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SOCIO-ECONOMIC CHARACTERIZATION OF COMMUNITIES IN INTEGRATED WATERSHED DEVELOPMENT

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By

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02-arid-98

A thesis submitted in partial fulfillment of
the requirements for the degree of

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Faculty of Sciences

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Pakistan

2008

In

the Name of Allah, the most

Beneficent, the most

Merciful"

I dedicate

This Humble Task,

Fruit of My Thoughts and Study

To My

Affectionate "Grand Parents (late), Father

F. Mansoor Ahmed (Late), Mother Musarrat

Afza, Brother in Law, Brothers, Sister, and

to my nephew

Ahmed Aliyaan Alam"

And to all my coming nephews and

Nieces

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(Bilal Mansoor)

Chapter 1

INTRODUCTION

Pakistan is an agrarian economy that is heavily dependent on water from its rivers for various purposes ranging from agriculture to power generation, of which agriculture is the single largest sector and dominant force for growth and development of national economy. It accounts for 20.9 percent of the GDP and employs 43.4 per cent of total work force almost 67.5 percent of country's population living in rural area is directly or indirectly linked with agriculture for their livelihood. Agriculture is growing by 5 percent annually. Agriculture contributes to growth as a supplier of a raw material to industry as well as market for industrial products and also contributes sustainably to Pakistan's export earnings. Whatever happens, agriculture is bound to affect not only the country's growth performance but to a larger segment of the society as well (Government of Pakistan, 2007).

Pakistan is blessed with different topographic land, and is one of the world's most arid countries with an average rain fall of 240 mm a year (I C A R D A, 2007). Barani areas are characterized as rain fed areas, makes significant contribution to agriculture, livestock production and foreign reserves. Out of total cropped area of 21.5 million hectare (Government of Pakistan, 2007) about 5 million hectare do not have any irrigation facility and completely depends upon the rainfall (N.A.R.C, 2003).

In Punjab, Barani area accounts for 18.6 per cent of cropped area (ICARDA, 2007). Whereas, in Pothowar region cropped area is over 90 per cent (N.A.R.C, 2003) which do not have any sort of access to any type of irrigation.

The annual flow of Indus basin system on an average is 142 MAF. However, there are wide variations in surface flows during wet and dry years. The highest availability of surface water in the Indus basin has been recorded of 186 MAF and the lowest 91 MAF (Ministry of food, Agriculture and livestock, 2005). Pakistan's current supply of water is just little above 1000 m cube per person and that puts Pakistan in the high water stress countries (Government of Pakistan, 2007).

Pakistan has not managed its water resources with care and now becoming increasingly water stressed. The country's current water storage capacity is 9 per cent as compared with the world's average water storage capacity of 40 per cent. Without additional water storage capacity, the short fall will increase by 12 per cent over the next decade alone (Planning commission of Pakistan, 2007). It had been estimated that an additional 48 billion cubic meter of water would be required to meet the growing demands of agriculture and the country's economy by the year 2011 (Government of Pakistan, 2007).

Water is an essential factor in agriculture especially in rain fed areas. It plays a decisive role in the growth and development of agriculture sector. Due to its pivotal importance in rural economy, the historical linkages developed among

available water and water use in the area. A little effort has been made to explore these historical bonds for development of poor stakeholders of the recent development process. Semi arid areas in all parts of the world depends on rain as a main source of water, where as in Pakistan arid areas receive rain mainly in monsoon season, so rain water should be efficiently used and managed in a way to ensure water availability throughout the year. Exploitation of methods and techniques for sustainable use of water requires knowledge of socioeconomic behaviors of communities of that particular arid area and effect of water on their livelihood (I C A R D A, 2007).

Agriculture performed poorly in 2007-08, growing at 1.5 percent against the target of 4.8 percent. The poor performance of agriculture can be attributed to an equally poor performance of major crops and forestry, registering negative growth of 3.0 percent and 8.5 percent, respectively. Livestock, minor crops and fishing have been the saving grace as these sectors have performed reasonably well to compensate the performance of major crops and forestry to arrive at 1.5 percent growth in agriculture this year. Major crops, accounting for 34 percent of agriculture and 7.1 percent of GDP, suffered on account of poor showing of wheat and cotton and less than satisfactory performance of rice crop .The wheat crop was adversely affected by the shortage of irrigation water by 23.3 percent over normal supplies during Rabi and inordinate spike in prices of DAP fertilizer (Government of Pakistan, 2008).

Accordingly, production of wheat declined to 21.7 million tons - from 23.3 million tons last year, thus registering a decline of 6.6 percent. Minor crops accounting for 12 percent in agriculture value added posted a growth of 4.9 percent against the negative growth of 1.3 percent last year. The performance of livestock accounting for 52.2 percent of agricultural value added was satisfactory at 3.8 percent. The performance of fisheries has been impressive as it grew by 11 percent in 2006-07 because inland fish catch has increased by 11.1 percent while the output of marine fishing grew by 11.5 percent during 2006-07. Forestry followed the traditional negative growth pattern for the fifth year in a row. This small sector with only one percent stake in the overall value addition in agriculture, registered negative growth of 8.5 percent in 2007-08 as the turn out of production of timber and firewood during the year declined by 9.3 percent (Government of Pakistan, 2007).

Pakistan's agricultural output is closely linked with the supply of irrigation water. As shown in Table, against the normal surface water availability at canal heads of 103.5 million-acre feet, the overall (both for Kharif and Rabi) water availability has been less in the range of 5.9 percent (2003-04) to 20.6 percent (2004-05). However, it remained less by 2.5 percent in 2005-06 against the normal availability. Relatively speaking, Rabi season faced more shortage of water than Kharif during 2006-07 (Government of Pakistan, 2007).

During the current fiscal year (2006-07), the availability of water for Kharif 2007 (for the crops such as rice, sugarcane and cotton) has been 5.5 percent more than the normal supplies and 12.2 percent more than last year's Kharif (see Table1). The water availability during Rabi season (for major crop such as wheat), as on end-March 2008 was, however, estimated at 27.9 MAF, which was 23.4 percent less than the normal availability, and 10.5 percent less than last year's Rabi, adversely affecting the wheat crop, production of which has\ decreased by 6.6 percent over the last year (Government of Pakistan, 2007).

Table 1 Surface water availability

Period	Kharif (maf)	Rabi (maf)	Total (maf)
2002-03	67.1	25.0	87.8
2003-04	62.8	31.5	97.4
2004-05	65.9	23.1	82.2
2005-06	59.1	30.1	100.9
2006-07	63.1	31.2	94.3
2007-08	70.8	27.9	98.7

SOURCE: IRSA (Indus river system authority)

Punjab is the most productive province of Pakistan having irrigated as well as rain fed lands. Chakwal district in Punjab is 146 km away from capital city of Islamabad. Two out of four tehsils were targeted namely Chakwal and Kallar kahar

tehsil. The topography of Chakwal district is mountainous consisting of salt range along with plane area. Some villages are situated in valleys.

Climate is generally cold in winter and hot in summer. Summer starts from April-September in which June and July are extremely hot months in which temperature reaches up to 30-35 C .Winter starts from October-March in which December and January are extremely cold months in which temperature reaches its minimum at 0-5C. Mostly rain in received in monsoon season.

Agriculture is the dominant sector in which highest contribution is of cropping (Rabi & Kharif) then vegetable, livestock and poultry. Irrigation practices consist of deep boring, tube wells and turbines. Some part of district depends upon rain for agriculture. Horticulture is not a leading sector but trace amount of citrus trees are found. Due to decline in soil productivity and unavailability of water farmers are switching over to livestock husbandry. Major threat to standing crops is wild borers.

Generally in Chakwal district the quality of drinking water varies and bad quality is due to presence of sulphur. Soil is mostly sandy and clayey. Minerals like stones which are dolomite and granite available in Chakwal district.

Dharabi watershed is located in Chakwal district of Punjab province (Pakistan). Total area of this watershed comprised of 180 sq. km. About 15 villages/dhokes are located partially or fully in this watershed. In these villages the

communities are partially or fully organized. This is an indication that the farmers of the area are concentrating on natural resource management in an organized way for rebuilding their watershed. To explore the existing system, an exploratory survey has been conducted addressing the issues of presence and effective ness of various development agencies, the natural resources of the area, the resource use pattern, dynamics of resource use, limitation of farmers in resource use, development works, labor efficiency issues, and marketing surpluses in the area of Dharabi watershed.

Three villages in Dharabi water shed area are selected Chak Khushi, Ratta Sharif and Kallar kahar, former of which are rain fed and later is irrigated.

Implementing methods and techniques for sustainable use of water, will improve the living standard of the communities, better food security, sustainable crop production, increased crop productivity, higher income level which will ultimately give better health facilities and education. And in broader vision, improved agriculture fetches higher foreign reserves (Planning commission of Pakistan, 2007).

The objectives of this study are:

- To study the socioeconomic characteristics of rain fed communities of water shed area.
- To study the socioeconomic characteristics of irrigated communities of water shed area.

- To find out the economics of crops in relation to rain fed and irrigated areas.

Chapter 2

REVIEW OF LITERATURE

Pendke *et al*. (1999) studied the impact of watershed development programme on farming community. Information was collected on family members, their educational status, livestock holding, land use pattern, cropping pattern, and crop yield before and after development. Results reveal that improved crop yield and moisture status, reduction in land slope, increase in pasture yield, increase in water levels in wells and increase in livestock production.

Singh (1999) studied the impact of watershed management efforts on the farmer's income. And concludes, average family income, labor sector, agriculture sector, inside the watershed was higher as compared to outside watershed. The living expenditure incurred on different components was slightly higher inside than outside watershed.

Singh (2000) studied the relevance of socio-economic household on watershed. He gathering data on caste, economic groups, agriculture, irrigation, livestock, wage earning, migration and indebtedness during 1997. The results show that the combination of different factors, composition of family, skill, quality of the land and irrigation determines the annual per caput annual income of the families

and the income from a particular source.

Misra (2001) studied the lack of integration between the resources of different ownership regimes; integration of different production systems; and integration of production systems with inputs, training, procurement, storage, processing and marketing. The result shows, the need of an organization which would require complete autonomy, authority to intervene on natural resource related policy matters, adequate financial resources and technical expertise for assisting rural communities directly or indirectly dependent on the watershed.

Sharan *et al*. (2001) studied socio-economic and nutritional status of farmers belonging to watershed development program. Results revealed that 40% of the farmers had chronic energy deficiency. Land holding, knowledge of nutrition, and age were found to have positive correlation with nutritional status.

Padmavathi and Reddy (2002) studied the personal and socioeconomic characteristics in National Watershed Development Project for Rain fed Areas. Results revealed that majority of the respondents were middle aged with low education, medium farming experience and medium farm income. Social participation was low and their exposure to mass media and contact with extension agency were medium. Significant percent belonged to medium category of innovativeness and achievement motivation. Majority of them were clustered in medium group with respect to scientific orientation, risk preference and economic orientation.

Shiyani *et al.* (2002) examined the differential impact of watershed development. Data were collected from a sample of 120 watershed beneficiaries and 120 non-beneficiaries. It was revealed that the watershed development increases cropping intensity, productivity of various crops, profitability, employment generation, reduces income disparity, reduce yield gap and reduced cost of production. However, relatively higher utilization of female labor per hectare of farm by the beneficiaries of watershed development proved the hypothesis that the female population has been more adversely affected.

Chand *et al.* (2003) examined a set of socioeconomic and participatory indicators/indices which were used to evaluate the impact of watershed program. Result showed that changes in the extent of awareness, women's empowerment, people's participation index, community contribution for works/activities, credit utilization pattern, employment opportunities, participation in meetings and training and better performance of self-help groups and village development associations are impacts of project.

Joshi *et al*. (2004) Studied overview of the National policy and institutional frameworks for watershed development and various institutional arrangements and watershed management experiences, using case studies of six watershed development programs. The study concludes by highlighting the knowledge gaps and areas for future socioeconomic and policy research to enhance the impacts of watershed programs.

Morton and Padgitt (2005) studied the selection of social and economic metrics to document baseline conditions and analyze the dynamic relationships between ecosystems and human communities. Several frameworks for reviewing social-ecosystem relations were there such as social sanctions, sense of place, civic structure, and cultural differences. The study concludes, underlying all of these frameworks are attitudes, beliefs, values, and norms that affect questions which are asked.

Das and Munda (2006) explore the feasibility and economic viability of incorporating different livestock in watershed. He found that watershed approach was the best for optimizing utilization of natural resources, i.e., soil, water, plant, livestock and human resources, economic development and employment generation of the people involved directly or indirectly with the watershed, improvement of nutritional status of the farming community in and around watershed and above all sustainable agricultural production.

Dhyani *et al.* (2006) studied, integrated watershed development approach to conserve natural resources and to improve crop productivity of rain fed agriculture and socio economic status of rural communities. It concludes, after implementation of watershed management project, significant changes in land use had taken place. Cash crops replaced coarse millets, while increased irrigation facilities and improved crop demonstrations encouraged the farmers to adopt new crop production technologies which significantly increased the yield of crops.

Bhakar *et al*. (2007) conducted the study to assess the extent of people's participation at various stages of watershed development projects. Data were gathered by interviewing 80 farmers. The study revealed that majority of the respondents had medium level of participation at benchmark survey, planning, implementation and post-implementation stages of watershed development projects. However, people's participation was maximum at implementation stage followed by planning, benchmark survey and post-implementation stages. The study further revealed that respondents' education, socioeconomic status, mass media exposure, extension contact and risk orientation were positively and significantly correlated with the extent of people's participation.

All above reviews strongly relate to my study as all of them had studies the relationship between the communities and watershed, they also reported the participation rate in watershed activities which could show distinct difference between community behaviors in watershed area.

Chapter 3

MATERIAL AND METHODS

3.1 POPULATION AND SAMPLE

Population of the study was rainfed and irrigated areas of Dharabi dam in district Chakwal. Villages were categorized on basis of differences in access to water resources and soil profiles. Two villages were selected purposively representing dam water avalibility and rainfed agriculture as selection criteria. A list frame was developed to select sample farmers using variables like number of household, family size, livestock population, size of land holding and education etc. Sample size was finally decided on the basis of number of household in a village and cultivated area owned.

$$n = Nt^2\alpha V^2/(ND^2 + t^2\alpha V^2)$$

n= Required sample size.

N= Total number of farm household of the respective farm size.

D= Relative sampling error.

$t^2\alpha$= Tabulated value.

V= Computed co-efficient of variation of cultivated area.

3.2 SURVEY INSTRUMENT

A comprehensive questionnaire was designed to gather data on socio-economic characteristics including profile of village institutions and road infrastructure, demographic conditions availability of basic facilities, land and land use pattern, agriculture production, farm machinery, soil type, water resources, rangelands utilization, marketing facilities and labor use etc. The questionnaire was thoroughly examined and discussed with other stake holders of project like ICARDA for further improvements needed to obtain the required information regarding the study.

3.2.1 Pretesting

Through informal survey, based on title and in the light of objectives of study the questionnaire covering important aspects of output and input costs components was prepared and was tested in field for accuracy. During pre-testing there was observed some flaws and complications in questionnaire, those were removed in final questionnaire given in Annexxure. Then formal survey was conducted.

3.3 DATA COLLECTION

Secondary data is collected from government organization (GO) and non-governmental organization (NGOs) about general characteristics of Chakwal district. Primary information was obtained from selected farmers through personal interviewing using structured questionnaire. The sampling frame of study consists of 465 farmers, out of which 124 sample farmers were interviewed.

Table 2 Respondents in survey of selected villages in Dharabi watershed

Village	Community	Interviewed	Percentage
Kallar khar	Irrigated	60	48
Chuk kushy	Rain fed	33	26.6
Ratta Sahrif	Rain fed	31	25.4

3.3.1 Data cleaning, coding, analysis

Data analysis is an important phase of research. Collected data was coded to transform huge amount of data in to meaning full form. Statistical Package for Social Scientist (SPSS) was used to analyze the data. Mainly averages, means, frequencies were calculated and cross tabulation was performed.

3.4 CALCULATION OF GROSS MARGINS

Revenues from output and costs of different variable inputs used were calculated. Gross margins were calculated at farm level by taking a difference of the gross revenue and per unit variable cost.

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

$$\mathbf{G_j = r_j - c_j}$$

Where rj is an activity per unit revenue and cj is an activities per unit variable input costs.

3.4.1 Revenue calculation

The revenue earned by any production activities are 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:

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

Where p_{njt} is the unit price of the nth output of activity j; Y_{njt} is the yield of the nth output produced from one unit of activity j t; and n = 1,…,N denotes the outputs.

3.4.2 Costs calculation

The total cost of the variable inputs 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 labor and farm inputs (Farm yard manure and seed). The money costs were paid for inputs like, fertilizer, herbicides, insecticide, fuel, improved seed, casual hired labor, picking and transplanting. The total variable costs to produce an activity x_j were measured as:

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

Where p_{ijt} is the unit price of the ith variable input applied to activity x_j in time period t; a_{ijt} is the amount if ith input used by activity x_j.

Chapter 4

RESULTS AND DISCUSSION

4.1 HOUSEHOLD HEAD AGE

Age is an important factor, which affect the potential employment and mobility status of respondents. The average age of the household heads was same almost in three selected sample villages to be 54 years approximately as in Table 4. It was observed that households were actively involved in farming practices and decision making in farm and life matters.

4.2 FAMILY COMPOSITION AND SIZE

The information regarding family size and composition of the respondents was collected during field survey as given in Table 5. The average family size in the research area was found to be seven persons. The main reason for large average family size was joint family system. The study shows the dependency of single earning person.

Table 3 General description of the selected villages.

Name of villages	Population	Main occupation	No of household	No of farming families	No of tenants	Percentage of tenets	Income classes
Chak khushi	1500	Laborers	300	200	100	33	Poor
Kalar kahar	3500	Farming	2000	1600	400	20	Poor, middle
Ratta Sharif	900	Laborers	280	240	40	2	Poor

Table 4 Village wise household head age of the respondantents.

Name of village	Household head age (years)		
	Average	Maximum	Minimum
Chuk Kushy	55	85	30
Kallar Kahar	54	70	28
Ratta Sharif	56	85	32

Table 5 Village wise family composition and size.

Name of village	Family composition (%) and size (number)				
	Percentage		Average members	Adults >16	Children < 16
	Single	Joint			
Chak Kushy	0	100	7.0	2.7	4.3
Kallar Kahar	1	99	7.3	4.7	2.6
Ratta Sharif	0	100	7.5	4.6	2.9

Table 6 Village wise income status of respondents.

Name of village	Income status (percentage)	
	Moderate	Poor
Kallar Kahar	30	70
Chuk kushy	10	90
Ratta Sharif	10	90

4.3 DEMOGRAPHIC CHARACTERISTICS

It was observed during field survey that main occupation was laborers in rainfed areas of Dharabi watershed the reason behind this was unavailability of irrigation water and un affordable prices of other agricultural inputs due to which farmers lose interest in agriculture farming. While in irrigated areas main occupation was farming as shown in Table 2, people were cultivating their lands more efficiently than farmers of un-irrigated areas due to timely and adequate availability of water and other agriculture inputs. The study results showed that there was a shift in occupation from agriculture farming to laborers in rainfed areas of selected villages. Tenancy farming is highest 33 percent in Chak Kushy as shown in Table 2. The main reason for highest tenancy farming percentage was un consolidated land holdings. While it was minimum in Ratta Sharif with 2 percent mainly because of consolidated land holdings.

4.4 INCOME STATUS OF RESPONDENTS

Most of the people in all of the villages are mediocre and poor people. They are either laborers or farmer. Their social status is poor because they cannot afford to purchase inputs such as fertilizer and other crop inputs to increase their crop yield. So due to less profit majority of them had left agriculture and switched over to laborersing. As compared to chuk Kushy and Ratta Sharif people of Kallar Kahar were better off with 70 percent poor and 30 percent mediocre Whereas in chuk kushy and Ratta Sarif 90 percent are poor and only 10 percent are moderate as reported by the community in Table 5. The main reason for better living standard of Kallar Kahar farmers were presence of irrigation system in that area.

4.5 FARMING EXPERIENCE

Average farming experience of the respondents in Chak Kushy and Kallar Kahar was 19 years while in Ratta Sharif it was 25 years. The result shows that farmers of Chak Kushy and Kallar Kahar had other sources of income along with agriculture farming that include poultry, shop keeping and other of off farm jobs. Whereas in Ratta Sharif people were intended towards farming as they could not leave this occupation due to social issues even if they are not earning profit.

4.6 VILAGE WISE EDUCATION LEVEL OF THE RESPONDANTS

Education plays an important role in the overall growth and development of any country. Level of education affects the planning and managerial abilities of the farmer in decision making. The literacy rate of the sample respondents was also explored the detail of which is given in Table 7. The literacy rate in Kallar Kahar is far much better than reported by the other communities. Middle school and one Cadet college, one private and one government collages were found in Kallar Kahar. In Ratta Sharif the number of educational institutes were increasing and institution were being made by the government sector .Only one person in chuk Kushy was claimed to be M.A. and two people in Ratta village have high school education.

A haunting figure of 87 percent of sample respondents was illiterate in Chak Kushy. Lack of educational institutional, poor economic condition and lack of access to the far located institutions were observed to be the conspicuous reason for low literacy rate in the study area. Average number of schooling years in all of three villages was same with highest level in chuk kushuy followed by Ratta

village. Ratta Sharif has maximum number of respondent with ten years of education.

4.7 NATURE AND LOCATION OF OFF FARM WORK

It was important to study the nature and location of off fam work because it indicates the type and level of employment available in any area. In rainfed area land holdings are generally small and agriculture is done on subsistence basis that's why most people engage themselves in off farm work. In all villages off farm work were observed generally because revenue from output does not even equals input cost. In chuk kushy dominant off farm work include shop keeping, driving, defence, few government jobs servents. Some of them are currently doing off farm work along with farming to supplement their income. Laborersing is very common occupation in the study area as maximum farmers reported to be laborersers in Kallar Kahar due to more labor opportunities in construction. The trend of off farm work was increasing in Chak Kushy particularly and generally in all three selected villages which indicates less availability of the employment opportunities in village. Also people do different kinds of job on adjoining villages during harvesting seasons.

Table 7 Village wise education level of respondents.

Name of village	Educated (percentage)	Un educated (percentage)
Kallar Kahar	36	64
Chuk kushy	13	87
Ratta Sharif	33	67

Table 8 Village wise farm traction power in Dharabi watershed.

Name of village	Bullock (Percentage)	Tractor (Percentage)	
		Owned	Rented
Chak Kushy	0	0	100
Kallak kahar	0	1	99
Ratta saharif	0	1	99

4.8 FARM TRACTION POWER IN SELECTED VILLAGES OF DHARABI WATERSHED

In modern mechanical era tractor has been used as a farm traction power in farm rather than bullock farming. Modern agriculture machinery is used as a mean to get higher production level as well as time saving method. This is very obvious from the results in Table 8 that all farmers use tractor to cultivate their lands and no one was using traditional methods of cultivation. Most of them (98 percent) reported to hire tractors for cultivation.

4.9 AVAILABILITY OF OTHER FARM IMPLEMENTS

Use of other improved farm implements like Mould bold (MB) plough, leveler and thresher can play important role in increasing agriculture production, but unfortunately no farmers in study area own any of the above mentioned farm implements. Framers can't afford to use farm implement on their land like MB plough, leveler or thresher as recommended by the agriculture department due to unavailability and high rates 950Rs/ hr of leveler. In Kallar Kahar one person had reported to level his land 10 years ago. Those farmers who do not have access to these farm equipments could not do deep tillage on their lands hence less yield ultimately fetching less money in comparison to those who use above mentioned implements.

4.10 IRRIGATION SOURCES

Irrigation water serves the basic need of any crop, as it bring nutrients to plant from soil, so availability of proper amount of water according to need of each

crop is necessary to reach its potential yield. In study area it was observed that in chuk kushy and Ratta village source of irrigation is only rain no farmer had access to dam water or tube well at their lands. Whereas in Kallar Kahar 70 percent of the farms located at head side of Nikka dam were irrigated while 20 percent on the tail end did not receive water only due to the breakage of water pipe coming from Nikka dam. Almost 10 percent of the farmers had bore or tube well as reported in Table 9.

4.11 TRANSPORTAION MEANS

The main source of transportation from one place to another is Toyota Hiace for majority of the people but few have their own means of transportation like motor car or motor bike. Toyota Hiace is used in by 98, 97, 98 percent respectively by the villagers of Chak Kushy, Kallar Kahar and Ratta Sharif. People approach to the main road by foot and then take some sort of lift or any public transport to reach their ultimate destination. This shows that people are poor in Chak Kushy and Ratta village as compare to Kallar Kahar as in Table10.

4.12 SIZE OF OPERATIONAL HOLDONG

Land is a scarce resource hence its optimal use is very important. Farm size is one of the major determinants of financial status of the farmers, which in turn affect farmer's ability to adopt modern farming practices. Operational land holding play a vital role in the family laborers employment as well as income generation. The main problem in the research area was small and fragmented land holding which results in management difficulties and ultimately less production. In Table

11 operational holding sizes were categorized in to three classes that are 0-50 kanal, 50-100 kanal, 100-200kanal and above 200 kanal. In Chak Kushy 76 percent farmer fall in 0-50kanal category, 12 percent farmers in 50-100 kanal category, 9 percent farmers in 100-200 and only 3 percent farmer fall in above 200 kanal categories.

In Kallar Kahar 67 percent farmers lies in the range of 0-50 kannal, 12 percent farmers lies in the range of 50-100 kannal, 17 percent farmers lies in the range of 100-200 kanal and 5 percent farmer lies above 200 kanals. In Ratta Sharif 52 percent farmers lies in the range of 0-50 kanal, 26 percent farmers lies in the range of 50-100 kanal, 22 percent farmer operates in the range of 100-200 kanal and no farmers have land above 200 kanals. This shows that land size varies in Kallar Kahar ranging from 50-200 and above. Ratta has no big farmer. Whereas Kallar Kahar has maximum numbers of small farmer with land holding less than or equal to 50 kannals.

Fragmented lands are mainly found in chuk khusy, moderately in Ratta Sharif and scarcely in Kallar Kahar. According to the respondents if some action is taken by the government to consolidate the land it could bring definite change in production level and income status of the dwellers.

4.13 LAND TYPES

It is generally observed that sloppy lands are subjected to different kinds of erosion problem. In selected villages of Dharabi watershed chuk kushy and Ratta Sharif

farmers had more eroded land than Kalla kahar. The major reason reported according to the farmers of chuk kushy and Ratta Sharif was the negligence in the past when land start to erode no one paid attention to it and it continue and now it's all most eroded and out of limits of the individual farmer to refill its eroded land or reclaim its land from local weed.

4.14 USE OF UNCULTIVATED LAND

In chuk kushy all the uncultivated land is plain but is uncultivable due to weed called locally as KUNDAR which is in fact a water borne weed. It had deep roots so cannot be easily eradicated, other than this KEEKAR, NARIAN were also found. Whereas in Kallar Kahar and Ratta village majority of the uncultivated land is eroded and fraction is plane unusable land. The main reason of eroded land is that they are mountainous in nature and due to rain soil erodes but was not reclaimed which then keeps on increasing up to the level to gullied area. There was no salinity problem in any study area. It is clear from the Table 13 that majority of the uncultivated land is eroded which are distinctive characteristics of rainfed area.

4.15 LAND ALLOCATION TO CROPS

In agriculture sector land allocation decision to various crops hold great importance in determining the profit of that particular entrepreneur. In modern agriculture it is determined through different economic tools but for those farmer who do not have access to reach the agriculture economist to determine their allocation ratio, have their own judgment of allocating land to different crops.

In research areas most of the farm area was allocated to wheat crop for sustainable agriculture. However in Kallar Kahar 30 percent of the farmers had reported to allocated their land to commercial cash crop,10 percent to fodder and 60 percent to wheat whereas in other two villages 93 percent land is under wheat production and 10 percent for fodder for their livestok. Farmers of Ratta and chuk kushy produce wheat which is sufficient only for home consumption.

4.16 CROPS OF RAINFED AND IRRIGATED AREAS

Wheat as a staple food was cultivated by every farmer either one having small land holding or large. In un-irrigated areas like Chak Kushy and Ratta Sharif farmers are practicing rainfed agriculture and only wheat and fodder crops are grown. They do not grow groundnut due to the absence of irrigation system, weeds infestation on their land and wild animals attack. No crop rotation or agronomic practices are followed, and farmer plant local verities and use their own unimproved seed.

Irrigated area like kallar kahr has more variety of crops and all farmers are practicing multi cropping in irrigated areas of Kallar Kahar. Wheat is sown by every farmer whereas maiz, millet, groundnut and vegetables were also grown. Vegetables are generally sown by those who receive water of Nikka dam. Wheat occupies the 60 percent of the total cultivated area in Kallar Kahar. Those farmers near to the dam are more benefited as compare to those farmers located near tail who do not get water from Nikka dam in WARA BANDY system. In addition to this the pipe line of dam was also worn out causing great damage to effecting farming system and practices and causing discrimination in community.

Table 9 Village wise irrigation source percentage of selected area.

Name of village	Irrigation source percentage		
	Rain	Dam	Tube well
Chuk kushy	100	0	0
Kallar Kahar	20	70	10
Ratta Sharif	100	0	0

Table 10 Transportation means in selected villages (percentage).

Name of village	Toyota Hiace	Private
Chuk kushy	98	2
Kallar kahr	97	3
Ratta Sharif	98	2

Table 11 Size of operational land holdings of selected villages (Percentage)

Name of Village	0-50 K	50-100 K	100-200 K	Above 200 K	Total
Chuk kushy	75.75	12.12	9	3	33
Kallar Kahar	66.66	11.6	16.6	5	60
Ratta Sharif	51.61	25.80	22.58	0	31

Table 12 Land types in selected villages of Dharabi watershed (percentage).

Name of village	Plain	Eroded	Saline
Chak Kushy	20	80	0
Kallar Kahar	40	60	0
Ratta Sharif	10	90	0

Table 13 Village wise use of uncultivated lands in Dharabi watershed. (Percentage)

Name of village	Grazing	Fuel trees	Fodder trees	Waste	Total
Chak Kushy	10	15	0	75	100
Kallar Kahar	60	40	0	0	100
Ratta Sharif	50	50	0	0	100

Table 14 Land allocation to crops in villages of Dharabi watershed. (Percentage)

Name of village	Wheat	Millet/Fodder /others	Groundnut	Total
Chak Kushy	90	10	0	100
Ratta Sharif	93	7	0	100
Kallar Kahar	60	10	30	100

Table15 Village wise crops cultivation by the respondents in Dharabi watershed (%).

Name of village	Wheat	Wheat & Groundnut	Vegetable	Fodder	Total
Kallar khar	45	38	2	15	100
Chak Kushy	90	0	0	10	100
Ratta Sharif	88	0	0	12	100

Table 16 Sale and purchase pattern of crops in Kallar Kahar (Respondent percentage).

Crops	Surplus/Sale	Purchase/Shortage
Wheat	5	1.6
Groundnut	33	0

4.17 TENANCY FARMING IN DHARABI WATERSHED AREA

Tenant farming had been practiced in the study area since ages. Large farmers rent out their lands either too small or landless farmers. The terms of tenanting practice were either share in main product or by-products.

This system was also observed in all villages of Dharabi watershed with highest percentage in chuk Kushy followed by Kallar Kahar and Ratta Sharif 33, 20 and 2 percent respectively (Table 3). The reason for highest percentage in Chak Kushy was split or fragmented lands which according to farmers was not possible to look after every day so they lend their lands.

4.18 CROP PRODUCTION OF IRRIGATED AND RAINFED AREA OF DHARABI WATERSEHD

Crop production of irrigated areas is almost double than in rainfed areas. Groundnut which is a cash crop of Chakwal district is also sown to earn good profit. In irrigated area more input use like fertilizer, pesticide and improved seeds also helps in getting higher production. On the other hand rainfed area production was half of the irrigated areas as all output depend upon rain fall. Use of fertilizer in rainfed does not assure high production until timely and adequate amount of rainfall is received. So according to the farmers of rainfed area of Dharabi watershed using fertilizer, pesticide or improves seed is nothing more than a sunk cost, this is because the average yield is less in rainfed areas compare to irrigated area.

4.19 SALE AND PURCHASE PATTERN OF CROPS IN SELECTED VILLAGES OF DHARABI WATERSHED

In rainfed area like Chuk Kushy farmer ausually practice subsistence farming and do not sale wheat rather 6 percent had purchased wheat as shown in Table 17. And no groundnut was grow as it is difficult for the farmers to protect their crop from wild boar. Whereas in Kallar Kahar 5 percent of the farmers had sold and 1.6 percent had purchased wheat and 33 percent of the respondents sold groundnut as shown in Table 16. Whereas the situation ion Ratta Sharif is little better than Chak Kushy with 2 percent respondents selling wheat and 2 percent had purchased wheat and for groundnut only 3 respondents had sold groundnut. So it is assumed that Kallar khar is having self sufficiency in food hence having less food security threats whereas Ratta is self sufficient in food and chuk Kushy is having threat to food security.

4.20 SOIL CONDITION OF THE SELECTED VILLAGES IN DHARABI WATERSHED

Chkawal district is well known for stony soils. The soil condition of the selected villages in Dharabi dam watershed area is mostly sandy to clayey. Most of the peoples of watershed are of the view that soil degradation is increasing with the passage of time. But the extent of erosion varies differently in different villages. It varies from low to high in different villages. In village like Chak Khushi the soil erosion is low, while its intensity increases as we move to Kallar Kahar which resulted in formation of Gullies of 3-5 ft as in Table 19. Soil degradation and

erosion are major factor responsible for decrease in agriculture area and reduction in the productivity level.

4.21 WATER CONDITION IN SELECTED VILLAGES OF DHARABI WATERSHED

Water is the major limiting factor in Barani areas. In Dharabi watershed, generally farmers use water of streams and springs for irrigation purposes. Total numbers of wells in the watershed are 132 and average water table depth is 96ft. Water table depth varies with stream as shown in Table 20. In Kallar Kahar water table depth is low while in Ratta Sharif it is too high. In Dharabi watershed, generally farmers use water of streams and springs for irrigation purposes. Total numbers of wells in the watershed are 132 and average water table depth is 96ft.

4.22 AVALIBILITY OF AGRICULTURAL MACHINERY IN SELECTED VILLAGES OF DHARABI WATERSHED

Agriculture machinery is another important indicator of socio-economic growth of the area. Total numbers of tractors in the selected villages of watershed area were 53 out of which 50 were in Kallar Kahar and 2 in Ratta Sharif and one was present in Chak Kushy. Twenty five trolleys in Kallar Kahar 1 in Ratta Sharif and no trolley was found in Chak Kushy. These tractors are used for agricultural as well as other purposes like loading and dragging purpose etc detail of which can be seen in Table 21.

4.23 LAND RESOURCE AVALIBILITY OF SELECTED VILLAGES OF DHARABI WATERSHED

The total area of selected villages of Dharabi watershed was 103362 kanals out of which cultivated area was 35 percent and uncultivated area is 64 percent. The total land resources owned by the watershed communities of chk Kushy was 25008 kanals of which 31 percent were cultivated and 69 percent are uncultivated. Ratta Sharif total own land resource is 15544 kanals out of which 25 percent are cultivated and 75 percent were uncultivated as revealed in Table 22. The land resource statistics shown in Table 22 states that 64 percent of the total area 103360 kanals was uncultivated which was more than half and total population is being fed by just 36 percent, so if uncultivated land is transformed in to useful cultivated land these research sites could produce double.

Table 17 Sale and purchase pattern of crops in Chk khushy (percentage).

Crops	Surplus/sale	Purchase/shortage
Wheat	0	6
Groundnut	0	0

Table 18 Sale and purchase pattern of crops in Ratta Sharif (Percentage).

Crops	Surplus/Sale	Purchase/Shortage
Wheat (Respondents)	2	3
Groundnut	8	0

Table 19 Soil conditions of selected villages in Dharbi watershed.

Name of villages	Stone availability	Soil type	Soil degradation Trend	Extent of erosion	Gullied area (feet)
Chak Khushi	No	Sandy	Increasing	Low	3-5
Kalar Kahar	Yes	Sandy	Increasing	High	Less than 3
Ratta Sharif	Yes	Clay+ sandy	Increasing	Low	No

Table 20 Village wise water resource availability in Dharabi watershed.

Name of villages	Natural water source for agriculture	No. of wells	Water table (feet)	Water table variation	Variation months
Chak khushi	Rain	0	35	Yes	June, July
Kalar kahar	Spring+ Stream	2	15	Yes	June, July
Ratta Sharif	Rain	4	150	Yes	June, July

Table 21 Availability of agricultural machinery in selected villages of Dharabi watershed.

Name of villages	No of tractors	Tractors with shower	Tractor with front blade	No of trolleys	Availability of Land leveler
Chak khushi	1	1	1	0	No
kalar kahar	50	25	25	20	Yes
Ratta Sharif	2	2	0	1	No

Table 22 Land resource availability of selected villages in Dharabi watershed.

Name of villages	Total area of village(k)	Cultivated area (k)	Uncultivated (k)
Chak khushi	25008	8000 (31)	17008 (69)
kalar kahar	62808	25120 (40)	37680 (60)
Ratta Sharif	15544	4000 (25)	11544 (75)
Total	103360	37120 (35)	66232 (65)

Note: Fig in parenthesis are percentages

Table 23 Gross margin of Wheat in un-irrigated Area of Dharabi atershed.(Rs/k)

Area	Numbers	Minimum	Maximum	Mean	Std. Deviation	cv
Un-irrigated	64	-1247	6822	846	1389	.60

Table 24 Gross margin of Wheat in irrigated Area of Dharabi watershed. (Rs/k)

Area	Numbers	Minimum	Maximum	Mean	Std. Deviation	cv
Irrigated	60	-1272	2270	2647	3935	.67

Table 25 Gross margin of groundnut in un-irrigated area of Dharabi watershed. (Rs/k)

Area	Numbers	Minimum	Maximum	Mean	Std. Deviation	cv
Un-irrigated	64	-500	3104	114	541	.21

Table 26 Gross margin of groundnut in irrigated area of Dharabi watershed. (Rs/k)

Area	Numbers	Minimum	Maximum	Mean	Std. Deviation	cv
Un-irrigated	60	-502	10396	294	1871	.15

4.24 GROSS MARGIN OF WHEAT IN IRRIGATED Vs. UN-IRRIGATED AREA

Gross margins of wheat grown both on irrigated and rainfed lands were estimated. Results shows that gross margin of wheat at irrigated lands were more than three times higher (Rs 846/k at rainfed and Rs 2647/k on irrigated land) than Wheat sown at rainfed lands. However standard deviation shows that gross margin of wheat greatly varies at both types of land as shown in Table 24.

4.25 GROSS MARGIN OF GROUNDNUT IN IRRIGATED Vs. UN-IRRIGATED AREA

Gross margins of groundnut grown both on irrigated and rainfed lands were estimated. Results shows that gross margin of groudnut at irrigated lands were more than 2.5 times higher (Rs 114/k at rainfed and Rs 294/k on irrigated land) than groundnut sown at rainfed lands. However standard deviation shows that gross margin of groundnut do not vary greatly at both types of land as shown in Table 25

SUMMARY

Chakwal district is 146 kilometers away from capital city of Islamabad. The topography of Chakwal district is mountainous consisting of salt range along with plane area. Some villages are situated in valleys.

A baseline study was conducted to characterize the livelihood of communities in term of their assets and opportunities. The study also explored socio economic conditions of farming communities. Information were gather through conducting village profile list frame and formal survey.

The survey results revealed that average age in all three villages was 56-58 years. Joint family system was pre dominant with average family size of 8 members. Education dominates in Kallar kahr as compare to Ratta sharif and chk Kushy. Few respondents were graduate and one possessed master degree. Average years of education were 6-8 years in research areas.

As majority of the people were poor to moderate so their living standard was not too high. Lack of credit limits agriculture in study area of Chakwal district. Only 2-3 farmers in study area had tractor but lacking all other modern farm machinery like MB plough, leveler and thresher.

Land holding was moderate that is 50-100 kannal on average. Rain was the main source for crops in Chuk kushy and Ratta Sharif village where as in Kallar kahar 70 percent of the area near Nikka dam was irrigated while 30 percent away from dam could not be irrigated due to broken water pipe.

In research area 80 percent uncultivated land is used as grazing area, 10 percent on average for fuel trees and 10 percent accounts for waste land due to high ground water table especially in chuk Kushy. Communities claimed that their uncultivated land could only be cultivable if government helps them in any way.

Climate in selected areas is generally cold in winter and hot in summer. Summer starts from April-September in which June and July are extremely hot months in which temperature reaches up to 30-35’ C. Winter starts from October-March in which December and January are extremely cold months in which temperature reaches its minimum at 0-5’C. Mostly rain is received in monsoon season.

Agriculture is the dominant sector in which highest contribution is from crop production (Rabi & Kharif) which is followed by vegetable (only in few places in Kallar khar) livestock and poultry. Irrigation practices consist of deep boring, tube wells and turbines. Some part of district depends upon rain for agriculture. Horticulture was not a leading sector but few of citrus trees were found. Due to decline in soil productivity and unavailability of water farmers were

switching over to livestock husbandry. Major threat to standing crops were from wild borers.

Generally the quality of drinking water varies and bad quality was due to presence of sulphur. Soil is mostly sandy and clayey. Minerals like stone dolomite and granite were available in study area.

Livestock was also reared in all three target villages and was used to supplement their income, although livestock is one of the major sources of livelihood for rainfed communities, its production is still based on traditional management practices and lack of credit.

In selected villages of Dharabi watershed the resource potential of land was not fully explored. Only 36 percent of land was feeding to whole of the community of selected villages and remaining 64 percent was waste cultivated area, which if fully used could increase production and socio-economic condition of that rural community.

The information presented regarding socio economic characteristics is mainly helpfull to characterize the project area as well as farming communities. These results could also be used as base line to compare changes in the profile at later stages of project completion or implementation.

CONCLUSION

Socio economic uplifts of any area depend upon its resource mapping for planning appropriate interventions. Available land resource could be used alternatively by applying different technological packages.

The research area was having both irrigated and rain fed land type. The study concludes that rain fed area were more neglected area by the government as compare to the irrigated area due to geographical location difference.

Rainfed area lack in agriculture machinery, easy access to agriculture inputs like fertilizer, improved seeds, pesticide, herbicide, weedicide, fragmented lands, eroded soil, weeds, lack of water storage bodies and agriculture extension agents.

Some problems were shared by both irrigated and un irrigated areas like lack of modern technique and technology, damage to crops by wild animals like Pigs and Porcupines, lack of pure drinking water facility, political influence which restricts socio economic development of the selected villages of Dharabi watershed. But comparatively irrigated areas are much better off than rainfed mainly due to water availability and access to credit.

RECOMMENDATIONS

1. Mini dam or water storage bodies should be constructed especially in rain fed areas of selected villages of Dharabi watershed.
2. Political influence should be minimize to accelerate the development of socio economic aspects and to give chance to poor farmer to get equally well off in both of the selected villages of Dharabi watershed.
3. Easy, cheap and timely access of agriculture inputs in both areas of selected villages of Dharabi watershed.
4. Full land resources use should be maximized for achieving high productivity and prosperity goals in both villages of Dharabi watershed.

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QUESTIONNAIRE

[1]	Name of interviewer		[4]	Village	
[2]	Name of respondent		[5]	Tehsil	
[3]	Date of interview		[6]	District	

Characteristics of the Member Respondent (Household)

i.	Household head age		v.	Formal Education (Years)	
ii.	Social status 1-Ordinary 2-numberdar 3- other		vi.	Farming experience (years)	
iii.	Type of present off-farm work (sp)		vii.	Present off-farm job experience (Years)	
iv.	Type of previous off-farm work (sp)		viii.	Previous off-farm job experience (Years)	

Farm Equipment

Farm traction power [1]=bullock, [2]=tractor, [3]=both [10.2] Ownership [1]=owned, [2]=rented		Thresher 1.Yes 2. No MB Plough 1.Yes 2. No Leveler 1.Yes 2. No		Irrigation source [1]=Dug well, [2]=Stream, [3]=Bore, [4]-Dam ,[5]Rain	
Water lifting device [1]=Peter, [2]=Engine, [3]=Electric motor, [4]=P.Wheel		Size of delivery pipe (inches)		Depth of dug well/Bore (feet)	
Water could lifted continuously (hours)		Recharged (hrs).		Transportation: [1]=bullock cart, [2]=self [3]=trolley, [4]=donkey	
Income earned by hiring out tractor service (Rs.).			Rabi season	Kharif Season	

Size of Operational Holding (Kanals)

Farm Land	Total Own Land		Area Rented-in	Area Rented-out	Operational Holding	Operational Holding	
	Cultivated	Un-cultivated				Irrigated	Un-irrigated
Area (Kanal)							Lepara / Mera

Present uses of uncultivated land types

Activities	Plain	Eroded/gravel	Saline	Change due to dam construction
Uses of un-cultivated lands: [1]=grazing, [2]=Tree fodder, [3]=Hay Grasses, [4]=Fuel wood, [5]=More than one				
If Grazing practices [1]=controlled,				

[2]=uncontrolled				
Plantation: [1]=Natural, [2]=Self, [3]=both				
If self, types of plantation: [1]=Fodder trees, [2]=Timber trees, [3]=Fodder Timber trees, [4]=Grasses [5] Fruit plants				
How many years before self plantation performed (No.)				
How would you intend to better use these lands: [1]=Leveling, [2]=Reclaim, [3]=Same, [4]=Plantation				

Tenancy Terms

% share	Land prep.	Seed	Fertilizer	Harvesting	Threshing	Main product	Bhusa	Dry stalk	Green Fodder	T.Well

Land and water productivity

Rabi Crops	Area (K)			Prod	Sale / purchase	Kharif Crops	Area (K)			produced	Sale/ purchased
	Irrigated	Rainfed					Irrigated	Rainfed			
		Lepara	Mera					Lepara	Mera		
Wheat						Maize (grain)					
Mustard in wheat						Maize (fodder)					
Mustard sole						Sorghum (green)					
Bar seem						Sorghum (D.Stalk)					
Oat						Millet (green)					
Lentil						Millet (D.Stalk)					
Gram						Groundnut					
Fallow											
Average area allocation to fodder crops before dam construction (k) 1- Rabi_____- 2- Kharif _____											

Sustainability

No. of minidam in your area		No. of small dam in your area	
Name of mini dam		Name of mini dam	
Area irrigated by the minidam		Area irrigated by the small dam	
Is water dry in minidam?		Is water dry in small dam?	
No. of months and their name		No. of months and their name	
Is grazing increase/decrease by construction of minidam		Is grazing increase/decrease by construction of small dam	
Water availability to livestock due to construction of minidam		Water availability to livestock due to construction of small dam	
Is forage production increase/ decrease due to its construction?		Is forage production increase/ decrease due to its construction?	
Is bird population increase/ decrease due to its construction?		Is bird population increase/ decrease due to its construction?	
Is wildlife population increase/ decrease due to its construction?		Is wildlife population increase/ decrease due to its construction?	
Is wildlife damage to crops increase/ decrease?		Is wildlife damage to crops increase/ decrease?	
Name of wildlife damage your crop/ livestock	Pig, rate, rabit, fox, bear	Name of wildlife damage your crop/ livestock	Pig, rate, rabit, fox, bear
No. of animal fall in water/ no. died?	/	No. of animal fall in water/ no. died?	/
Is fire wood availability increase/ decrease due to its construction?		Is fire wood availability increase/ decrease due to its construction?	

Cost incurred on different farm operation

Operation	Time (hr/k)	Cost (Rs/k)	Operation	Time (hr/k)	Cost (Rs/k)
Cultivator			Reaper		
Planking			Thresher for wheat		
Tractor leveling			Ground nut reaper		
MB Plough			Leveling		
Wheat sowing drill			Ground nut digger		

Financing of expenditure on production inputs

Inputs	Payment 1=cash, 2= borrow 3= credit	Source of payment	Borrowing periods	Percent cash payment	Main input buying months
Fertilizer					
Weedicide/pesticide					
Land preparation					
Reapir and maintenance					
Animal feed					

Input out put Data of major crops

Production practices	Wheat	Ground Nut	Maize	Sorghum	Millet	Fodder	Vegetables
Land preparation							
Farm Yard manure (nos) Qty applied (Trolley/load/cart)							
Fertilizer (bags)							
DAP							
UREA							
SSP							
Seed Rate (kg/K) or total							
Planting Method: 1-broadcoat 2-drill 3- planter 4- manual							
Weeding Manual (man hours)							
Chemical							
Total chemical weeding cost Rs.							
Pesticide use Total sprays							
Average cost of one spray (Rs/K)							
Total irrigations Dam(nos) Well(nos)							
Irrigations for land preparation							
Harvesting method 1-combine 2-reaper 3-manual 4- digger 5-cutter binder							
Wages paid in: kind(mond/k) cash (Rs/k)							
Threshing 1-combine 2-tractor 3- manual 4- thresher							
Wages paid in: kind(mond/k) cash (Rs/k)							
Labor shortage							
Average yield main product / grain (mds/K) By product / straw /forage (mds/K)							
Selling of main product (mds)							
Selling price (Rs/40Kg)							
Transportation cost (Rs/input)							

Input output Data of Livestock

Production practices	Buffalo wet	Buffalo dry	Cow wet	Cow dry	Heifer	Sheep	Goat	others
No. of animals held								
Breeds								
Average price per animal								
Average milk prod. In year								
Daily milk yield								
Lactation length								
Milk selling price								
Amount of green fodder provided daily								
Type of green fodder								
Amount of concentrate provided daily								
Is balanced feed given to animals								
No. of grazing hours								
Is controlled grazing or not								
Grazing availability months								
Hay cutting months								
Amount of fodder need daily after grazing								
Is water available at home								
Cost on water resource availability								
No. of man hours engaged with livestock daily								
Is casual labor hired								
Is their any permanent labour hired								
Rate of casual labour								
Rate of permanent labour								
Medicine charges								
No. of animals sold during last year								
No. of animals purchased during last year								
Average selling price								
Sell at farm gate or in the market								
Name of nearby market								
Distance from nearby market								
Is livestock rearing profitable?								
Transportation cost (Rs)								