Bilal Mansoor [**], Aftab Hanif [***]
[*,**,***] *(Department of Economics & Agri.Economics,PMAS Arid Agriculture University, Rawalpindi)*

Abstract: ***Water is a limiting factor for sustainable agriculture in Barani(Arid). However, rainfall is the only source of water the spatial and temporal variation of which is very high. Therefore conservation and management of this source is vital for agriculture development and socio-economic uplift of the area. This study was, mainly, also devised to address land distribution problems and consequent farm productivity in the study area. The farmers were divided into two main categories irrigated and rainfed farmers. The performance of most of the indicators i.e. yield, gross margins, farm income, labour productivity, income distribution, cropping intensity and crop diversity was found better in irrigated as compared to rainfed. While marginal factor productivity, irrigation productivity and rate of institutional credit availability was higher in irrigated area. However, rainfed area was always least efficient with respect to all of the quantified indicators. The findings of the research are helpful for the farmers of the study area in decision making among different farm enterprises. Hence it can alleviate poverty and help to bring food security in the deprived regions.***

Keyword: Production Possibility;Socio Economic Characterization; Whole farm budget; gross margin

INTRODUCTION

Pakistan's agriculture is classified as an irrigated one. Out of about 23.5 million hectares of its total culturable land, 19.62 million hectares come from irrigated area, giving about 90% of its total agriculture production. Culturable waste is about 8.32 million hectares. Like in other developing countries, poverty in Pakistan is largely a rural phenomenon; therefore, development of agriculture will be a principal vehicle for alleviating rural poverty (GOP, 2011).There could be two possible approaches to increase the agricultural production viz. either by bringing more area under cultivation or increasing the yield per acre. The first option is almost flexible, however, the yield per acre could be increased. To increase the crop yield, water input is the most limiting factor particularly in the barani areas (Bhutta, 99).The Punjab province contains about 70%, or 14.8 million hectares of Pakistan's total cultivated area. Of these 12.6 million hectares are irrigated of which 8.3 million hectares is irrigated through the Indus Basin irrigation system. Decentralized irrigation system in the so-called barani (rainfed) tract of the Punjab province irrigate part of the remainder (International Irrigation Management Institute, 1999).

A common feature of the rain fed areas is that agriculture is not developed due to low yield, inconsistent and tardy rainfall over a year, losses of rainwater due to swift run off, small size holdings and primitive technology. At the same time, topography of Barani areas having sheer ground slopes, helps the rain water to flow with high velocity to the slant of numerous brooks, thus resulting in erosion of the fertile soils.

The Dharabi dam project is one of such efforts to develop water path by making the dam in Dhrab River, a tributary of Soan River out fall in Indus River at a distance of about 5 kilometers from village Balkasar of tehsil and district Chakwal. Total catchment area of dam site is 147.31Sq.Km (56.88 Square miles). Mean Annual rainfall in the Catchment area is 701.52 mm (28 inch).The proposed project will bring about 6400 Acres of land water under irrigation out of which 6000 Acres through gravity flow and 400 Acres through lift (Small Dam Organization, 2007). After heavy investment on these small dams, less than one third of the proposed area was irrigated by small dams. Therefore, the desired changes in cropping pattern could not be achieved (Iqbal and Shahid, 1992). Owing to high surface area to volume ratio, these small reservoirs are subject to high evaporation losses. On an average, small reservoirs lose 50% of their impoundments to evaporation in arid and semi-arid areas .The leaching and percolation losses in small reservoirs are about 20% of reservoir volume against 5% in large dams (Keller et al., 2000).

The research study of the gross margins has been carried out at Dharabi dam. Dharabi dam is located in Tehsil Kalar Kahar District Chakwal.Pakistan

Number of Small Dams in Different districts of Potohar. Punjab

Districts	Number of small Dams
Islamabad	2
Rawal pindi	8
Chakwal	16
Attock	15
Jhelum	9
Grand Total	50

Source: Small Dam Organization, Islamabad. 2007

Silent features of Dharabi dam

C.C.A (acres)	Catchment Area (sq.miles)	Live Storage (Aft)	Capacity of Irrigation Channel (Cfs.)	Length of Canal (ft)
6400	56.88	37000	32	131800

Source: Small Dam Organization, Islamabad. 2007

This research identifying the Production possibilities of the communities of two villages i.e. Chak khushi and Kalar kahar located in the Dharabi dam command area. It reflects somehow a true picture of farmer's economic condition in the form of gross margins at enterprise and at a farm level. The coefficients estimated from the study will be used for analysis of different models constructed for farm level under different resource system.

METHODOLOGY

Questionnaire Formation

Through informal survey, the questionnaire covering important aspects of output and input costs components was prepared and are tested in field for accuracy. During pre-testing there were observed some flaws and complications in questionnaire, those were removed in final questionnaire.

Selection of Respondents and Collection Of Data

The primary data pertaining to the gross margins of the command area of Dharabi dam from two villages (Kalar kahar & Chak Khushi) was collected on the basis of stratified random sampling. Data was collected by making two categories of farmers. First, farmers using dam water (irrigated), second, farmers from control area (rainfed).

The sample size for study was 60 as mentioned in Table. Farmers from both categories were selected randomly. The data was collected through face to face interview with each individual farmer. Questionnaire was in English language but questions were interpreted in local language for farmers and exact reply was written instantaneously.

Categories of farmers

Categories	No. of farmers	Sample farmer percentage
Irrigated	30	50%

Rain fed	30	50%
Total	60	100%

The data thus collected was sorted out, tabulated and enterprise budgets were prepared and gross margins were calculated for the purpose of analysis.

Calculation of Gross Margins

Gross Margin at Enterprise level

Enterprise gross margin was calculated by enterprise gross income minus the variable expenses attributable to that enterprise. In order to calculate gross margins. Budgets were prepared at enterprise level for different crops and livestock in both irrigated and rain fed areas.

Revenues from output and costs of different variable inputs used were calculated. Gross margins were calculated at average sample size level by taking a difference in the activity per unit revenue and per unit variable cost.

Gross margin at farm level

Gross margin at average farm level was calculated by different area allocation to different enterprises multiplied by Gross Margin/unit area.

Economic techniques used

The Economic techniques used were:

Enterprise Budgeting
Whole farm Budgeting
Marginal Analysis

Estimation of activity variable costs, revenues, and gross margins

The total cost of the variable input used to produce one unit of each enterprise consists of money costs and opportunity costs. The opportunity costs were estimated for the operations performed by owned farm machines, family labour and farm inputs (Farm yard manure and seed). The money costs were paid for inputs like fertilizer, herbicide, insecticide, fuel, improved seed, casual hired labour, picking and transplanting. The total variable costs to produce an activity x j were measured as

$$cj = \sum_{i=1}^{k} \sum_{t=1}^{T} Pijt \qquad aijt$$

Where pijt is the unit price of the ith variable input applied to activity xj in time period t ; aijt is the amount if ith input used by activity xj in time period t ; the subscript t = 1,….T identify the time intervals with in the activity's production period

The revenue earned by production activities is the type and quantity of outputs, and their market price. The types of output per activity were categorized into main product and by product. Given the prices received for each output; the total revenue earned from each unit of activity x j was measured as

$$rj = \sum_{n=1}^{N} \sum_{t=1}^{T} Pnjt \qquad Ynjt$$

Where pnjt is the unit price of the nth output of activity j in time period t ; Ynjt is the yield of the nth output produced from one unit of activity j in time period t ; and n = 1,…,N denotes the outputs.

The contribution of each enterprise to farm profitability is that activity's gross margins; that is the difference between an activity's per unit revenue and variable input costs per unit, computed as

$$\mathbf{Gj = rj - cj}$$

Where r j is an activity's per unit revenue and c j is an activity's per unit variable input

Gross Marginal Analysis

Gross marginal analysis is a technique, which assists farm managers when calculating profitability of alternative plans. Gross margin may be define as returns above variable costs, and are expressed per unit of some common resource (per hectare or per head of animal). It is a very useful measure of efficiency for both single activity farm business and multiple activity plans of a business. (Chaudhry et al., 1995).

To calculate Gross Farm Income firstly, enterprise budgets were prepared. For enterprise budgets returns and costs of different enterprises were calculated, in estimating the returns from an agricultural enterprise or a production system, an important distinction is drawn between variable and fixed cost. The market value of the produce (and that of any by-product) of a production system is defined as its output. Normally this value is based on prices of the farm. When the variable costs are subtracted from the estimate of the output, the remainder is called the Gross Margin (Chaudhry et al., 1995).

The difference between the output and the variable costs, usually calculated on per acre or per hectare basis, is a very useful measure of the performance of an enterprise and the contribution that it can make to farm income or profitability.

Gross Margin at average farm level was calculated by different area allocation to different enterprises multiplied by Gross Margin / unit area. The gross margins of crops at farm level are presented in Table prices used for different crops to calculate outputs is given in Annexure 3.

The value of output per unit farm of irrigated and rainfed crops were 32678 and 16435 rupees, respectively. Thus, irrigated crops fetched more returns than rainfed crops. The calculation of gross Margin and other performance indicators for livestock enterprise follow essentially the same principles as for cropping enterprises. The value of output per unit farm of buffaloes and cows is given in table 22.The value of output per unit of irrigated livestock was higher than rainfed ones. It was due to the fact the availability of fodder to irrigated livestock's

GROSS MARGINS OF CROPS AT FARM LEVEL

Crops	Observed Average	Gross Margin	Gross Return
	Area allocation Ha)	Per unit area/ha	At Farm Level
Irrigated Crops			
Wheat	2.23	13456	16201
Soghum	0.43	13025	7231
Maize	0.51	20456	6411
Groundnut	0.26	69540	12715
Berseem	0.17	1913	1240
Raddish	0.04	31567	204
Turnip	0.06	23456	104

Spinach	0.02	14321	35
Carrot	0.002	25613	24
Cauliflower	0.0048	24367	3.4
Tori	0.005	23416	0.21
Coriander	0.001	2130	451
Okra	0.03	43521	721
Tomatoes	0.02	36781	789
Melon	0.03	24367	123
Bitter gourd	0.01	21456	156
Onions	0.19	10987	1214
Chilies	0.12	14356	31
Garlic	0.08	23222	40
Tinda	0.009	32781	2
Brangil	0.0006	12233	1
Total	4.2224		47696.61
Irrigated GM per unit Farm			32678
Rainfed crops			
Wheat	1.24	10231	15123
Sorghum	0.51	4567	1876
Maize	0.11	7685	1324
Groundnut	0.25	61238	16578
Gram	0.16	29876	4561
Total	2.27		39462
Rainfed GM per unit farm			16435

Value of Output per Unit Farm of Buffaloes and Cows.

Livestock	Value of output in irrigated area in rupees	Value of output in Rain fed area in rupees
Buffalo	91400	48725
Cow	61433	43200

Nature of Farm Costs

Farm costs include cash cost and imputed cost. Cash costs are those costs which are met "Out of pocket'. The items included in the cash cost are seed, fertilizer, farm yard manure, causal labor hired, permanent labor, threshing, payment to artisans and livestock rearing (Iqbal, 1989).

Imputed cost is defined as the cost for which no cash expenditure is incurred; instead these are met by using resources already available with the farm household. Imputed costs include the imputed wages of family workers, rental value of land etc (Iqbal, 1989). In the study the costs of family labor, rental value of land, irrigation labor, and additional labor from time to time for different activities were used as imputed costs.

The cost per unit of crops of irrigated farm is higher than rainfed farm. It was due to the more usage of inputs. The average annual cost per unit farm of irrigated and rainfed crops were found to be 24034 and 7958.5 rupees respectively. The cost per unit of animal of irrigated and rainfed areas presented was also calculated by same procedure.

Average Annual Cost per Unit Sample Farm

Crops	Observed Average	Cost	Cost

	Area allocation HA	Per unit area/ha	At Farm Level
Irrigated Crops			
Wheat	1.31	24567	30065
Soghum	0.43	8678	4356.4
Maize	0.51	13426	678.95
Groundnut	0.26	9658.5	2164.2
Barseem	0.17	12453	1345
Raddish	0.04	22345	185
Turnip	0.06	24537	192.5
Spinach	0.02	21987	247.2
Carrot	0.002	18617	23.35
Cauliflower	0.065	19876	14.56
Tori	0.005	9768.6	4.345
Coriander	0.001	6745	1.324
Okra	0.03	20567	345.6
Tomatoes	0.02	36781	1297
Melon	0.03	14678	123
Bitter gourd	0.01	21456	39.6
Onions	0.19	53261	7921
Chiliies	0.12	67545.2	11362
Garlic	0.08	6931	437
Tinda	0.009	16782	147
Brangil	0.0006	18796	8.435
Total	3.3626	449455.3	60958.464
Cost per unit Farm			24034
Rainfed crops			
Wheat	1.24	10231	14123
Soghum	0.51	4567	1976
Maize	0.11	7685	1524
Groundnut	0.25	61238	17578
Gram	0.16	29876	4861
Total	2.27	113597	40062
Cost per unit farm			7958.5

Cost of per Unit Animal of irrigated and Rainfed Farms

Livestock	Cost per unit animal in irrigated area	Cost per unit area in Rainfed area
Buffalo	6542	6231
Cow	4131	3980

Whole Farm Budget

Enterprise	Irrigated		Rainfed	
	Benefits	Costs	Benefit	Cost
Crops	34582	28634	16724	9865
Livestock	168568	12462	106542	14580
Whole Farm	186524	56420	124580	19040

The cost per unit animal of irrigated area for buffalo and cow was higher than rainfed ones.

Whole Farm Budget

The farm budget is a physical and financial plan for the operation of the farm for some period of time. The total farm budget is prepared as an aid in organizing the entire farm business.

In whole farm economic analysis, the farm is considered as complete entity. The whole crop and livestock production programme is reviewed and the use of farm resource is considered on an overall basis. This type of analysis is undertaken to show the anticipated consequences, in terms of selected measures of performance, of some proposed farm plan. The costs and returns analysis accounts cash and non cash costs as well as both fixed and variable costs (Chaudhry et al., 1995). The whole farm budget was prepared by adding the benefits of crops and livestock of irrigated area and also the costs of crops and livestock of irrigated area. Same was adopted for the calculation of whole farm budget for rainfed area.

In whole farm budget the costs and returns of irrigated area, both are greater than rainfed ones.

Benefit Cost Ratio

It is a profitability indicator, which expresses the relationship between the sum of net benefits and capital costs over the life of the project. It is in fact, a form of input output analysis that is useful for on farm trails. Cash and non cash costs and benefits are include in deriving appropriate ratios (Chaudry et al., 1995).

To calculate the benefit cost ratio, the benefits and costs of irrigated crops and livestock were added, respectively. And then ration of benefit to cost was calculated. Same procedure was adopted for rainfed ones. The benefit cost ration of crops and livestock are in

Benefit Cost Ratio of crops (per Farm unit)

Crops	Benefit	Cost	B/c Ratio
Irrigated	42568	34354	1.2359
Rainfed	24731	18765	1.3145

Benefit Cost Ratio of livestocks (per Farm unit)

Livestock	Benefit	Cost	B/C Ratio
Irrigated Buffalo	105412	9784	10.77
Rainfed Buffalo	56785	6586	7.10
Irrigated Cow	56435	4120	13.69
Rainfed cow	46780	4230	11.06

The same procedure was adopted for livestock as that for crops. The benefit cost ration of irrigated livestock was higher than rainfed one. The difference of benefit cost ration of irrigated and rainfed buffalo was significant. The benefit cost ration of irrigated as 14.06 and was found greater than rainfed buffalo 7.10

Marginal Analysis

The purpose of marginal analysis is to reveal just how the net benefits from an investment increase as the amount invested increases. An easier way of expressing this relationship is by calculating the marginal rate of return. This is simply the marginal net benefit divided by the marginal cost expressed as a percentage. The marginal analysis is a highly useful measure of judging and ascertaining farmer's acceptability of new innovations at the farm level. The marginal rate of return of Dharabi dam is presented in table

$$MRR = \frac{\text{Incremental NB}}{\text{Incremental TCV}} \times 100$$

$$= \frac{65078}{13468} \times 100$$

= 483%

This means that for every Rupee invested in the application of dam water facility, farmers can expect to recover Rs. 1 and also obtains an Additional Rs.4.83.

Marginal Rate of Return

	Irrigated	Rain fed	Differences
Benefits	167546	102468	65078
Costs	31486	18018	13468

CONCLUSION

There is need for research in the barani (rainfed) area of Pakistan to diagnose factors limiting productivity and to develop recommendations that can be adopted by farmers to improve productivity. Past research has often not provided recommendations that are relevant to farmers of the area. They have generally been developed without economic analysis to determine the most profitable and least risky practices. Moreover recommendations have not considered differences in land type, rainfall and crop rotation in the area and have provided general recommendations to cover the entire region. In addition, the recommendations provide a complete package of technology, which is very costly for farmers to adopt. Given these deficiencies of research, and poor extension services, it is not surprising that many farmers have not adopted the recommendations being provided by research and extension.

It was observed during study that farmers in both the irrigated as well as the rain fed must shift from conventional crops to high value crops. They must start farming on the commercial basis. They can increase their income by an appreciable amount by commercial farming of vegetables. As they have opportunity they can send their product to nearby Islamabad urban market.

REFERENCES

Ashraf, M., F.U. Hassan, M. A. Khan (1999). Water conservation and its optimum utilization in barani areas. Journal of Science, Technology and Development, 18(1): 28-32.

Azhar A.M. (1995). Yields in canal command areas. Journal of Engineering and Applied Sciences. 4(1):109-116

Bennie ATP, Hofman JE, Coetzee MJ and Very HS (1994) Storage and Utilization of Rain Water in Soils for Stabilizing Crop Production in Semi-Arid Areas. (In Afrikaans). WRC Report No. 227/1/94. Water Research Commission, Pretoria.

Bhutta I.A. (1999). Achievments and issues in 20th Century in Small Dams (Rainwater Harvesting) . In : Procedings of the national workshop on:Water resources achievements and issues in 20th Century and challenges for the next millennium. Pakistan Council of Research in Water Resources, Islamabad-Pakistan,pp.64-69

Botha JJ, Van Rensburg LD, Anderson JJ, Hensley M, Machelli MS, Van Staden PP, Kundhlande G, Groenewald DG and Baiphethi MN (2003) Water Conservation Techniques on Small Plots in Semi-Arid Areas

to Enhance Rainfall Use Efficiency, Food Security, and Sustainable Crop Production. WRC Report No. 1176/1/03. Water Research Commission, Pretoria

Chaudry, M. A.,B. Ahmad and M. Sharif . 1995. Hand Book for Economic Analysis of Experimental Data. Agri. Social sciences Res. Centre, Faculty of Agri. Eco. And Rural Sociology, uni. of Agri., Faislabad.p.23-28

Cheema and Bandaragoda D.J. (1997). Base line survey for farmers organizations of mirwal and Shahpur small dams, Punjab, Pakistan. International Irrigation Management institute.

Directorate of Soil conservation. 1997. A Brief on Second Barani Area Development Project.Directorate of Soil Conservation Punjab, Rawalpindi.p.15-16

GOP. 2008. Economic Survey. Govt. Pakistan, Finance Division, Economic Advisory Wing. Islamabad. 8.

Gujarati, D. N. (1995). Basic Econometrics New York: McGraw-Hill, Inc.

IIMI (1999). Social Organization for improved system management and sustainable irrigation agriculture in small dams (Inception report). International irrigation Management institute.

Iqbal, M.S. 1989. Bench mark survey of khokhar Zer/ Surlah Small Dams. Punjab Eco. Res. Inst., Lahore. Pub. No.254. 117

Iqbal, S. M and S. A. Khan.1991.An assessment of Agriculture Development in the existing Small Dams Command Area. Punjab Eco. Res. Ins., Lahore. Pub. No. 280. 53-75

Iqbal M.S., S.A. Shahid (1992). An Assessment of agricultural development in the rehabilitated small dams command area. Punjab Economic Research Institute, Lahore

Keller, A., R. Sakthivadivel and D. Seckler (2000).Water scarcity and the role of storage in development. International Water Management Institute (IWMI) research Report No. 39.

Khan M.J., M.A Khan, M. Shraf, S.A. Shahid (1998). Screening Survey of potential Small Dam Sites in Punjab. Punjab Economic Research Institute, Lahore Publication No.242.

Kidsom, A. (2003). An essay in Production Functions and Empirical study in Total Factor Productivity Growth, http://www.geocities.com/jeab_cu/paper/product.htm (assessed, 02/05/2003).

Macours, K., and Swinnen, J. F. M. (1997). Causes of Output Decline in Economic Transition: The Case of Central and Eastern European Agriculture. Department of Agricultural Economics Policy Research Working Paper, Katholieke Universiteit Leuven, Belgium.

MINFAL, (2008). Economic Survey of Pakistan, 2007-2008. Ministry of Food, Agriculture and Livestock, Government of Pakistan

Molnar, I. (1965). Production in Relation to Rainfall, Super phosphate and Erosion, Australian Journal of Agricultural Economics 9(2):169-175

Mugabe, F. T. , Hodnett, M. G. , Senzanje, A. , 2003. Opportunities for increasing productive water use from dam water: a case study from semi-arid Zimbabwe. Agric. Water Manage. 62,149–163

NESPAK (1991). Evaluation of small dams in Punjab and N. W. F. P. Volume II − Part A-C, Govt. of Pakistan, Planning and Development Division.

Ogbeide H. E., E. Uyigue, S. Oshodin (2003) Socio-economic and Environmental Performance of Dams. Case Study of Ojirami Dam Nigeria.

Renfro, R. Z. "The value of participation in development- relevance to soil and water conservation"internetsite:http://www.adbi.org/files/the_value_of_participation_in_ development_keynote_final.pdf.(March 9, 2005)

Shahid S. A., M. Ashraf, K. Ata, Mazhar-ul-Haq (1996). Evaluation of Small Dams Project in Punjab. Punjab Economic Research Institute.

Tarar, R. N. (1999), Surface water achievements and issues in 20th century, Proceedings: National workshop on water resources achievements and issues in 20th century and challenges for the next Millennium, June 28-30, 1999, PCRWR, Islamabad

Annex-1

Cost of input Use

Particulars	Unit	Wheat (Ha)		Maize (Ha)	
		Irrigated	Rainfed	Irrigated	Rainfed
Deep Ploughing	No	-	1	-	1
Ploughing	No	4	3	2	2
Ploughing & Planking	No	2	3	1	2
Drill	No	-	1	-	-
Manure	40kg	6.98	3.24	14.75	5.86
Seed	Kg	172	118	34.6	63
Fertilizer N	Kg	76.1	42.36	124.6	48.64
P	Kg	55	34.5	56.8	24.8
Irrigation labor	Hr	6.9	-	6.7	-
Water rates	Rs	256	-	234	-
Land rent	Rs	14678	5698	14678	5698
Labor(Additional)	Day	40	40	-	40
Harvesting	Day/kg	149.33 kg	149.33kg	40	60
Threshing	Day/kg	149.33 kg	149.33kg	-	-
Interculture	D	-	-	79	60

	ay				
Labor (Thinning)	Day	-	-	-	60
		Sorghum (Ha)		Ground Nut (Ha)	
		Irrigated	Rainfed	Irrigated	Rainfed
Deep Ploughing	No	-	1	-	1
Ploughing	No	4	3	2	2
Ploughing & Planking	No	2	3	1	2
Drill	No	-	1	-	-
Manure	40kg	9.38	6.24	-	-
Seed	Kg	108.2	124.6	98.6	122
Fertilizer N	Kg	111	142.5	-	-
P	Kg	-	-	-	-
Irrigation labor	Hr	6.9	-	6.9	-
Water rates	Rs	256	-	234	-
Land rent	Rs	14678	5698	14678	5698
Labor(Additional)	Day	40	40	-	40
Harvesting	Day	60	60	60	60
Threshing	Day	-	-	-	-
Interculture	Day	-	-	40	40
Labor (Thinning)	Day	-	-	-	60

Particulars	Unit	Vegetables
Ploughing	No	4
Ploughing & Planking	No	3
Manure	40 kg	12.2.-14.8
Seed	Kg	5-6
Fertilizer N	Kg	110.5-182
P	Kg	70-120.2
Irrigation labor	Hr	7.24
Water rates	Rs	624
Land rent	Rs	14678
Labor(Additional)	Day	40
Harvesting	Day	40
Interculture	Day	40
Labor (Thinning)	Day	7.46
Plant protection measures	No	1.4

Annex-2

Yield of Crops

Particulars	Unit	Wheat		Maize (Ha)	
		Irrigated	Rain fed	Irrigated	Rainfed
Grain/Produce	40 kg	60	31.3	62.7	26.6
Straw/by product	40 kg	64.5	56.84	91.75	60.54
Thinning	40 kg	-	-	-	60.64
		Sorgham		Groundnut	
		Irrigated	Rainfed	Irrigated	Rainfed
Grain/ produce	40 kg	168	96.4	72.16	62.16

Yield of Vegetables

Particulars	Unit	Vegetables
GRAIN/Produce	40 kg	169-210