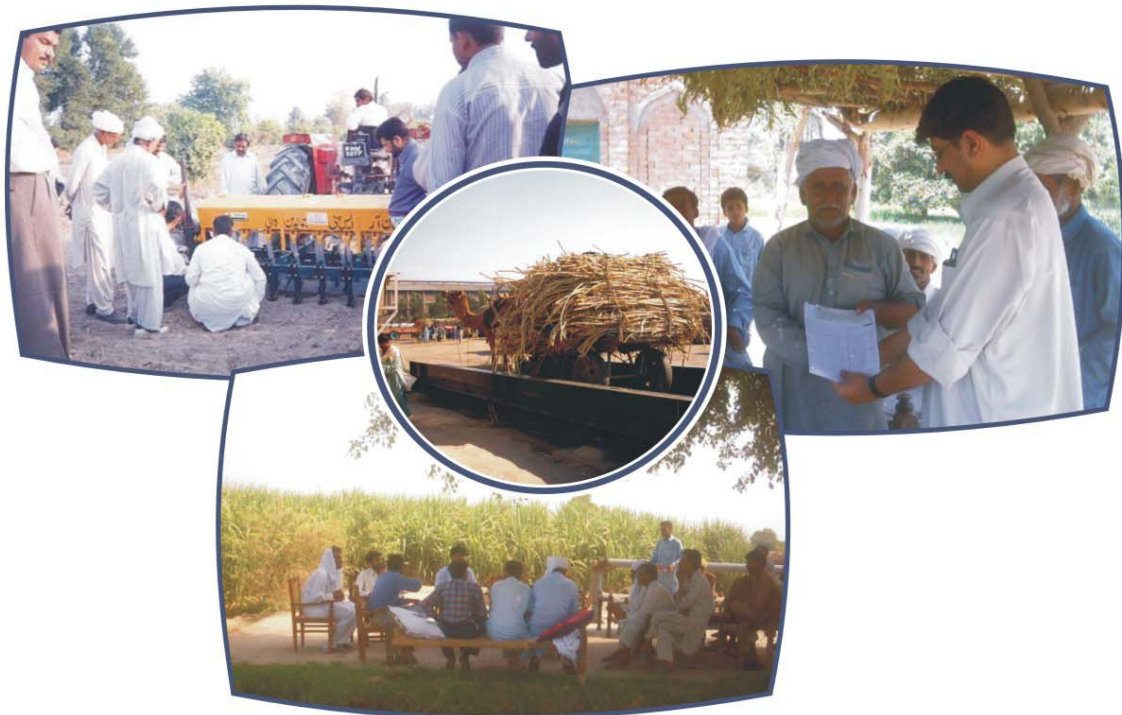


# Sugarcane Productivity Enhancement Project 3rd Party Impact Assessment

## MAIN REPORT



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Consultant

**DECEMBER 2006**

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## 0 Executive Summary

SPEP was initiated as a joint venture between NRSP and the Jamal Din Wali Sugar Mills in 2000 with the objective of enabling 10,000 farmers with small land-holdings to double their per acre yield of sugarcane, and thereby raise their incomes and standard of living, over three years. The project was launched in District Rahim Yar Khan in areas adjacent to the JDW Mill. These consist of fifteen union councils having 108 revenue villages, 193,026 acres of land and 36,228 households in two Tehsils: Rahim Yar Khan and Sadiqabad.

This sample survey was designed to determine the economic impact of the program on the living standards of the participating households. More specifically, it was designed to assess the impact according to the length of time that farmers had been CO members. The hypothesis was that improvements in economic position would have increased for CO member because of program interventions. A third aim was to learn the ways in which participating households had utilized their income.

### Methodology

The survey captured the socio economic data of 312 households (nearly 1% of the total households) in 52 sample villages (nearly 27% of the total villages). The villages were selected at random from a list of 195 villages and were also located on map to observe the distribution of sample villages over the project area. The households were selected through systematic random sampling in each selected village.

Since there was no baseline data against which to measure impact, the survey collected data from (i) both CO member and non-CO member households in villages where the SPEP had been operating (“treatment” villages) and (ii) villages where SPEP was not present (“control villages”).<sup>1</sup> The direct beneficiaries of the program were farmers with small land holdings, *i.e.* only those farmers who were growing sugarcane on less than 10 acres of land were included in the survey.

The survey covered numerous aspects of household characteristics, including the following:

- Demographic composition
- Education status
- Health status
- Contributions of family and women to household well-being
- Farming and livestock practices

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<sup>1</sup> The control villages were as similar as possible in every respect to the treatment villages. Details of the village characteristics are given in Section 3 of the report.



- Income and expenditures, based on farm and non-farm activities
- Benefits of community organization membership, as perceived by the household

The **major findings** of the survey are detailed below:

1. The SPEP program had a significant positive impact on total household income, farm income, sugarcane income and household expenditures. The regression analysis determined that “each month of CO membership in the treatment villages makes a difference of 0.39% to the household income”. This means that the income of the participating household would be lower by 4.7% per annum if it had not the access to program. Similar interpretation follows for other significant impacts given in following table.

Economic Outcome	Impact / Month (%)	Impact / Year (%)
Household Income	0.39	4.7
Farm Income	0.57	6.87
Sugarcane Income	0.79	9.45
Household Expenditures	0.11	1.37

2. The total annual income per household for participating households (Rs 272,107) was 61% higher than the total annual income of all non-participating households (*i.e.* non-CO members and control villages) which was Rs 169,242.
3. The main source of income, both for participating and non-participating households, was based on farm activities (including subsistence and cash crops, fruit (mango) and livestock) contributing 93.1% and 91.4% respectively to their total annual incomes.
4. The annual gross income per household derived from farm-based activities for participating households (Rs 354,915) was 47% higher than that of the non-participating households (Rs 241,478).
5. The gross farm income was chiefly derived from the production of crops; sugarcane, cotton and wheat contributing 78%, 12% and 9% respectively to the total farm income of participating households, and 57%, 26% and 16% respectively to the total income of all non-participating households.<sup>2</sup>
6. The average sugarcane yield per acre was 839 *maunds* in participating households. This was approximately 27% higher than that of all non-participating households (non-CO members and control villages).

<sup>2</sup> 34.78% of households in control villages consulted a Government Agricultural Extension worker while 97.41% of member households and 39.66% of non-member households in treatment villages consulted an SPEP Extension worker.

7. The annual gross income derived from sugarcane crops per acre by participating households was Rs 55,487. This was 38% higher than that of non-participating households (Rs 40,238).
8. The monthly *per capita* income in participating households was Rs 3,037. This was 55% higher than that of non-participating households (Rs 1,954).
9. There are significant differences in agricultural expenditures for treatment and control villages (Table 3-48). Participating households rent more land (p. 3-80) purchase more fertilizer (p. 3-78) and young plants, and invest more in watercourse maintenance. Participating households also pay less to transport crops to market (p. 3-81) and less on improving their land.
10. The monthly *per capita* income in both cases was well above the official poverty line of Rs 879). The *per capita* monthly income of the surveyed households was categorized into the following 'poverty bands':
  - a. income less than Rs 439 was categorized as 'extremely poor' or destitute and income of Rs 440 to 659 as 'chronically poor'
  - b. Rs 659 to Rs 879 as 'transitory poor' (signifying the likelihood that an economic 'shock' could drive the household below the poverty line)
  - c. Rs 879 to Rs 1,098 as 'transitory vulnerable'
  - d. Rs 1,098 to Rs 1,757 as 'transitory non-poor'
  - e. Rs 1,757 and above as 'non-poor'.
11. The following table shows the percentages of surveyed households falling within these poverty bands. The majority of participating households (71.6%) were non-poor as compared to 48.5% of non-participating households. Also, the percentages of extremely or chronically or transitory poor in participating households were lower than those of non-participating households.

Poverty Bands	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Monthly Per Capita (%)							
0-Up to Rs 439	7.3%	2.6%	5.2%	3.5%	2.6%	6.6%	5.1%
1-Rs 439-659	7.3%	4.3%	1.7%	3.5%	4.3%	5.6%	5.1%
2-Rs 659-879	7.3%	2.6%	10.3%	5.2%	2.6%	8.2%	6.1%
3-Rs 879-1,098	5.1%	6.9%	15.5%	9.8%	6.9%	8.2%	7.7%
4-Rs 1,098-1,757	26.1%	12.1%	15.5%	13.2%	12.1%	23.0%	18.9%
5-Rs 1,757 and above	47.1%	71.6%	51.7%	64.9%	71.6%	48.5%	57.1%

12. The survey data indicated that there were no significant differences in the monthly household expenditures (as distinct from investments in the purchase of assets) *per capita* between the participating (Rs 1,032) and non-participating households (Rs 1,003).

13. The primary household expenditure in the overall sample region was on food (48%). Other expenditures include clothing & foot wear (11%), housing (9%), education (7%), transportation (6%), dowries (5%), social events (4%) and health care (4%). The remaining 6% of household expenditures were made on mobile phones, tobacco, household equipment and consumable items and other sundry expenditures.
14. The annual investment per participating household in the purchase of assets was Rs 14,023. This is 18% higher than that of the non-participating households. The main assets purchased were livestock and agricultural machinery. These investments were the results of increased income from the program interventions.
15. Nearly 59% of the households in the sample (95% of the participating households and 37% of the non-participating households) had taken credit to invest in their farms.
16. The average loan size for participating households was Rs 29,483 which was 12% lower than that of the non-participating households (Rs 32,908). The loan size to asset ratio was 1.4% and 1.6% for participating and non-participating households, which was quite small.
17. The non-participating households had borrowed 82.12% of their total credit from the Agriculture Bank, 9.80% from commercial banks, 2.87% from commission agents, 1.63% from input suppliers, 0.33% from JDW mills, 1.43% from moneylenders and 1.83% from relative/friends. The participating households had borrowed 22.78% of their credit from the Agriculture Bank, 0.18% from JDW Mill and 77.05% from NRSP. This shows that the participating households prefer to borrow from SPEP rather than from agricultural banks for their farm-input needs.

## 0.1 Survey Statistics at a Glance

### 0.1.1 Sample Village

General Infrastructure	Control	Treatment	Total
<b>Total Villages</b>	23	29	52
<b>Road Type</b>			
Paved Metallic	17	20	37
Paved Bricks	2	5	7
Unpaved	4	4	8
<b>Telephone</b>			
No	15	20	35
Yes	8	9	17
<b>Electricity</b>			
No	1	2	3
Yes	22	27	49
Average Coverage (%)	70.20%	65.70%	67.70%
Average Years	9.6	7.8	8.6
<b>Sui Gas</b>			
No	19	26	45
Yes	4	3	7
Average Coverage (%)	6.30%	2.80%	4.30%
Average Years	2.1	0.7	1.3
<b>Drinking Water Source</b>			
Hand/Motor Pump	23	28	51
Piped To House	0	1	1
<b>Closed Drainage System</b>			
No	22	29	51
Yes	1	0	1
<b>Garbage Disposal System</b>			
Sewage or Gutter System	0	1	1
Disposal Through Sweepers	0	2	2
No Particular Methods	23	26	49
<b>Farming Practices</b>			
<b>Average Agriculture Land (acres)</b>			
Irrigated	1,454.20	1,532.30	1,497.80
Barani / Rain fed	0	0	0
Water Logged/Saline	35.9	48.3	42.8
Average Prices/Acre	246,956.50	251,379.30	249,423.10
<b>Average No. of Tube Wells</b>			
Private	77	117.66	100.12
Public	9.13	0.52	4.33
<b>Water Rotation</b>			
Irrigation Department	13	15	28
Local Zamindar	9	13	22
Zila Council	1	1	2
<b>Bricked Lined Water Courses (%)</b>	16.30%	25.00%	21.20%
<b>Daily Wages</b>			
Adult Men	126.52	120.69	123.27

Adult Women	95.65	94.48	95
Children below 15 years	63.04	58.62	60.58
<b>General Facility</b>			
01-District Capital	22.39	18.1	20
02-Tehsil Capital	19	20.83	20.02
03-Union Council Capital	7.74	5.03	6.23
04-Post Office	4.74	4.1	4.38
05-Bus Stop	2.74	3.76	3.31
06-Railway Station	20.91	21.97	21.5
07-Police Station	8.3	7.45	7.83
08-Sugar Mill	19.39	16.83	17.96
09-Flour Mill	14.39	11.41	12.73
10-Telephone Service	3.78	4.72	4.31
11-Tractor Rental	4.26	1.59	2.77
12-Weekly Market	12.13	8.28	9.98
13-Main Mandi	14.13	8.17	10.81
<b>Medical Facilities</b>			
01-Government Dispensary	6.22	8.72	7.62
02-Government Clinic	5.96	9	7.65
03-Basic Health Unit (BHU)	4.39	5.79	5.17
04-Rural Health Unit (RHU)	6.87	7.34	7.13
05-Government Hospital	6.57	10.34	8.67
06-Private Hospital	5.17	6.41	5.87
07-Private Dispensary	3.22	4.21	3.77
08-Private Maternity Home	9.87	9.52	9.67
09-Family Planning Clinic	8.48	8	8.21
<b>Education Facility</b>			
23-Private Primary School, Girls	8.78	7.34	7.98
24-Private Primary School, Boys	8.17	6.86	7.44
25-Private Primary School, CO	8.43	10.02	9.32
26-Private Middle School	11.04	12.1	11.63
27-Private Secondary School	12.43	12.36	12.39
28-Public Primary School, Girls	2.26	2	2.12
29-Public Primary School, Boys	1.87	1.1	1.44
30-Public Primary School, CO	13	14.72	13.96
31-Public Middle School, Boys	10.3	9.34	9.77
32-Public Middle School, Girls	9.74	10.55	10.19
32-Public Secondary School, Boys	22.52	17.72	19.85
33-Public Middle School, CO	17.87	15.86	16.75
33-Public Secondary School, Girls	14.48	9.86	11.9
34-Public Secondary School, CO	3.3	4.31	3.87
35-Religious / Mohallah School	6.83	4.04	5.29
36-Ilmi Madrasa	8.04	3.55	5.54
37-Adult Literacy Program	9.48	9.45	9.46

## 0.1.2 Sample Households

Demographic Structure	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
<b><u>Demographic Structure</u></b>							
Total Households	138	116	58	174	116	254	312
Total Population	981	866	434	1300	866	1415	2281
Average Household Size	7.43	7.22	7.23	7.22	7.22	7.37	7.31
Sex Ratio(Male: Female) (%)	95%	99%	112%	103%	99%	100%	99%
Dependency Ratio (%)	57%	63%	59%	62%	63%	57%	60%
Child Women Ratio (%)	50%	66%	53%	62%	66%	51%	56%
Married Ratio (Male: Female) (%)	87%	89%	86%	88%	89%	87%	88%
<b><u>Education Status</u></b>							
<i>Literacy Level</i>							
Not Literate	43%	51%	54%	52%	51%	46%	48%
Literate, No Schooling	8%	5%	3%	4%	5%	7%	6%
Primary	28%	22%	26%	23%	22%	27%	25%
Middle	10%	10%	7%	9%	10%	9%	10%
Matric	8%	8%	6%	7%	8%	7%	7%
Intermediate	2%	4%	2%	3%	4%	2%	3%
Degree College	1%	1%	2%	1%	1%	1%	1%
<i>School Going Children</i>							
Government	67%	65%	74%	68%	65%	69%	68%
Private	23%	14%	8%	11%	14%	19%	17%
Religious/Islamic	0%	2%	2%	2%	2%	1%	1%
SPEP/Government	9%	20%	16%	18%	20%	11%	14%
<b><u>Health Status</u></b>							
Good Total	86%	88%	88%	88%	88%	87%	87%
Fair Total	10%	8%	7%	8%	8%	9%	9%
Poor Total	4%	4%	5%	4%	4%	4%	4%
<b><u>Female Time use (Average hrs /Week)</u></b>							
Animal Care/Grazing/Herding/Collecting	12	10	8	9	10	10	10
Child Care and Teaching	22	20	17	18	20	19	20
Cleaning the House/ Laundry/ Ironing	12	9	10	10	9	11	10
Cooking Baking Bread / Washing Dishes	9	8	8	8	8	9	9
Fetching Water	0	1	0	1	1	0	1
Gathering Firewood	5	4	4	4	4	5	5
Going to Market	4	3	3	3	3	4	4
Grinding Floor or Husking Rice	1	2	2	2	2	2	2
Milking Animals/ Making Ghee	5	5	5	5	5	5	5
Preparing Dung Cakes	5	5	5	5	5	5	5
Stitching / Embroidery for Household use	8	7	7	7	7	7	7
Taking Meal to Field Worker	6	4	6	5	4	6	5
<b><u>Family Labor (Average Hours per Year)</u></b>							
Wheat	225	205	181	197	205	212	209
Cotton	253	190	213	198	190	241	222
Sugarcane	301	407	330	381	407	309	346
Fodder	170	215	210	214	215	182	194
Livestock	175	165	184	171	165	177	173
Poultry	25	22	17	21	22	22	22
Fishing	8	2	3	2	2	7	5

Demographic Structure	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
<b><u>Employment Status</u></b>							
Inside Agriculture	2	5	0	5	5	2	7
Outside Agriculture	11	16	9	25	16	20	36
Overseas	1	2	0	2	2	1	3
Non Farm Business	5	6	7	13	6	12	18
Unemployment Rate	28.06%	33.44%	28.43%	31.73%	33.44%	28.17%	30.51%
<b><u>Agriculture Land</u></b>							
Total Land	919.12	759.75	321.99	1081.74	759.75	1241.11	2000.86
Operational Land	1,137.75	1,034.38	408.74	1443.12	1034.38	1546.49	2580.87
Percentage Increase	23.79%	36.15%	26.94%	33.41%	36.15%	24.61%	28.99%
<b><u>Crop Production</u></b>							
<b><i>Wheat</i></b>							
Total Acres	512.5	334	142	476	334	654.5	988.5
Total Production (Mounds)	13426	9197	3791	12988	9197	17217	26414
Yield Mounds/Acre	26.2	27.54	26.7	27.29	27.54	26.31	26.72
<b><i>Cotton</i></b>							
Total Acres	465.74	245.5	133.5	379	245.5	599.24	844.74
Total Production (Mounds)	7956	4562	2400	6962	4562	10356	14918
Yield Mounds/Acre	17.08	18.58	17.98	18.37	18.58	17.28	17.66
<b><i>Sugarcane</i></b>							
Total Acres	416.82	553	194.75	747.75	553	611.57	1164.57
Total Production (Mounds)	269676	463670	135535	599205	463670	405211	868881
Yield Mounds/Acre	646.98	838.46	695.94	801.34	838.46	662.58	746.1
<b>Primary Buyers of Sugarcane</b>							
Commission Agent	0.40%	0.16%	1.53%	0.47%	0.16%	0.78%	0.45%
JDW Mill	81.25%	97.99%	95.71%	97.47%	97.99%	86.17%	92.51%
Other Sugar Mills	18.36%	1.49%	2.76%	1.78%	1.49%	13.05%	6.85%
Relative/Friend	0.00%	0.36%	0.00%	0.28%	0.36%	0.00%	0.19%
<b><i>Fodder</i></b>							
Acres	104.81	73.37	44	117.37	73.37	148.81	222.18
Production	2170	1410	828	2238	1410	2998	4408
Production/Acre	20.7	19.22	18.82	19.07	19.22	20.15	19.84
<b><i>Rice</i></b>							
Total Acres	9	6.25	2	8.25	6.25	11	17.25
Total Production (Mounds)	198	144	47	191	144	245	389
Yield Mounds/Acre	22	23.04	23.5	23.15	23.04	22.27	22.55
<b><i>Onion</i></b>							
Acres	7.5	1.75	0.75	2.5	1.75	8.25	10
Production	714	170	66	236	170	780	950
Production/Acre	95.2	97.14	88	94.4	97.14	94.55	95
<b><i>Mango</i></b>							
Household Reporting (%)	23.19%	29.31%	37.93%	32.18%	29.31%	27.55%	28.21%
Avg. No. of Trees/HH	8.28	5.72	20.41	10.61	5.72	11.87	9.58
Avg. No. of Trees/Acre	27.54	19.51	32	26.02	19.51	29.64	26.58
Total Acres	41.5	33.99	37	70.99	33.99	78.5	112.49
Total Production (Mounds)	2696	1507	2555	4062	1507	5251	6758
Yield/Acre	64.96	44.34	69.05	57.22	44.34	66.89	60.08

Demographic Structure	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
<b><u>Livestock</u></b>							
Average Animal/HH							
Cattle	0.7	0.73	0.5	0.66	0.73	0.64	0.68
Buffalo	2.49	2.4	2.33	2.37	2.4	2.44	2.43
Sheep	0.38	0.26	0.1	0.21	0.26	0.3	0.28
Goat	3.3	3.57	3.17	3.44	3.57	3.26	3.38
Camels	0.01	0	0	0	0	0.01	0.01
Horses	0.07	0.02	0.02	0.02	0.02	0.06	0.04
Donkey/Mules	0.13	0.09	0.03	0.07	0.09	0.1	0.1
Poultry	0.9	0.78	1	0.86	0.78	0.93	0.88
<b><u>Farm Income</u></b>							
Income / Acre	21,866	33,916	27,413	31,974	33,916	23,276	27,254
Income / Household	240,270	354,915	244,352	318,061	354,915	241,478	283,653
<b><i>Income / Household (%)</i></b>							
Crop	223,465	341,716	213,786	299,072	341,716	220,601	265,631
Fruits	10,476	7,303	24,862	13,156	7,303	14,733	11,971
Farm Services	3,581	3,195	2,622	3,004	3,195	3,297	3,259
Farm Production	1,810	2,081	2,910	2,357	2,081	2,136	2,115
Farm Rentals	938	621	172	471	621	712	678
<b><i>Contribution (%)</i></b>							
Crop	93.01%	96.28%	87.49%	94.03%	96.28%	91.35%	93.65%
Fruits	4.36%	2.06%	10.17%	4.14%	2.06%	6.10%	4.22%
Farm Services	1.49%	0.90%	1.07%	0.94%	0.90%	1.37%	1.15%
Farm Production	0.75%	0.59%	1.19%	0.74%	0.59%	0.88%	0.75%
Farm Rentals	0.39%	0.17%	0.07%	0.15%	0.17%	0.29%	0.24%
<b><u>Crop Income</u></b>							
<b><i>Average/Household</i></b>							
Wheat	38,042	31,365	25,744	29,491	31,365	34,403	33,273
Cotton	61,858	42,000	43,749	42,583	42,000	56,499	51,108
Sugarcane	118,775	264,521	141,675	223,572	264,521	125,551	177,220
Fodder	464	375	247	332	375	400	391
Rice	487	377	442	399	377	474	438
Onion	2,025	570	412	517	570	1,548	1,184
<b><i>Contribution In Total (%)</i></b>							
Wheat	17.20%	9.20%	12.10%	9.90%	9.20%	15.70%	12.60%
Cotton	27.90%	12.40%	20.60%	14.30%	12.40%	25.80%	19.40%
Sugarcane	53.60%	78.00%	66.70%	75.30%	78.00%	57.40%	67.20%
Fodder	0.20%	0.10%	0.10%	0.10%	0.10%	0.20%	0.10%
Rice	0.20%	0.10%	0.20%	0.10%	0.10%	0.20%	0.20%
Onion	0.90%	0.20%	0.20%	0.20%	0.20%	0.70%	0.40%
<b><i>Gross Income Per Acre</i></b>							
Wheat	10,244	10,893	10,515	10,780	10,893	10,302	10,502
Cotton	18,329	19,845	19,007	19,550	19,845	18,480	18,877
Sugarcane	39,324	55,487	42,193	52,025	55,487	40,238	47,479
Fodder	611	593	325	493	593	527	549
Rice	7,474	6,994	12,831	8,409	6,994	8,448	7,921
Onion	37,261	37,800	31,840	36,012	37,800	36,768	36,949



Demographic Structure	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
<b><u>Agriculture Expenditure</u></b>							
Expenditure/Acre	8,177	9,708	8,849	9,452	9,708	8,348	8,857
Expenditure/Household	89,856	101,591	78,881	94,021	101,591	86,608	92,179
Income to Expenditure Ratio (%)	37.4%	28.6%	32.3%	29.6%	28.6%	35.9%	32.5%
<b><u>Expenditure/Household</u></b>							
Crop Inputs	31,283	37,961	29,383	35,101	37,961	30,721	33,413
Farm Machinery	25,474	22,751	16,904	20,802	22,751	22,938	22,869
Farm Services	19,727	18,569	15,806	17,648	18,569	18,567	18,568
Farm Rentals	10,601	20,371	14,155	18,299	20,371	11,653	14,894
Others	2,769	1,940	3,012	2,297	1,940	2,841	2,506
<b><u>Contribution (%)</u></b>							
Crop Inputs	34.81%	37.37%	37.25%	37.33%	37.37%	35.47%	36.25%
Farm Machinery	28.35%	22.39%	21.43%	22.12%	22.39%	26.49%	24.81%
Farm Services	21.95%	18.28%	20.04%	18.77%	18.28%	21.44%	20.14%
Farm Rentals	11.80%	20.05%	17.95%	19.46%	20.05%	13.45%	16.16%
Others	3.08%	1.91%	3.82%	2.44%	1.91%	3.28%	2.72%
<b><u>Household Income</u></b>							
Income / HH	163,885	272,107	181,989	242,068	272,107	169,242	207,487
Income / Capita	23,054	36,449	24,321	32,400	36,449	23,443	28,381
Monthly per Capita	1,921	3,037	2,027	2,700	3,037	1,954	2,365
<b><u>Monthly Per Capita Groups (%)</u></b>							
0-Up to Rs 439	7.25%	2.59%	5.17%	3.45%	2.59%	6.63%	5.13%
1-Rs 439-659	7.25%	4.31%	1.72%	3.45%	4.31%	5.61%	5.13%
2-Rs 659-879	7.25%	2.59%	10.34%	5.17%	2.59%	8.16%	6.09%
3-Rs 879-1098	5.07%	6.90%	15.52%	9.77%	6.90%	8.16%	7.69%
4-Rs 1098-1757	26.09%	12.07%	15.52%	13.22%	12.07%	22.96%	18.91%
5-Rs 1757 or Over	47.10%	71.55%	51.72%	64.94%	71.55%	48.47%	57.05%
<b><u>Income Sources (%)</u></b>							
Agriculture	91.78%	93.10%	90.67%	92.49%	93.10%	91.43%	92.24%
Business	4.28%	3.61%	5.04%	3.97%	3.61%	4.52%	4.08%
Jobs	1.06%	2.21%	3.92%	2.64%	2.21%	1.97%	2.09%
Remittance	0.31%	0.62%	0.00%	0.46%	0.62%	0.21%	0.41%
Others	2.57%	0.46%	0.38%	0.44%	0.46%	1.87%	1.18%
<b><u>Household Expenditure</u></b>							
Expenditure / Household	88,048	92,413	84,274	89,700	92,413	86,931	88,969
Expenditure / Capita	12,386	12,379	11,262	12,006	12,379	12,041	12,169
Monthly per Capita	1,032	1,032	939	1,000	1,032	1,003	1,014
<b><u>Expenditure Sources (%)</u></b>							
Food	47.50%	47.30%	49.40%	48.00%	47.30%	48.10%	47.80%
Clothing & Foot Wear	11.40%	12.00%	10.80%	11.60%	12.00%	11.20%	11.50%
Housing	8.50%	8.60%	8.90%	8.70%	8.60%	8.60%	8.60%
Education	6.90%	6.40%	7.70%	6.80%	6.40%	7.20%	6.90%
Transportation	6.20%	6.50%	4.70%	5.90%	6.50%	5.80%	6.10%
Dowries	5.30%	4.40%	3.90%	4.20%	4.40%	4.90%	4.70%
Social Events	4.40%	4.50%	3.70%	4.30%	4.50%	4.20%	4.30%
Health Care	3.20%	3.50%	4.30%	3.80%	3.50%	3.50%	3.50%
Household Equipments	2.30%	2.20%	2.20%	2.20%	2.20%	2.30%	2.20%
Household Consumables	1.20%	1.50%	1.70%	1.60%	1.50%	1.30%	1.40%
Mobiles Cards / Bills	1.10%	1.20%	1.10%	1.20%	1.20%	1.10%	1.10%
Other Expenditures	1.90%	1.90%	1.6%	1.8%	1.90%	1.80%	1.9%

Demographic Structure	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
<b>Assets</b>							
Value / HH	2,126,653	2,074,056	1,809,289	1,985,800	2,074,056	2,032,739	2,048,101
Value / Capita	299,162	277,818	241,794	265,792	277,818	281,567	280,144
<b>Assets Sources (%)</b>							
Agriculture Land	73.98%	75.11%	73.99%	74.77%	75.11%	73.98%	74.41%
Livestock	5.49%	5.80%	5.19%	5.61%	5.80%	5.41%	5.56%
Agriculture Equipments	6.96%	7.17%	5.45%	6.65%	7.17%	6.56%	6.79%
Trees	0.40%	0.29%	1.13%	0.55%	0.29%	0.60%	0.48%
Dwelling	7.92%	6.57%	7.82%	6.95%	6.57%	7.89%	7.39%
Consumer Durables	5.01%	4.80%	5.39%	4.98%	4.80%	5.11%	4.99%
Business	0.14%	0.12%	0.97%	0.38%	0.12%	0.36%	0.27%
Property	0.03%	0.08%	0.00%	0.06%	0.08%	0.03%	0.05%
Investments	0.07%	0.06%	0.06%	0.06%	0.06%	0.07%	0.06%
<b>Value of Assets</b>							
Purchased / Household	14,247	14,023	6,123	11,390	14,023	11,843	12,653
Sold / Household	278	23	24	23	23	203	136
<b>Household Credit</b>							
Household in Credit (%)	39.10%	97.40%	37.90%	77.60%	97.40%	38.80%	60.60%
Credit / Household	46,978	33,836	22,328	30,000	33,836	39,684	37,510
Credit to Income Ratio (%)	28.70%	12.40%	12.30%	12.40%	12.40%	23.40%	18.10%
<b>Credit Source (%)</b>							
Agriculture Bank	87.31%	30.55%	56.91%	37.09%	30.55%	82.24%	64.91%
Commercial Bank	9.56%	0.00%	16.22%	4.02%	0.00%	10.67%	7.09%
Commission Agent	0.00%	0.00%	14.29%	3.54%	0.00%	2.38%	1.58%
Input Supplier	1.23%	0.00%	1.93%	0.48%	0.00%	1.35%	0.90%
JDW Sugar Mill	0.32%	0.15%	0.00%	0.11%	0.15%	0.27%	0.23%
Money Lender	0.72%	0.00%	4.25%	1.05%	0.00%	1.31%	0.87%
NRSP/SPEP	0.00%	69.30%	0.00%	52.11%	69.30%	0.00%	23.24%
Relative/Friend	0.85%	0.00%	5.25%	1.30%	0.00%	1.58%	1.05%
<b>Credit Purpose</b>							
Farm Inputs	76.79%	95.04%	87.50%	93.79%	95.04%	80.00%	89.05%
Other Agriculture Cost	0.00%	1.65%	8.33%	2.76%	1.65%	2.50%	1.99%
Purchase of Agriculture Land	0.00%	1.65%	0.00%	1.38%	1.65%	0.00%	1.00%
Purchase of Agriculture Machinery	14.29%	0.83%	4.17%	1.38%	0.83%	11.25%	4.98%
Purchase of Livestock	0.00%	0.83%	0.00%	0.69%	0.83%	0.00%	0.50%
Purchase / Improvement of Land / Building / Equipment	8.93%	0.00%	0.00%	0.00%	0.00%	6.25%	2.49%
<b>Household Borrowing</b>							
Household In Debt	37.68%	94.83%	36.21%	75.29%	94.83%	37.24%	58.65%
Debt / Household	40,638	29,483	14,517	24,494	29,483	32,908	31,635
<b>Debt to Asset Ratio</b>							
Debt to Source (%)	1.90%	1.40%	0.80%	1.20%	1.40%	1.60%	1.50%
Agriculture Bank	85.77%	22.78%	57.84%	61.69%	22.78%	82.12%	61.56%
Commercial Bank	11.06%	0.00%	1.43%	6.42%	0.00%	9.80%	6.40%
Commission Agent	0.00%	0.00%	21.97%	1.88%	0.00%	2.87%	1.87%
Input Supplier	1.43%	0.00%	2.97%	1.07%	0.00%	1.63%	1.06%
JDW Sugar Mill	0.37%	0.18%	0.00%	0.27%	0.18%	0.33%	0.27%
Money Lender	0.39%	0.00%	8.31%	0.75%	0.00%	1.43%	0.93%
NRSP/SPEP	0.00%	77.05%	0.00%	26.72%	77.05%	0.00%	26.70%
Relative/Friend	0.98%	0.00%	7.48%	1.20%	0.00%	1.83%	1.20%

# 1 Introduction

SPEP is a systemic and strategic intervention for agriculture productivity enhancement. Its need was felt when the statistics of the region showed the declining trends in the acreage of sugarcane. The declining trend was attributed to poor seed quality, low yields, non scientific agronomic practices, lack of access to credit and delayed payment to small growers by the Mills which discouraged the small farmers and growers. Therefore, SPEP was initiated as a joint venture between NRSP and the Jamal Din Wali Sugar Mills with the objective to double the production of sugarcane of 10,000 small farmers living in designated Union Council around the JDW Mill in RYK in a period of three years. Later, the aim of project was modified to raise the income of rural poor by improving their per acre yield with the goal to double the yield of sugarcane of small grower in 15 Union Councils around the JDW Mills with in a period of three years.

## 1.1 *SPEP Activities*

The following activities are carried out in the SPEP area

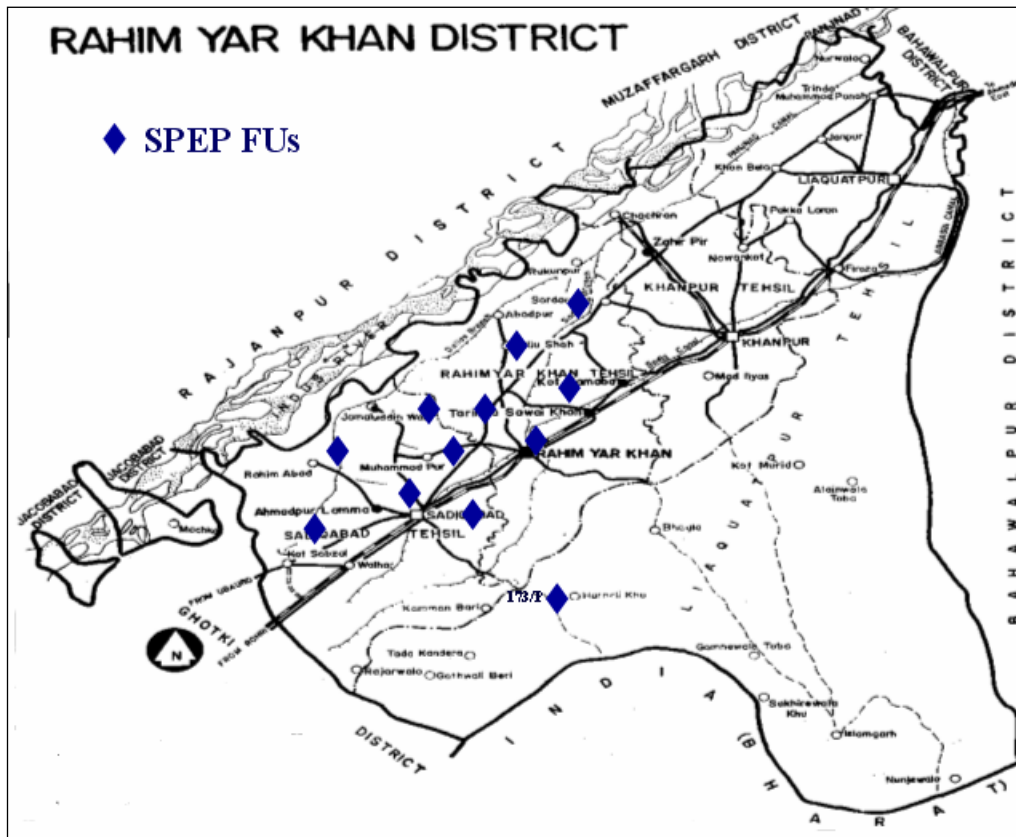
- Community Mobilization carried out by NRSP
  - Organization of small farmers into Community Organization (CO)
  - Providing them planning and management trainings
  - Development of marketing channels
- Extension services carried out by JDW Mill
  - Arrangement of quality inputs
  - Giving technical advice
  - Better agronomic practices
- Financial Services carried out both by NRSP and JDW Mills i.e., SPEP
  - CO savings
  - Credit for fertilizer
  - Credit for seed
  - Credit for agriculture machinery and implements

## 1.2 *Project Area*

The project area of SPEP is shown in Figure 1 below. The project is operated in two tehsils; “Rahim Yar Khan” and “Sadiqabad” of district Rahim Yar Khan. It consisted of fifteen union councils having 108 revenue villages with 193,026 acres of land. The total rural population of the area is 275,333, with 36,228 households and the major crops are wheat, cotton and sugarcane. The main participants of program are the small farmers that grow sugarcane in

less than 10 acres of the land.

Figure 0-1: SPEP Project Area



As SPEP was in operation for the last 7 years, the NRSP management wanted to determine its economic impact if any on the standard of living of the household. Further the management was also interested in knowing the significance of economic impact with respect to the formation of the Community Organizations. Therefore a sample survey was designed and executed in order to properly answer the above queries.

## 2 Methodology

### 2.1 Survey Objective

The primary objective of the survey was to collect household and community data which can be used to analyze important questions, particularly those relating to poverty, income distribution and impact of the sugar cane enhancement program of small sugarcane growers.

## **2.2 Survey Scope**

The survey included both type (control and treatment) of villages where SPEP was and was not in operation in two tehsils; “Rahim Yar Khan” and “Sadiqabad” of District Rahim Yar Khan. This consisted of 195 revenue villages in 23 union councils of both tehsils. Only those farmers were included in the survey who grow sugarcane in less than 10 acres of land.

## **2.3 Survey Questionnaire**

The survey questionnaire was adopted from the Pakistan Household Integrated Survey (PIHS-1991), a study conducted by UNDP in collaboration with the Federal Bureau of Statistics, Pakistan; and was modified to develop a multi-purpose data base for coverage of various aspects of household behavior and village statistics. It included following questionnaires (questionnaire formats given in Annexures)

## **2.4 Household Questionnaire**

It was designed for extensive coverage of various aspects of household behavior which included following areas:

- Demographic composition of the household
- Education Status of Household
- Health Status of Household
- Women's time use and contribution to household well-being
- Farming and livestock practices of household
- Income and expenditure pattern of household based on farm and non farm activities.
- Benefits of community organization as perceived by the household

### **2.4.1 Community, Price, and Facility Questionnaires**

A community, price, and facility questionnaire was administered to a group of local community members or other knowledgeable individuals in the community and in the local market. The data collected was used to:

- measure access to infrastructure and other services such as schools, health centers and financial institutions
- determine local prices of major commodities, primarily food
- measure factors reflecting the quality of services in the community, for example, number of boys and girl's schools, number and gender of teachers in each etc.

## 2.5 Survey Sample Design

The survey uses a representative sample of 312 households who grow sugarcane in less than 10 acres of land and is stratified by treatment and control area. The treatment group includes those who receive the benefits and control group consists of those that do not receive the benefits of SPEP program. The following table shows the allocation of the sample:

	<b>Total Villages</b>			<b>Sample Villages</b>		
	<b>Control</b>	<b>Treatment</b>	<b>Total</b>	<b>Control</b>	<b>Treatment</b>	<b>Total</b>
<b>RYK</b>	35	52	<b>87</b>	9	14	<b>23</b>
<b>SQD</b>	40	68	<b>108</b>	14	15	<b>29</b>
<b>Total</b>	<b>75</b>	<b>120</b>	<b>195</b>	23	29	<b>52</b>

The sample excludes the household that either do not grow sugarcane or grow at more than 10 acres of land because these were not the direct beneficiaries of the program. Households were selected using a two-stage, stratified random sample drawn from the list created after the identification of the control and treatment villages in each tehsil. The identification of the treatment and control villages was based on the cane survey 2004-05 conducted by the cane department of the JDW Sugar mill.

In the first stage, a total of 52 primary sampling units (i.e. villages) were drawn at random from the master list of villages with probability proportional to population of the villages in each tehsil. A total of 23 primary sampling villages drawn were selected as the control villages and the remaining 29 villages drawn were selected as the treatment villages. These villages were also located on map to observe the distribution of sample villages over the target population.

For the second stage, six secondary sampling units (i.e. households) were selected. The total number of household in each village were taken from the population census 1998, conducted by Government of Pakistan. However, the complete household list was not available. Therefore the following strategy was adopted for determining and locating the household to be interviewed.

Each team was required to prepare a map of all basties/deras of a village and to find the total number of households in it. Then a household was selected by using systematic random sampling. However, in villages where community organization was present two maps were prepared. One for the households of members of community organizations (COM) and other was for the households of non members of Community Organization (CON). Then 4 households belonging to member of community organization were drawn and

2 household belonging to non members of community organization were drawn from it.

Household selection form was prepared to assist the interviewers in selecting the households to be interviewed. This form was completed by each team before reaching the sample village. Only six of the twelve households selected on the form were interviewed. The remaining six households were designated as "replacement households".

## **2.6 Survey Field Organization**

Survey data was collected by 4 field teams. Each team consisted of two interviewers (both males), having a motorcycle for transportation between villages. Each team received 2 day training for getting familiar with questionnaire and then was sent to field for conducting the pilot survey. The questionnaire was adjusted on the basis of feed back from the teams and was completely finalized on the last day of training.

It was decided to move the teams from one end of the sample region to the other thus covering the complete distribution of sample. Each team visited approximately 13 villages over the course of the survey which was scheduled to last for 20 to 25 days. As 6 household were interviewed every day; each team conducted approximately 75 interviews during the survey period.

## **3 Analysis & Results**

### **3.1 Profile of Sample Villages**

The general infrastructure for sample villages is given at table 3-1 that directly affects the daily life of the people. The road that serves the largest or central in sample villages was paved metallic. Nearly 71% of villages reported this kind of road indicating that both treatment and control villages had access to reasonable quality of road.

**Table 3-1: Village General Infrastructure**

	Control	Treatment	Total
<b>Total Villages</b>	23	29	52
<b>Road Type</b>			
Paved Metallic	17	20	37
Paved Brick	2	5	7
Unpaved	4	4	8
<b>Telephone</b>			
No	15	20	35
Yes	8	9	17
<b>Electricity</b>			
No	1	2	3

	Control	Treatment	Total
Yes	22	27	49
Average Coverage (%)	70.2%	65.7%	67.7%
Average Years	9.6	7.8	8.6
<b>Sui Gas</b>			
No	19	26	45
Yes	4	3	7
Average Coverage (%)	6.3%	2.8%	4.3%
Average Years	2.1	0.7	1.3
<b>Drinking Water Source</b>			
Hand/Motor Pump	23	28	51
Piped To House	0	1	1
<b>Closed Drainage System</b>			
No	22	29	51
Yes	1	0	1
<b>Garbage Disposal System</b>			
Sewage Or Gutter System	0	1	1
Disposal Through Sweepers	0	2	2
No Particular Methods	23	26	49

Only 17 villages (33% of the sample villages) have telephone service available. Electricity was available in all villages only 67.7% of households had electricity: 70.2% in control villages and 65.7% in treatment villages. The Sui gas connections were present only in 4.3% of sample villages: 6.3% in control villages and 4.3% in treatment villages. The main source of drinking water in sample villages was underground water extracted through hand or motor pumps. Except for one control village, none of the villages had a closed drainage system. Only one treatment villages had a sewage or gutter system for garbage disposal. The remaining villages had no system, except for two treatment villages where household garbage was collected by a sweeper.

**Table 3-2: Village Farming Practices**

	Control	Treatment	Total
<b>Average Agriculture Land</b>			
Irrigated	1,454.2	1,532.3	1,497.8
Barani / Rain fed	0.0	0.0	0.0
Water Logged/Saline	35.9	48.3	42.8
Average Prices/Acre	246,956.5	251,379.3	249,423.1
<b>Average No of Tube Wells</b>			
Private	77.00	117.66	100.12
Public	9.13	0.52	4.33
<b>Water Rotation</b>			
Irrigation Department	13.00	15.00	28.00
Local Zamindar	9.00	13.00	22.00
Zill Council	1.00	1.00	2.00
<b>Bricked Lined Water Courses (%)</b>	16.3%	25.0%	21.2%
<b>Daily Wages</b>			



	Control	Treatment	Total
Adult Males	126.52	120.69	123.27
Adult Females	95.65	94.48	95.00
Children below 15 years	63.04	58.62	60.58

The farming practice of sample villages is described in table 3-2. The sample villages had a total of 1,497 acres of land with 1,452 acres of land in control villages and 1,532 acres of land in treatment villages. These agriculture lands were connected to central irrigated system of province. The water rotation system was mainly arranged by irrigation department and by local *zamindars*. Both private and public tube wells were also used for irrigating agriculture land. The wide difference between the average number of public and private tube well in each village was apparent indicating that households in these villages didn't rely on public tube wells and prefer owning their own tube well. However the average number of tube well in treatment villages was significantly higher than in control villages. Also the percentage of bricked lined water courses in control villages was significantly lower than in treatment villages. However, no significant difference was observed in the average acres of land available for cultivation, the average value of land per acre and the average wages of adult males, females and children below 14 years.

The various facilities available in villages along with their average distance are summarized in table 3-3. The average distance in the overall sample villages for district and tehsil offices was 20 Km. The facilities of post office and bus stop were accessible from all villages with in a range of 3 to 4 Km. However the railway station was accessible from the average distance of 20 kilometers. The flour and sugar mills were at the distance of 10 to 15 kilometers on average from all villages. Similarly the weekly and main *mandi* were 9 to 10 Km on average from all villages. The tractor rental facilities were present with in an average distance of 4.26 Km in control villages and 4.72 Km in treatment villages.

**Table 3-3: Village General Facilities (Average Distance)**

Facility	Control	Treatment	Total
01-District Capital	22.39	18.10	20.00
02-Tehsil Capital	19.00	20.83	20.02
03-Union Council Capital	7.74	5.03	6.23
04-Post Office	4.74	4.10	4.38
05-Bus Stop	2.74	3.76	3.31
06-Railway Station	20.91	21.97	21.50
07-Police Station	8.30	7.45	7.83
08-Sugar Mill	19.39	16.83	17.96
09-Flour Mill	14.39	11.41	12.73
10-Telephone Service	3.78	4.72	4.31
11-Tractor Rental	4.26	1.59	2.77
12-Weekly Market	12.13	8.28	9.98
13-Main Mandi	14.13	8.17	10.81

The average distance to various health facilities are summarized in table 3-4. On average all villages were at the distance of 7 to 9 Km from various health facilities except for private dispensary and basic health unit (BHU) which can be accessed from an average distance of 3.77 and 5.17 Km respectively in the sample villages. Note that people in both types of villages were on the average at the distance of 8.67 Km from government hospitals with a distance of 6.87 Km from control villages and 10.34 Km from treatment villages. However the private hospitals were closer from both villages with an average distance of 5.87 Km. The private maternity homes and family planning units were 8 to 10 Km away.

**Table 3-4: Village Health Facilities**

Facility	Control	Treatment	Total
01-Government Dispensary	6.22	8.72	7.62
02-Government Clinic	5.96	9.00	7.65
03-Basic Health Unit (BHU)	4.39	5.79	5.17
04-Rural Health Unit (RHU)	6.87	7.34	7.13
05-Government Hospital	6.57	10.34	8.67
06-Private Hospital	5.17	6.41	5.87
07-Private Dispensary	3.22	4.21	3.77
08-Private Maternity Home	9.87	9.52	9.67
09-Family Planning Clinic	8.48	8.00	8.21

The average distance for various school facilities are summarized in table 3-5. The private schools were on the average at the distance of 9 to 10 kilometers from both types of village. Except for the public primary schools for boys and girls and secondary school having coeducation; that were at a distance of less than 2 kilometers on average, all other public schools were at the distance of more than 13 kilometers. Some informal schools like religious or *mohallah* school or *illmi madrasa* were accessible from a distance of 5 kilometers on the average from all villages. The adult literacy program was also found in these villages with an average distance to 10 kilometers from all villages.

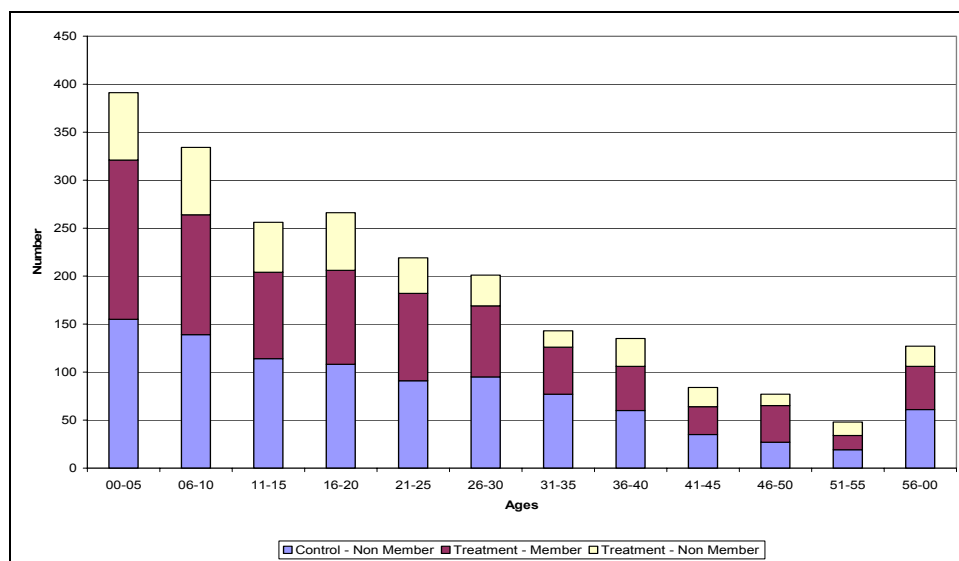
**Table 3-5: Household School Facilities**

Facility	Control	Treatment	Total
23-Private Primary School, Girls	8.78	7.34	7.98
24-Private Primary School, Boys	8.17	6.86	7.44
25-Private Primary School, Co	8.43	10.02	9.32
26-Private Middle School	11.04	12.10	11.63
27-Private Secondary School	12.43	12.36	12.39
28-Public Primary School, Girls	2.26	2.00	2.12
29-Public Primary School, Boys	1.87	1.10	1.44
30-Public Primary School, Co	13.00	14.72	13.96
31-Public Middle School, Boys	10.30	9.34	9.77
32-Public Middle School, Girls	9.74	10.55	10.19
32-Public Secondary School, Boys	22.52	17.72	19.85
33-Public Middle School, Co	17.87	15.86	16.75
33-Public Secondary School, Girls	14.48	9.86	11.90
34-Public Secondary School, Co	3.30	4.31	3.87
35-Religious / Mohallah School	6.83	4.04	5.29
36-Ilmi Madrasa	8.04	3.55	5.54
37-Adult Literacy Program	9.48	9.45	9.46

### 3.2 Demographic Structure of Households

The distribution of population in different age groups is shown in figure 3-1. The percentage distribution is given in table 3-6. The sample indicated that 31.78% of the total population is less than 10 years old; 22.88% were 11 to 20 years old; 40.12% were 21 to 55 years old and the remaining 5.57% were over 56. The distribution of population was approximately the same in control and treatment villages and in participating and non-participating households.

**Figure 3-1: Distribution of Population in Age Groups**



**Table 3-6: Percentage Distribution of Population in Age Groups**

Age Group	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
00-05	15.80%	19.17%	16.13%	18.15%	19.17%	15.90%	17.14%
06-10	14.17%	14.43%	16.13%	15.00%	14.43%	14.77%	14.64%
11-15	11.62%	10.39%	11.98%	10.92%	10.39%	11.73%	11.22%
16-20	11.01%	11.32%	13.82%	12.15%	11.32%	11.87%	11.66%
21-25	9.28%	10.51%	8.53%	9.85%	10.51%	9.05%	9.60%
26-30	9.68%	8.55%	7.37%	8.15%	8.55%	8.98%	8.81%
31-35	7.85%	5.66%	3.92%	5.08%	5.66%	6.64%	6.27%
36-40	6.12%	5.31%	6.68%	5.77%	5.31%	6.29%	5.92%
41-45	3.57%	3.35%	4.61%	3.77%	3.35%	3.89%	3.68%
46-50	2.75%	4.39%	2.76%	3.85%	4.39%	2.76%	3.38%
51-55	1.94%	1.73%	3.23%	2.23%	1.73%	2.33%	2.10%
56-00	6.22%	5.20%	4.84%	5.08%	5.20%	5.80%	5.57%

The demographic structure of the household is described in table 3-7. The sample household had a population of 2,281 of which 50.15% were females and 49.85% were males. Of the female population 50.26% were children, 44.93% adults and the rest (4.81%) elders. Of the male population 51.19% were children, 42.48% were adults and remaining 6.33% were elders. The male/female ratio for the whole population was 99.39%. However this ratio is 94.64% for control villages and 103.13% for treatment villages. This ratio for member and non-member households in treatment villages is 99.08 and 111.71%. The ratio for the non-members in treatment villages was unexpectedly high, largely because of the smaller number of households sampled. The sex ratio for participating and non-participating households was 99.08% and 99.38%, respectively.

**Table 3-7: Demographic Structure of Households**

Demographic Structure	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Total Households	138	116	58	174	116	254	312
Total Population	981	866	434	1300	866	1415	2281
%Female Population	51.38%	50.23%	47.24%	49.23%	50.23%	50.11%	50.15%
%Children(00-18Years)	49.21%	50.34%	52.68%	51.09%	50.34%	50.21%	50.26%
%Adults(19-55 Years)	45.44%	44.83%	43.90%	44.53%	44.83%	44.99%	44.93%
%Elders(Over 55 Years)	5.36%	4.83%	3.41%	4.38%	4.83%	4.80%	4.81%
%Male Population	48.62%	49.77%	52.76%	50.77%	49.77%	49.89%	49.85%
%Children(00-18Years)	48.64%	52.67%	53.71%	53.03%	52.67%	50.28%	51.19%
%Adults(19-55 Years)	44.23%	41.76%	40.17%	41.21%	41.76%	42.92%	42.48%
%Elders(Over 55 Years)	7.13%	5.57%	6.11%	5.76%	5.57%	6.80%	6.33%
Sex Ratio(Male: Female)	94.64%	99.08%	111.71%	103.13%	99.08%	99.58%	99.39%
Dependency Ratio	56.71%	63.40%	58.97%	61.89%	63.40%	57.40%	59.62%
Child Women Ratio	49.61%	65.85%	52.94%	61.56%	65.85%	50.56%	56.11%
Average Household Size	7.43	7.22	7.23	7.22	7.22	7.37	7.31
Adults Per Household	3.80	3.50	3.38	3.46	3.50	3.67	3.60

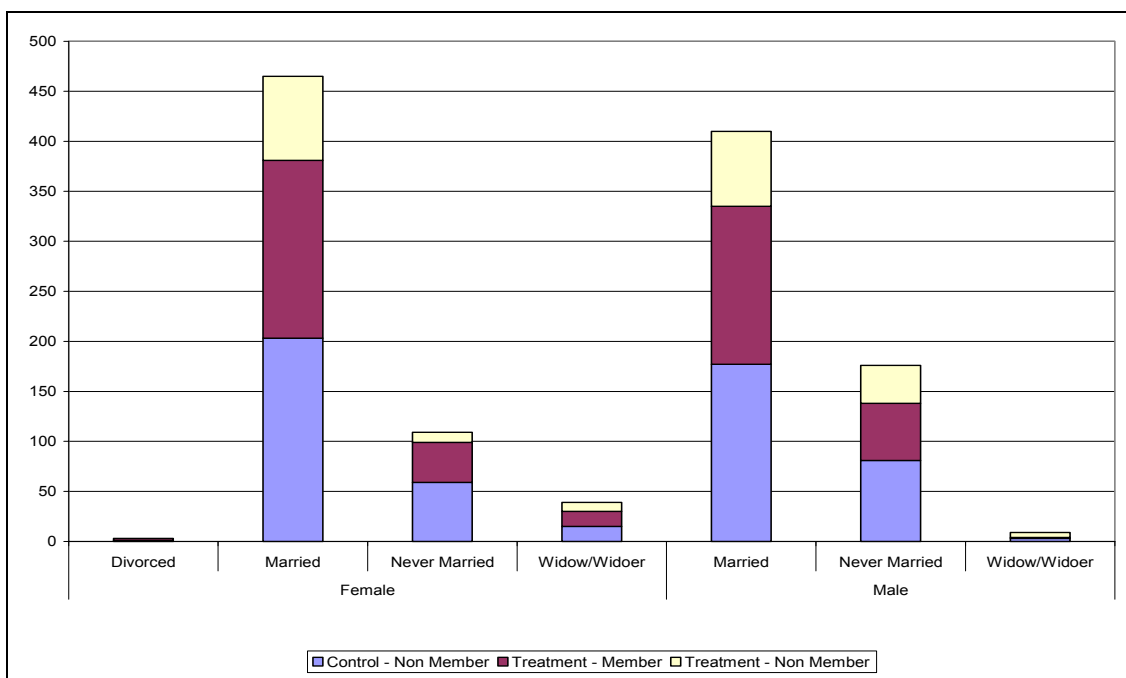
The dependency ratio in the overall sample was 59.62% (56.71% in control villages and 61.89% in treatment villages). Within the treatment villages the ratio was 63.40% and 58.97%. The ratio for participating and non-participating household was 63.40 and 57.40%. This indicated the presence of a greater number of dependents in participating households.

Similarly the child/women ratio in the overall sample is 56.11% with 49.61% and 61.56% in control and treatment villages. Within the member and non-member households of treatment villages this ratio is 65.85% and 52.94% respectively and for participating and non-participating households the ratio is 65.85% and 50.56% respectively. This higher ratio for participating households indicates that there were more dependent children for women in participating households.

The average household size in the sample was approximately seven people, with 3 adults per family in both control and treatment villages and participating and non-participating households.

Figure 3-2 shows the marital status of adult (18 years or over) males and females in the population. The sample population showed that 0.26% of the adult women were living as either divorced or widowed, 40.65% were married and 9.53% were never married. Similarly 2.10% of adult males were widowers, 40.65% were married and 9.53% were never married.

**Figure 3-2: Marital Status of Adult Population**



In overall sample region, 0.13% of adult population was divorced, 38.36% was married, 12.49% were never married and 2.10% was divorced. Almost same proportions were

prevalent in both the control and treatment villages, in member and non-member households of treatment villages and in participating and non-participating households. The married population consisted of 38.36% of males and 40.65% of females. The percent ratio of married males to females was 87.87% which was approximately the same for control and treatment villages and participating and non-participating households. This indicates that polygamy is practiced in the sample region.

**Table 3-8: Marital Status of Household**

Marital Status	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
%Females	51.38%	50.23%	47.24%	49.23%	50.23%	50.11%	50.15%
%Divorced	0.20%	0.46%	0.00%	0.31%	0.46%	0.14%	0.26%
%Married	40.28%	40.92%	40.98%	40.94%	40.92%	40.48%	40.65%
%Never Married	11.71%	9.20%	4.88%	7.81%	9.20%	9.73%	9.53%
%Widow/Widower	2.98%	3.45%	4.39%	3.75%	3.45%	3.39%	3.41%
%Males	48.62%	49.77%	52.76%	50.77%	49.77%	49.89%	49.85%
%Divorced	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
%Married	18.04%	18.24%	17.28%	17.92%	18.24%	17.81%	17.97%
%Never Married	8.26%	6.58%	8.76%	7.31%	6.58%	8.41%	7.72%
%Widow/Widower	0.31%	0.12%	1.15%	0.46%	0.12%	0.57%	0.39%
%All Genders							
%Divorced	0.10%	0.23%	0.00%	0.15%	0.23%	0.07%	0.13%
%Married	38.74%	38.80%	36.64%	38.08%	38.80%	38.09%	38.36%
%Never Married	14.27%	11.20%	11.06%	11.15%	11.20%	13.29%	12.49%
%Widow/Widower	1.83%	1.85%	3.23%	2.31%	1.85%	2.26%	2.10%
Married Ratio(Male: Female)	87.19%	88.76%	89.29%	88.93%	88.76%	87.80%	88.17%
Married Per Household	2.88	2.80	2.65	2.75	2.80	2.81	2.80

### 3.3 Household Dwelling Facilities

The physical environment and amenities of life for the households are described in table 3-9. The overall sample indicated that 15.71% of population had *pucca* (brick or concrete structure) houses; 61.22% had *katcha/pucca* (partly brick or concrete and partly mud based structure) and 23.08% had *katcha* (mud based) houses.

**Table 3-9: Household Dwelling Facilities**

Dwelling Facilities	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Total Households	138	116	58	174	116	196	312
Dwelling Structure							
Pucca	23.91%	11.21%	5.17%	9.20%	11.21%	18.37%	15.71%
Katcha/Pucca	60.14%	62.07%	62.07%	62.07%	62.07%	60.71%	61.22%
Katcha	15.94%	26.72%	32.76%	28.74%	26.72%	20.92%	23.08%
Number of Rooms							
Two	89.13%	82.76%	82.76%	82.76%	82.76%	87.24%	85.58%
Three	10.14%	15.52%	15.52%	15.52%	15.52%	11.73%	13.14%

Dwelling Facilities	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Four	0.72%	1.72%	1.72%	1.72%	1.72%	1.02%	1.28%
Drinking Water							
Canal/River	0.00%	0.00%	1.72%	0.57%	0.00%	0.51%	0.32%
Hand Pump/Motor Pump	91.30%	88.79%	87.93%	88.51%	88.79%	90.31%	89.74%
Tap Water	8.70%	10.34%	10.34%	10.34%	10.34%	9.18%	9.62%
Well	0.00%	0.86%	0.00%	0.57%	0.86%	0.00%	0.32%
Drainage System							
No Drainage	47.10%	37.07%	37.93%	37.36%	37.07%	44.39%	41.67%
Yes, Open Drains	27.54%	21.55%	15.52%	19.54%	21.55%	23.98%	23.08%
Yes, Soak Pit	18.12%	37.07%	43.10%	39.08%	37.07%	25.51%	29.81%
Yes, Underground Drains	7.25%	4.31%	3.45%	4.02%	4.31%	6.12%	5.45%
Garbage Disposal							
Burned/Buried	1.45%	0.86%	1.72%	1.15%	0.86%	1.53%	1.28%
Dumped	21.01%	8.62%	8.62%	8.62%	8.62%	17.35%	14.10%
Dumped & Used for Fertilizer	77.54%	90.52%	89.66%	90.23%	90.52%	81.12%	84.62%
Toilet System							
Communal Latrine	9.42%	11.21%	17.24%	13.22%	11.21%	11.73%	11.54%
Household Flush Connected to Municipal Sewer	17.39%	13.79%	5.17%	10.92%	13.79%	13.78%	13.78%
Household Flush Connected to Septic Tank	42.75%	25.00%	34.48%	28.16%	25.00%	40.31%	34.62%
Household Non Flush	6.52%	27.59%	25.86%	27.01%	27.59%	12.24%	17.95%
No Toilet	23.91%	22.41%	17.24%	20.69%	22.41%	21.94%	22.12%

In the overall sample, 85.58% of dwellings had two rooms (89.13% in control and 82.76% in treatment villages); 13.14% of dwelling had three rooms (10.14% in control and 15.52% in treatment villages). The main source of drinking water in these dwelling was under ground water (89.74% of households in the overall sample). Just 9.62% of the households in the overall sample use tap water (8.70% in control villages and 10.34% in treatment villages).

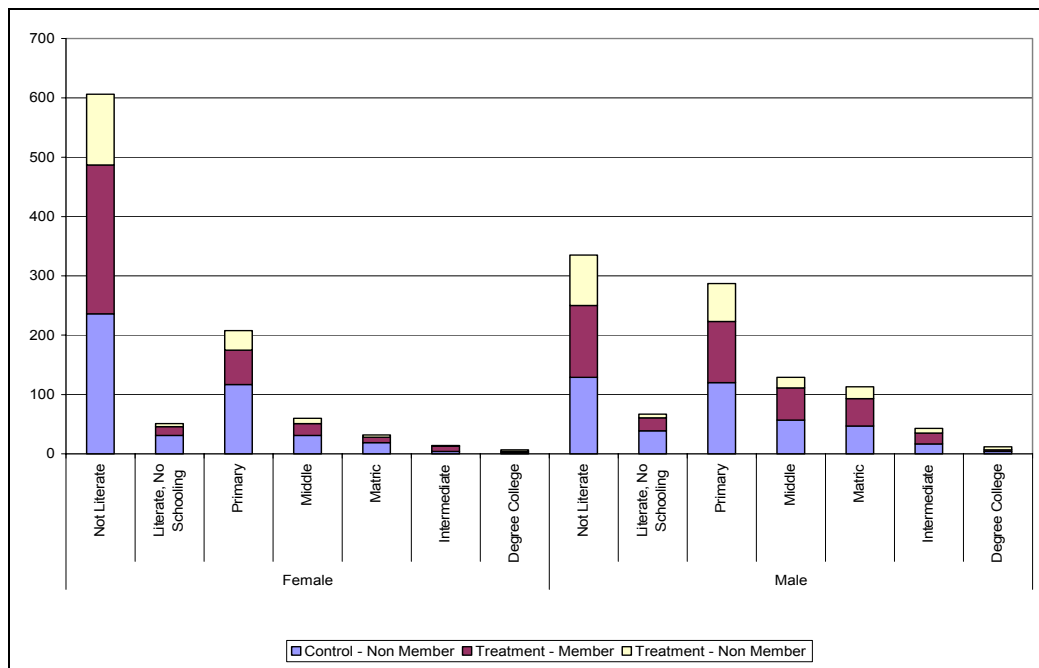
Majority of the households had no drainage system, 41.67% in overall sample with 37.07% and 44.39% in participating and non participating household. In control and treatment villages 47.10% and 37.36% respectively reported no drainage system. However 29.81% of the households reported the drainage system with soak pit with 18.12% and 39.08 %, respectively in treatment and control villages and 37.07% and 25.15%, respectively in participating and non participating household. Similarly 29.81% of the household reported the open drains in their dwellings with 27.54% in control villages and 19.54% in treatment villages. Also the use of open drains in their dwelling as reported by participating and non participating households was 21.55% and 23.98% respectively.

The majority of dwellings (84.62%) use their garbage as fertilizer (77.54% in control and 90.23% in treatment villages). Majority of the dwellings (42.75% and 28.16% in control and treatment villages respectively) had household flush connected to the septic tank. 22.12% of dwellings had no toilet system (23.91% in control villages and 20.69% in treatment villages).

### 3.4 Educational Status of Households

The literacy level of household members (5 years and greater) is shown in figure 3-3. It indicates that the majority of men and women are illiterate and illiteracy is more common in women than men. This is because of women had fewer opportunities than men to attend school. The enrollment rates drops significantly in higher classes for both males and females.

Figure 3-3: Literacy Level of Household



The sample indicated that 52.09% of the total population (49.11% of participating households and 53.85% of non-participating households) was literate. 57.21% of in control villages and 48.15% of in treatment villages were literate. In treatment villages the literate percentages of members and non-members were 49.11% and 46.32% respectively. No significant difference in the literacy level was observed in the proportion of literate population between participating and non-participating households. The percentage distribution of literacy level is given in table 3-10.

There were two important features of the household literacy who had attended the school. First, nearly 29.11% had finished primary school in the total population: 28.07% of the participating households and 29.74% of non-participating households. The literacy figures for control and treatment villages were 27.78% and 23.22% respectively. The difference between control and treatment villages and participating and non-participating households was small.

Only 10% of household members had completed Matriculation or higher level of education,



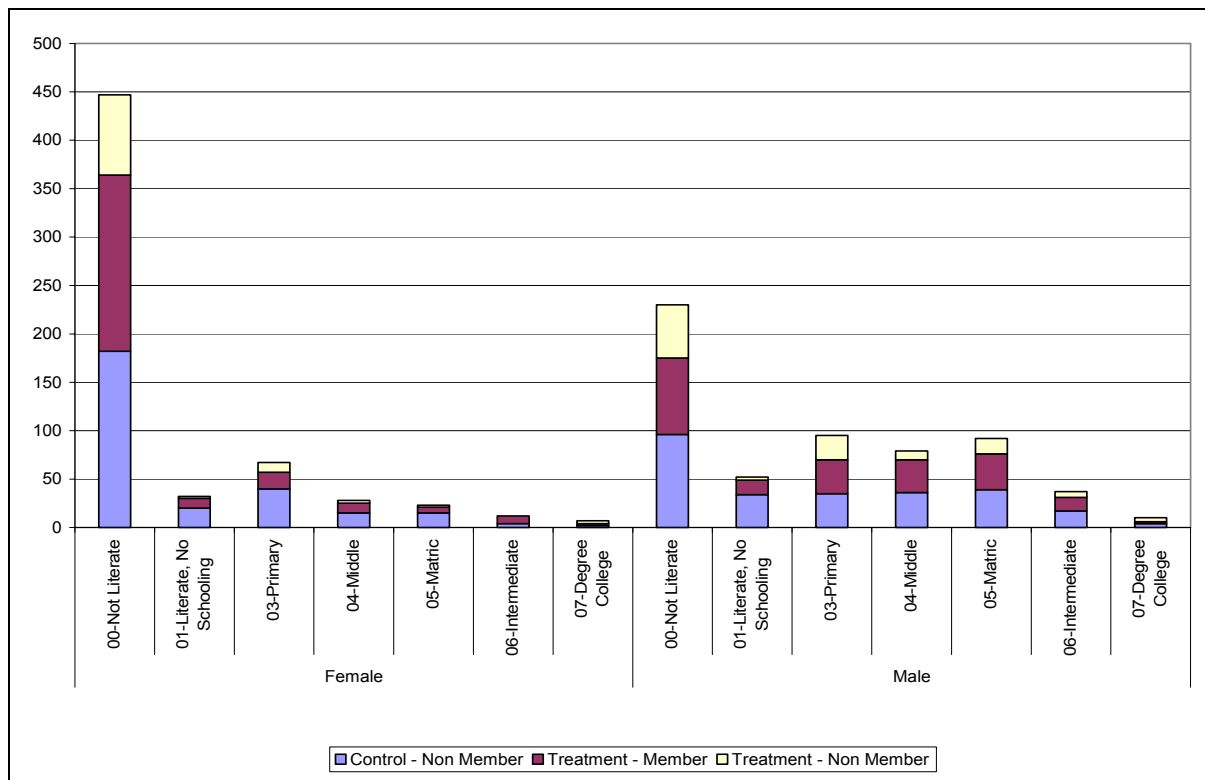
again with no significant difference between treatment and control villages or between participating and non-participating households.

**Table 3-10: Percentage Distribution of Literacy Level**

Literacy Level	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
<b>Females</b>							
Not Literate	53.64%	68.96%	68.39%	68.77%	68.96%	57.82%	61.96%
Literate, No Schooling	7.05%	4.12%	2.87%	3.72%	4.12%	5.86%	5.21%
Primary	26.59%	15.93%	18.97%	16.91%	15.93%	24.43%	21.27%
Middle	7.05%	5.49%	5.17%	5.39%	5.49%	6.51%	6.13%
Matric	4.32%	2.47%	2.30%	2.42%	2.47%	3.75%	3.27%
Intermediate	0.91%	2.47%	0.57%	1.86%	2.47%	0.81%	1.43%
Degree College	0.45%	0.55%	1.72%	0.93%	0.55%	0.81%	0.72%
<b>Total Females</b>	<b>51.58%</b>	<b>49.79%</b>	<b>45.79%</b>	<b>48.42%</b>	<b>49.79%</b>	<b>49.80%</b>	<b>49.80%</b>
<b>Males</b>							
Not Literate	31.23%	32.97%	41.26%	35.95%	32.97%	34.57%	33.98%
Literate, No Schooling	9.44%	5.99%	2.91%	4.89%	5.99%	7.27%	6.80%
Primary	29.06%	28.07%	31.07%	29.14%	28.07%	29.73%	29.11%
Middle	13.80%	14.71%	8.74%	12.57%	14.71%	12.12%	13.08%
Matric	11.38%	12.53%	9.71%	11.52%	12.53%	10.82%	11.46%
Intermediate	4.12%	4.90%	3.88%	4.54%	4.90%	4.04%	4.36%
Degree College	0.97%	0.82%	2.43%	1.40%	0.82%	1.45%	1.22%
<b>Total Males</b>	<b>48.42%</b>	<b>50.21%</b>	<b>54.21%</b>	<b>51.58%</b>	<b>50.21%</b>	<b>50.20%</b>	<b>50.20%</b>
<b>Both Sexes</b>							
Not Literate	42.79%	50.89%	53.68%	51.85%	50.89%	46.15%	47.91%
Literate, No Schooling	8.21%	5.06%	2.89%	4.32%	5.06%	6.57%	6.01%
Primary	27.78%	22.02%	25.53%	23.22%	22.02%	27.09%	25.20%
Middle	10.32%	10.12%	7.11%	9.09%	10.12%	9.33%	9.62%
Matric	7.74%	7.52%	6.32%	7.11%	7.52%	7.30%	7.38%
Intermediate	2.46%	3.69%	2.37%	3.24%	3.69%	2.43%	2.90%
Degree College	0.70%	0.68%	2.11%	1.17%	0.68%	1.14%	0.97%

The literacy rate of adults (18 and older) is shown in figure 3-4 and the percentage distribution is given in table 3-11. The sample indicated that 61.34% of adult males were literate (63.22% in control villages and 59.88% in treatment villages). The proportions were 63.43% and 53.59% respectively for member and non-member households in treatment villages. The difference between the participating and non participating household was quite small. Male literacy was highest (63.43%) in the member households of treatment villages followed by 63.22% in control villages and was least (53.39%) in the non-member households of treatment villages.

**Figure 3-4: Adult Literacy of Household**



The literacy rate among adult women was far lower than among men: only 27.44% of adult women were literate. The literacy rate of adult women was 34.53% in control villages and 21.60% in treatment villages. The proportions were 22.55% and 19.42% for the member and non-member households in treatment villages respectively.

The proportions of adult literate women between participating and non-participating households was 22.55% and 30.45%. Thus more women in non-participating households were literate than women in participating households. The female literacy was highest in the control villages followed by member and non-member households of treatment villages.

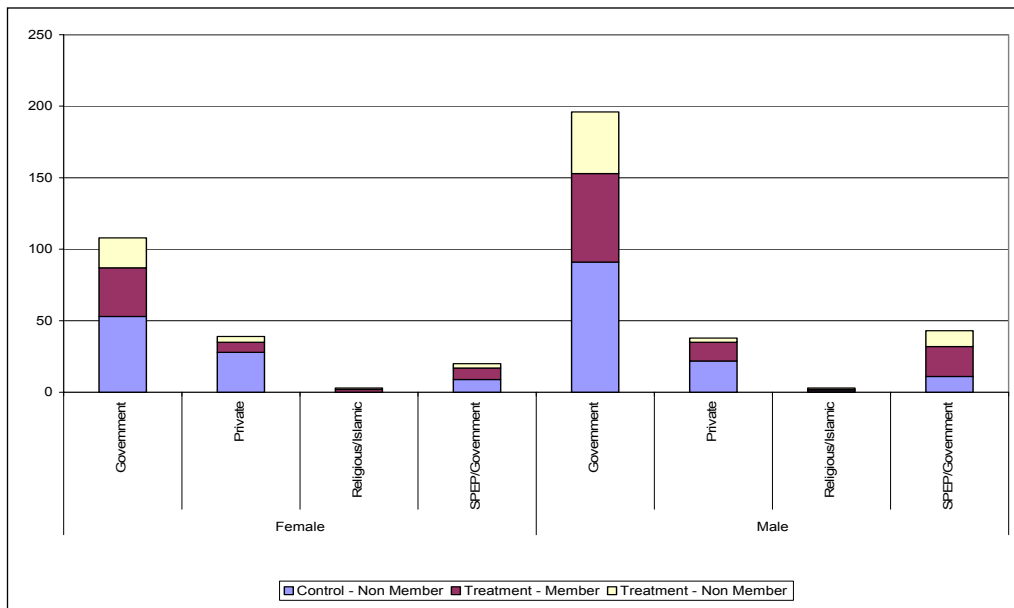
In the overall sample, 13.38% of people had completed the primary level; 8.84% had completed middle level; 9.50% had completed Matriculation and 5.45% had completed intermediate and higher education. The difference in the proportion between participating and non-participating households was quite small and the difference between the proportion in the control and treatment villages was negligible.

**Table 3-11: Adult Literacy of Households**

Adult Literacy Level	Control Villages	Treatment Villages		Total	All Villages		
		Member	Non Member		Member	Non Member	Total
<b>Female</b>							
00-Not Literate	65.47%	77.45%	80.58%	78.40%	77.45%	69.55%	72.56%
01-Literate, No Schooling	7.19%	4.26%	1.94%	3.55%	4.26%	5.77%	5.19%
03-Primary	14.39%	7.23%	9.71%	7.99%	7.23%	13.12%	10.88%
04-Middle	5.40%	4.26%	2.91%	3.85%	4.26%	4.72%	4.55%
05-Matric	5.40%	2.55%	1.94%	2.37%	2.55%	4.46%	3.73%
06-Intermediate	1.44%	3.40%	0.00%	2.37%	3.40%	1.05%	1.95%
07-Degree College	0.72%	0.85%	2.91%	1.48%	0.85%	1.31%	1.14%
<b>Female Total</b>	<b>51.58%</b>	<b>52.11%</b>	<b>46.61%</b>	<b>50.30%</b>	<b>52.11%</b>	<b>50.13%</b>	<b>50.87%</b>
<b>Male</b>							
00-Not Literate	36.78%	36.57%	46.61%	40.12%	36.57%	39.84%	38.66%
01-Literate, No Schooling	13.03%	6.94%	2.54%	5.39%	6.94%	9.76%	8.74%
03-Primary	13.41%	16.20%	21.19%	17.96%	16.20%	15.83%	15.97%
04-Middle	13.79%	15.74%	7.63%	12.87%	15.74%	11.87%	13.28%
05-Matric	14.94%	17.13%	13.56%	15.87%	17.13%	14.51%	15.46%
06-Intermediate	6.51%	6.48%	5.08%	5.99%	6.48%	6.07%	6.22%
07-Degree College	1.53%	0.93%	3.39%	1.80%	0.93%	2.11%	1.68%
<b>Male Total</b>	<b>48.42%</b>	<b>47.89%</b>	<b>53.39%</b>	<b>49.70%</b>	<b>47.89%</b>	<b>49.87%</b>	<b>49.13%</b>
<b>All Households</b>							
00-Not Literate	51.58%	57.87%	62.44%	59.38%	57.87%	54.74%	55.90%
01-Literate, No Schooling	10.02%	5.54%	2.26%	4.46%	5.54%	7.76%	6.94%
03-Primary	13.91%	11.53%	15.84%	12.95%	11.53%	14.47%	13.38%
04-Middle	9.46%	9.76%	5.43%	8.33%	9.76%	8.29%	8.84%
05-Matric	10.02%	9.53%	8.14%	9.08%	9.53%	9.47%	9.50%
06-Intermediate	3.90%	4.88%	2.71%	4.17%	4.88%	3.55%	4.05%
07-Degree College	1.11%	0.89%	3.17%	1.64%	0.89%	1.71%	1.40%

The position of school-going children (5 years old and above) by type of school and gender is shown in figure 3-5. Clearly, most children were attending the government school. The number of male children was nearly twice that of female children. The smallest number of children were attending the Islamic/religious school. The remaining children were approximately evenly distributed between private and SPEP/Government schools with one important difference; the male and female children attending private school were equal in number, whereas in the SPEP/Government the number of male students was almost twice that of female students.

**Figure 3-5: Children in School**



The percentage distribution of school-going children is given in table 3-12. In the overall sample, 37.78% of female children were attending school: of these, 41.86% belonged to control villages and 34.04% belonged to treatment villages. The proportion of female children attending school between member and non-member households of treatment villages was 34.46% and 33.33% respectively. Similarly the proportion of female children attending school between participating and non-participating households was 34.46% and 39.40%. This shows that more female children attend school in control villages than in treatment villages. The same is true for participating and non-participating households.

Similarly in the overall sample, 62.22% of male children were attending school out of which 58.14% belonged to control villages and 65.96% belonged to treatment villages. The proportion of male children attending school between member and non-member household of treatment villages was 65.54% and 66.67% respectively. This showed that more male children attend school in treatment villages than in control villages. Similarly the proportion of male children attending school between participating and non-participating household was 65.54% and 60.60% which again showed that more male children attend school in participating households than in non-participating households.

In the overall sample 67.56% of children were attending government school. More or less the same proportion prevails between control and treatment villages and between participating and non-participating households.

**Table 3-12: Percentage Distribution of School going Children**

Children in School	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
<b>Female</b>							
Government	58.89%	66.67%	72.41%	68.75%	66.67%	62.18%	63.53%
Private	31.11%	13.73%	13.79%	13.75%	13.73%	26.89%	22.94%
Religious/Islamic	0.00%	3.92%	3.45%	3.75%	3.92%	0.84%	1.76%
SPEP/Government	10.00%	15.69%	10.34%	13.75%	15.69%	10.08%	11.76%
Female Total	41.86%	34.46%	33.33%	34.04%	34.46%	39.40%	37.78%
<b>Male</b>							
Government	72.80%	63.92%	74.14%	67.74%	63.92%	73.22%	70.00%
Private	17.60%	13.40%	5.17%	10.32%	13.40%	13.66%	13.57%
Religious/Islamic	0.80%	1.03%	1.72%	1.29%	1.03%	1.09%	1.07%
SPEP/Government	8.80%	21.65%	18.97%	20.65%	21.65%	12.02%	15.36%
Male Total	58.14%	65.54%	66.67%	65.96%	65.54%	60.60%	62.22%
<b>Both Genders</b>							
Government	66.98%	64.86%	73.56%	68.09%	64.86%	68.87%	67.56%
Private	23.26%	13.51%	8.05%	11.49%	13.51%	18.87%	17.11%
Religious/Islamic	0.47%	2.03%	2.30%	2.13%	2.03%	0.99%	1.33%
SPEP/Government	9.30%	19.59%	16.09%	18.30%	19.59%	11.26%	14.00%

In the overall sample 17.11% of children – the second largest percentage - were attending private schools. The proportion of children attending private school between control and treatment villages was 23.26% and 11.49% respectively and between participating and non-participating household was 13.51% and 18.87% respectively.

In the overall sample 14.00% of children were attending SPEP/Government schools. The proportion of children attending these schools was 9.30% in control villages and 18.30% in treatment villages. The proportion in participating and non-participating households was 19.59% and 11.26% respectively. In the treatment villages 19.59% of member households and 16.09% of non-member households attended SPEP/Government schools.

It was noted earlier that the school dropout rate increases as class level increases. Table 3-13 describes the primary reasons for such drop outs for school going children.

**Table 3-13: Primary Drop out Reason from School**

Primary Drop out Reason	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Child Not Willing To Attend	0	1	2	3	1	2	3
Has To Help At Home	1	6	4	10	6	5	11
Has To Help With Family Business	0	2	0	2	2	0	2
Has To Help With Farm Work	4	3	1	4	3	5	8
Other Reason	1	0	0	0	0	1	1
Parents Didn't Want	3	3	1	4	3	4	7
Poor Acad. Progress	1	0	0	0	0	1	1
School Or Teacher Not Good	1	3	0	3	3	1	4
Teacher Absent Too Often	1	0	0	0	0	1	1
Too Expensive	1	4	1	5	4	2	6
Too Far Away	8	1	3	4	1	11	12
Grand Total	21	23	12	35	23	33	56

In the overall sample 21.4% of school going children responded with “Too far away”, 19.6% responded with “Has to help at home”, 14.3% responded with “Has to help with farm work”, 12.5% responded with “Parents did not want” and 10.7% responded with “Too expensive” as the primary reason for dropping out from school.

In control villages the primary reasons for dropping out of school were “Too far away”, “has to help at home” and “parents didn’t want”, as reported by 38.1%, 19.0% and 14.3% respectively of the respondents. In treatment villages the primary reasons for dropping out from school were “Has to help at home” (28.6%) and “Too expensive” (14.3%). The same reasons were reported by respondents from member and non-member households in treatment villages.

### **3.5 Household Health Status**

The general state of health reported by respondents was divided into three categories: “good” (no report of illness), “fair” (minor illnesses like cough, flu and fever) and “poor” (chronic and acute ailments like TB and major stomach problems). The health status classified by gender is given in table 3-14.

**Table 3-14: Household Health Status by Gender**

Health Status	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Good							
Female	44.75%	44.00%	41.47%	43.15%	44.00%	43.75%	43.84%
Male	41.59%	44.00%	47.00%	45.00%	44.00%	43.25%	43.53%
Good Total	86.34%	87.99%	88.48%	88.15%	87.99%	87.00%	87.37%
Fair							
Female	4.49%	4.50%	3.69%	4.23%	4.50%	4.24%	4.34%
Male	5.50%	3.70%	3.23%	3.54%	3.70%	4.81%	4.38%
Fair Total	9.99%	8.20%	6.91%	7.77%	8.20%	9.05%	8.72%
Poor							
Female	2.14%	1.73%	2.07%	1.85%	1.73%	2.12%	1.97%
Male	1.53%	2.08%	2.53%	2.23%	2.08%	1.84%	1.93%
Poor Total	3.67%	3.81%	4.61%	4.08%	3.81%	3.96%	3.90%

Nearly 87.37% of the population enjoyed good health, with very little difference between participating and non-participating households. Men and women reported no major differences in health status. People in 'fair' health make up 8.72% of the total population, with 9.99% in control villages and 6.91% in non-member household of the treatment villages.

People with poor health constitute 3.90% of the sample population, with 3.81% in participating households and 3.96% in non-participating households. However, in participating households the proportion of men suffering poor health is higher than that of women and more women in non-participating households reported suffering poor health.

The health status classified details are in table 3-15. It shows that more children than adults were in good health in the treatment villages. These differences were more visible in the non-participating households. More children than adults had 'fair' health, with more adults than children having 'poor' health.

**Table 3-15: Household Health Status (Adults and Children)**

Health Status	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Good							
Adult	44.44%	42.38%	39.40%	41.38%	42.38%	42.90%	42.70%
Children	41.90%	45.61%	49.08%	46.77%	45.61%	44.10%	44.67%
Good Total	86.34%	87.99%	88.48%	88.15%	87.99%	87.00%	87.37%
Fair							
Adult	4.18%	3.23%	3.46%	3.31%	3.23%	3.96%	3.68%
Children	5.81%	4.97%	3.46%	4.46%	4.97%	5.09%	5.04%
Fair Total	9.99%	8.20%	6.91%	7.77%	8.20%	9.05%	8.72%
Poor							
Adult	2.45%	2.89%	3.92%	3.23%	2.89%	2.90%	2.89%
Children	1.22%	0.92%	0.69%	0.85%	0.92%	1.06%	1.01%
Poor Total	3.67%	3.81%	4.61%	4.08%	3.81%	3.96%	3.90%

The percentage distribution of diseases prevalent in the sample is given in table 3-16. The most important illnesses are cough, flu and fever (reported by 55.21% of respondents) with 61.94% in the control villages and 49.35% in the treatment villages. The next important disease (reported by 15.97% of respondents) was stomach problems with 16.35% in participating and 15.76% in non- participating households.

The third important disease category included conditions like high blood pressure, diabetes and heart problems and was reported by 12.15% of respondents with 9.62% and 13.59% in participating and non-participating households.

TB and respiratory problems were reported by 6.94% of the respondents with 7.69% in participating and 6.52% in non-participating households.

**Table 3-16: Prevalent Diseases in Area**

Prevalent Diseases	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Bone Fracture	0.75%	1.92%	0.00%	1.30%	1.92%	0.54%	1.04%
Chicken Pox	0.75%	0.96%	2.00%	1.30%	0.96%	1.09%	1.04%
Cough/Flu/Fever	61.94%	55.77%	36.00%	49.35%	55.77%	54.89%	55.21%
Cuts/Braises	0.75%	1.92%	6.00%	3.25%	1.92%	2.17%	2.08%
Diarrhea	1.49%	0.96%	8.00%	3.25%	0.96%	3.26%	2.43%
Fits	0.75%	2.88%	0.00%	1.95%	2.88%	0.54%	1.39%
Hepatitis	0.00%	0.96%	0.00%	0.65%	0.96%	0.00%	0.35%
Malaria	0.75%	0.96%	0.00%	0.65%	0.96%	0.54%	0.69%
Other Illness	10.45%	9.62%	22.00%	13.64%	9.62%	13.59%	12.15%
Snake Bite	1.49%	0.00%	0.00%	0.00%	0.00%	1.09%	0.69%
Stomach Problems	14.93%	16.35%	18.00%	16.88%	16.35%	15.76%	15.97%
TB/Respiratory	5.97%	7.69%	8.00%	7.79%	7.69%	6.52%	6.94%

The sources for consulting medical practitioners in the sample area are given in table 3-17. It shows that 70.88% (77.67% in participating and 67.03% in non-participating households) of respondents preferred a private doctor with. The second source was government hospitals, reported by 14.04% (11.65% and 15.38% in participating and non-participating households respectively). Private hospitals were third, reported by 7.72% of respondents (6.80% of participating households and 8.24% of non-participating households). Finally 4.91% of the respondents reported consulting a *siani* (“quack”) for diseases with 3.88% in participating and 5.49% in non-participating households.



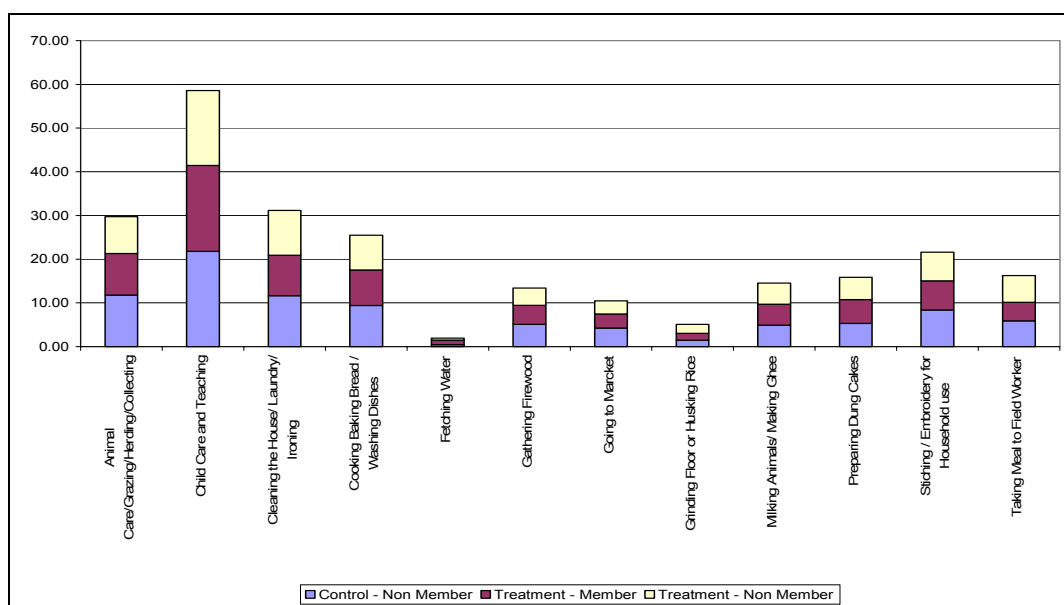
**Table 3-17: Illness Consulted With**

Consulted With	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Basic Health Unit (BHU)	0.00%	0.00%	4.00%	1.31%	0.00%	1.10%	0.70%
Government Dispensary	0.00%	0.00%	8.00%	2.61%	0.00%	2.20%	1.40%
Government Hospital	17.42%	11.65%	10.00%	11.11%	11.65%	15.38%	14.04%
Herbalist/Hakim/ Homeopath	0.76%	0.00%	0.00%	0.00%	0.00%	0.55%	0.35%
Private Doctor	67.42%	77.67%	66.00%	73.86%	77.67%	67.03%	70.88%
Private Hospital	7.58%	6.80%	10.00%	7.84%	6.80%	8.24%	7.72%
<i>Siani</i> (Quack)	6.82%	3.88%	2.00%	3.27%	3.88%	5.49%	4.91%

### 3.6 Women's Role in Household Welfare

The significant role of women in household welfare is indicated by the numerous types of work they do. The average number of hours per week that women spend in work at home are shown in figure 3-6 and given in table 3-18. It is clear that most important work done by women is child care, followed by laundry and ironing, caring for animals and cooking and baking. The next most significant categories of work were sewing and embroidery, taking meals to field workers, preparing dung cakes, milking animals, gathering fire wood and going to the market. The least time-consuming tasks were fetching water and grinding flour or husking rice. Note that women had to work harder in both treatment and control villages and therefore constitute a significant part of household economic welfare. Some of the women were also reported to work for profit in addition to their daily work at home.

**Figure 3-6: Average Hours per Week Spent By Females on Household Work**



The table indicates that on average girls and women in the control villages spend 9.50 hours per week engaged in tasks, and girls and women in treatment villages spend 7.91 hours per week on these tasks. The difference in average hours spent was statistically significant between treatment and control villages and between participating and non-participating households, which means that girls and women in non-participating households work longer hours than girls and women in participating households.

**Table 3-18: Average Hours per Week Spent By Females on Household Work**

Female Household Work	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Animal Care/Grazing/Herding/Collecting	11.77	9.52	8.42	8.97	9.52	10.09	10.18
Child Care and Teaching	21.78	19.67	17.13	18.40	19.67	19.46	20.06
Cleaning the House/ Laundry/ Ironing	11.62	9.27	10.26	9.76	9.27	10.94	10.48
Cooking Baking Bread / Washing Dishes	9.40	8.10	7.99	8.05	8.10	8.69	8.64
Fetching Water	0.43	1.06	0.46	0.76	1.06	0.45	0.66
Gathering Firewood	5.07	4.36	3.95	4.15	4.36	4.51	4.50
Going to Market	4.23	3.23	3.00	3.12	3.23	3.62	3.72
Grinding Floor or Husking Rice	1.45	1.58	2.06	1.82	1.58	1.76	1.67
Milking Animals/ Making Ghee	4.91	4.78	4.83	4.81	4.78	4.87	4.85
Preparing Dung Cakes	5.28	5.46	5.08	5.27	5.46	5.18	5.31
Stitching / Embroidery for Household use	8.38	6.67	6.57	6.62	6.67	7.47	7.42
Taking Meal to Field Worker	5.90	4.22	6.15	5.19	4.22	6.02	5.24

In addition to performing household work some women also reported home-based work for profit. Table 3-19 shows the number of women working for wages, the average number of hours spent working and the monthly income generated from their work.

**Table 3-19: Females Performing Profit Generating Activity**

Profit Generating Activity	Control Villages	Treatment Villages	
		Member	Non Member
Stitching/Embroidery			
No. of Females Reporting To Work	2	4	0
Average no. of hours spent per month	270	135	0
Average income generated from activity	2,750	1375	0

The table shows that women were only doing sewing and embroidery to earn money. Only six women in the overall sample (2 in control villages and 4 in treatment villages) reported home-based labour for income. The women spent on average 270 hours per month (9 hours per day) and reported an income of Rs 2,750 per month in control villages. However the women in treatment villages spent an average of 135 hours per month (4.5 hours per day) and reported an average monthly income of Rs 1,375. No women in the non-member household of treatment villages reported working this way: this is because of their small representation in the sample. In both treatment and control villages the wage rate was approximately Rs. 10 per hour.

### 3.7 Family Role in Household Welfare

The average number of hours each household spent annually in raising crops and other economic activities is depicted in figure 3-7. The graph clearly indicated that the five main activities were sugarcane, cotton, wheat, fodder and livestock.

Figure 3-7: Average Hours Spent by Family in Various Activities

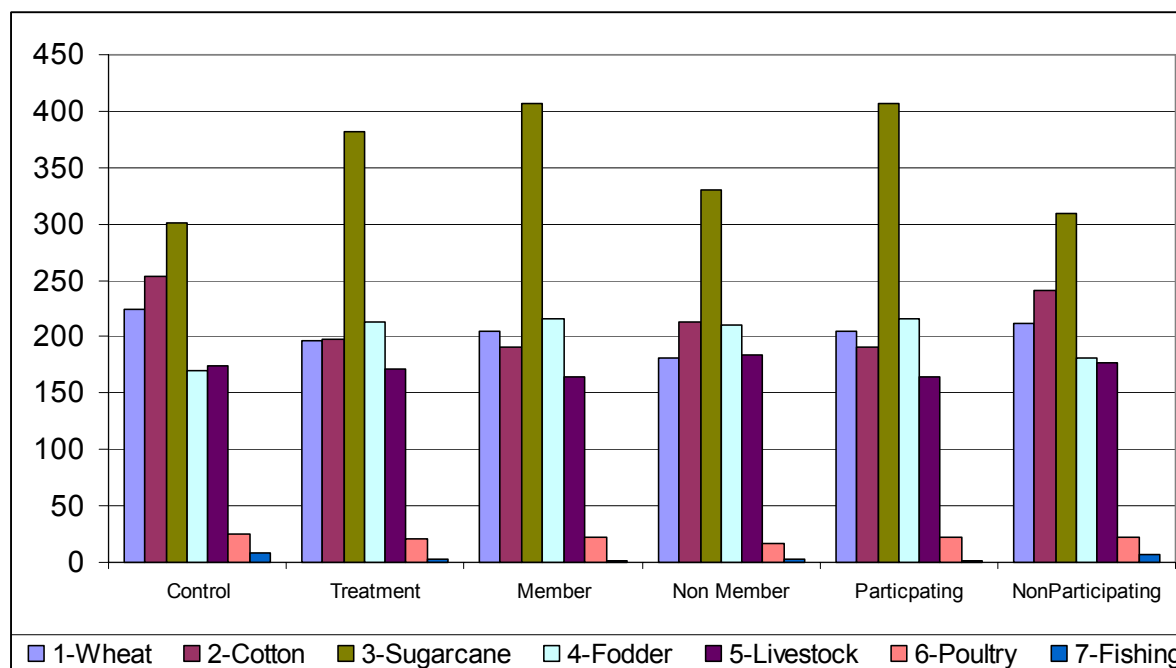


Table 3-20 shows the average number of hours spent by each household per year in farm-related economic activities. It is clear that most families spent the majority of their time on the sugarcane crop, with an average of 345.5 hours per year across the entire sample. The average number of hours worked by families in control and treatment villages was 300.5 and 381.2 hours per year which was statistically significant.

Families in participating households spent an average of 406.6 on sugarcane: those in non-participating households spent 309.3 hours. This is also statistically significant.

Table 3-20: Average Hours Spent by Family

Activities	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
1-Wheat	224.5	204.8	181.2	196.9	204.8	211.7	209.1
2-Cotton	253.3	190.2	212.6	197.6	190.2	241.3	222.3
3-Sugarcane	300.5	406.6	330.3	381.2	406.6	309.3	345.5
4-Fodder	169.7	215.4	210.2	213.7	215.4	181.7	194.2
5-Livestock	174.7	164.6	183.9	171.1	164.6	177.4	172.7
6-Poultry	24.5	22.2	17.0	20.5	22.2	22.3	22.3
7-Fishing	7.9	1.8	3.3	2.3	1.8	6.5	4.8

Cotton was the second most significant crop, with household members devoting an average of the entire sample spending 222.3 hours per year. The average for control villages was 253.3 hours and for treatment villages 97.6 hours per year. We can conclude that for families in control villages the cotton crop was the predominant agricultural activity. Participating households spent 190 hours annually on cotton: non-participating households spent an average of 241.3 hours.

The third most significant crop was wheat, with households spending an average of 209.1 hours per year across the whole sample. The average number of hours per year in control and treatment villages was 224.5 and 196.9 which was statistically significant. Families in participating and non-participating households spent an average of 204.8 and 211.7 hours, respectively, which was statistically significant.

The time spent on fodder crops was the least significant activity, with an average of 194.2 hours per annum in the overall sample. In control villages families averaged 169.7 hours and in treatment villages they spent 213.7 hours. The figures for participating and non-participating households were 215.4 and 181.7 respectively. The average number of hours per annum devoted to raising fodder in treatment villages and in participating households was higher but were statistically insignificant indicating that fodder crop was equally important for the whole region.

The next most important economic activity was livestock care. The livestock care described in this section refers only to men's activities, because female participation has been described previously.

Men spent an average of 172.7 hours per annum on livestock: 174.7 and 171.1 hours in control and treatment villages respectively. The difference was statistically insignificant. The average number of hours spent per annum by men and boys for livestock care was 164.6 and 177.4 respectively. This is also statistically insignificant.

The average time spent per annum raising poultry in the overall sample was 22.3 hours, with 24.5 and 20.5 in control and treatment villages respectively and was statistically insignificant. There were no significant differences between participating and non-participating households (22.2 and 22.3 hours per year respectively). The very small time spent on poultry indicates that domestic poultry is an insignificant economic activity.

Only 11 families reported fishing as a contribution to the household economy. They spent less than 5 hours per year in the overall sample: 7.9 hours and 2.3 hours in control and treatment villages respectively. The average number of hours spent by participating and

non-participating households was 1.8 and 6.5 hours per year.

The four main cropping activities were field preparation and planting, irrigation and weeding, applying fertilizers or pesticides and harvesting the crop. These are summarized in Table 3-21 for each crop. The most time-consuming activity was harvesting and threshing with an average of 468.5 hours per year spent. Irrigation and weeding required an average of 267.3 hours, and field preparation required an average of 150.6 hours per year. Applying fertilizers or pesticides consumed the smallest amount of time. Harvesting, irrigation and weeding consumed more time in participating households, while non-participating households spent more time on field preparation, planting, and applying fertilizer, manure and pesticides. This explains the significant difference in time spent by participating and non-participating households. Recall that participating households spend more time on their sugarcane crop and non-participating household more time on their cotton and wheat crops.

**Table 3-21: Average Time Spent in Field Activities for Crops**

Activities	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
<b>Wheat</b>							
Field Preparation and Planting	44.2	31.1	30.2	30.8	31.1	40.0	36.7
Irrigation and Weeding	54.9	66.1	42.1	58.1	66.1	51.1	56.7
Applying Fertilizer, Manure, Pesticides	24.0	19.1	23.0	20.4	19.1	23.7	22.0
Harvesting And Threshing	101.5	88.5	85.9	87.6	88.5	96.9	93.8
Wheat Total	224.5	204.8	181.2	196.9	204.8	211.7	209.1
<b>Cotton</b>							
Field Preparation and Planting	43.3	30.6	36.1	32.4	30.6	41.2	37.3
Irrigation and Weeding	62.3	53.6	52.3	53.2	53.6	59.4	57.2
Applying Fertilizer, Manure, Pesticides	27.0	23.2	32.6	26.3	23.2	28.6	26.6
Harvesting And Threshing	120.7	82.7	91.6	85.7	82.7	112.1	101.2
Cotton Total	253.3	190.2	212.6	197.6	190.2	241.3	222.3
<b>Sugarcane</b>							
Field Preparation and Planting	57.3	74.2	65.8	71.4	74.2	59.8	65.2
Irrigation and Weeding	123.6	145.7	109.8	133.8	145.7	119.6	129.3
Applying Fertilizer, Manure, Pesticides	24.3	34.4	34.3	34.4	34.4	27.3	29.9
Harvesting And Threshing	95.2	152.3	120.4	141.7	152.3	102.7	121.1
Sugarcane Total	300.5	406.6	330.3	381.2	406.6	309.3	345.5
<b>Fodder</b>							
Field Preparation and Planting	11.1	11.3	12.8	11.8	11.3	11.6	11.5
Irrigation and Weeding	20.7	26.3	28.1	26.9	26.3	22.9	24.2
Applying Fertilizer, Manure, Pesticides	5.9	6.2	6.8	6.4	6.2	6.1	6.2
Harvesting And Threshing	132.0	171.5	162.6	168.6	171.5	141.1	152.4
Fodder Total	169.7	215.4	210.2	213.7	215.4	181.7	194.2
<b>Total</b>							
Field Preparation and Planting	155.9	147.1	145.0	146.4	147.1	152.7	150.6
Irrigation and Weeding	261.5	291.8	232.3	271.9	291.8	252.9	267.3
Applying Fertilizer, Manure, Pesticides	81.2	82.9	96.6	87.5	82.9	85.7	84.7
Harvesting And Threshing	449.4	495.1	460.5	483.6	495.1	452.7	468.5

The average number of hours spent by males and females in various crop growing activities are given in table 3-22. It is important to realise that females, in addition to performing their household work, are also engaged in cropping activities. The table indicates that women contributed to fodder production (72.26 hours per year); sugarcane (52.71 hours per year), cotton (50.65 hours per year) and wheat (34.17 hours per year).

Women spent 72.26 hours annually on fodder production: men spent 41.53 hours. This difference is statistically significant. Women in participating households averaged 97.25 hours per annum and women in non-participating households spent 40.55 hours. In non-participating households women spent on average 59.38 hours per year and men spent 42.20 hours.

**Table 3-22: Male, Female Contribution in Household Welfare**

Activities	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Wheat Growing							
Female	39.42	26.79	36.36	30.73	26.79	38.24	34.17
Male	40.09	34.82	27.91	32.65	34.82	36.49	35.83
Cotton Growing							
Female	57.74	43.11	49.70	46.02	43.11	54.49	50.65
Male	45.93	37.45	36.23	37.05	37.45	43.27	41.18
Sugarcane Growing							
Female	49.53	49.12	61.71	54.58	49.12	54.72	52.71
Male	57.20	70.92	54.90	65.97	70.92	56.52	62.25
Fodder Growing							
Female	74.98	97.25	45.56	71.03	97.25	59.38	72.26
Male	41.06	40.55	44.80	41.86	40.55	42.20	41.53
Livestock Care							
Male	142.67	138.38	130.10	135.30	138.38	138.56	138.50
Poultry Care							
Female	65.36	128.25	85.50	114.00	128.25	67.88	79.95
Male	72.44	68.80	68.00	68.57	68.80	71.28	70.30
Ponds Fishing							
Male	155.43	104.00	96.00	100.00	104.00	142.22	135.27

For growing sugarcane men spent an average of 52.71 hours and women 62.25 hours in the overall sample. In participating house hold this average was 49.12 and 70.92 respectively and for non-participating households the average was 54.72 and 56.52 respectively. This showed that males had given more time for sugarcane crop than their female counter parts in participating households whereas in non participating households both male and female gave equal time.

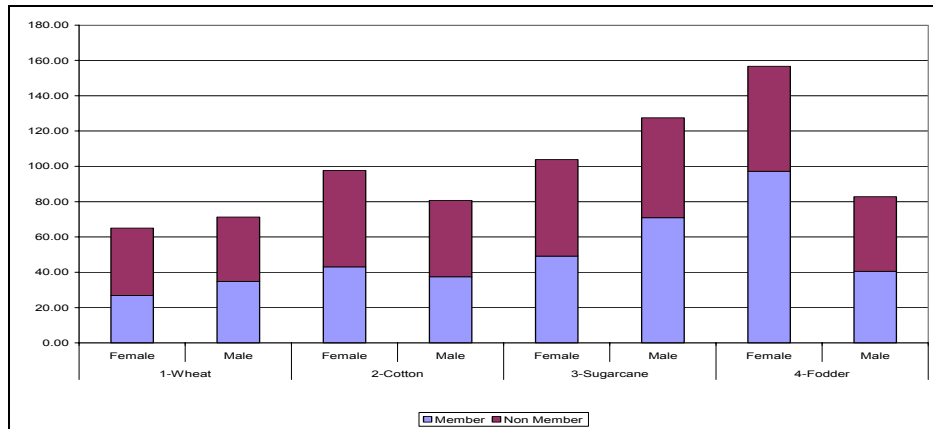
Similarly, the contribution of females in growing cotton crop was again very significant. Females had worked 50.65 hours per year whereas males had worked for 41.18 hours per year in the over all sample. Both in control and treatment villages female exerted more time

than male and same was true for participating and non participating households.

The contribution of females in wheat was statistically insignificant indicating that both female and male spent their time in equal proportion for growing this crop. The average hours spent per year by females and males for this crop was 34.17 and 35.83 respectively. This average of females and males in control villages was 39.42 and 40.09 hours per year respectively. For treatment villages this average of females and males was 30.73 and 32.65 hours per year respectively.

The female contribution in poultry care was again very significant than their male counterparts. On the average females spent 79.95 hours per year whereas male spent 70.30 hours per year in overall sample population and the difference was statistically significant indicating that females spent more time than males in poultry care. The average hours spent on poultry care by females and males in the participating household was 128.25 and 68.80 respectively whereas this average for non participating household was 67.88 and 71.28 respectively. Clearly in participating or member household poultry had significant importance for females. The figure 3-8 below shows the contribution of males and females in the family in growing crops graphically.

**Figure 3-8: Male Female Contribution in Household Welfare**



### **3.8 Employment Status of Households**

Although in the sample population nearly all of the household were engaged in farming, some members of these households were also doing employment inside or outside agriculture or doing some business to raise the income of household and some were unemployed. The people reported to be engaged in employment activities are given in table 3-23. As expected very few members of household (actually only 7 people in whole sample, which is 0.43% of total eligible population that was greater than or equal to 10 years) had reported to be employed in agriculture out of which 2 were in the control village and 5 were in the treatment villages. Note that non of the non member household member in treatment

village had reported doing employment in agriculture which was because of their lower representation in the sample.

**Table 3-23: Employment inside Agriculture**

Employment	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Inside Agriculture							
Casual labor	2	2	0	2	2	2	4
Permanent Labor		2	0	2	2	0	2
Seasonal Labor		1	0	1	1	0	1
Grand Total	2	5	0	5	5	2	7
Casual labor (%)	100.00%	40.00%	0.00%	40.00%	40.00%	100.00%	57.14%
Permanent Labor (%)	0.00%	40.00%	0.00%	40.00%	40.00%	0.00%	28.57%
Seasonal Labor (%)	0.00%	20.00%	0.00%	20.00%	20.00%	0.00%	14.29%
All(%)	28.57%	71.43%	0.00%	71.43%	71.43%	28.57%	100.00%
Outside Agriculture							
Labor	6	4	2	6	4	8	12
Service	5	12	7	19	12	12	24
Grand Total	11	16	9	25	16	20	36
Labor%	54.55%	25.00%	22.22%	24.00%	25.00%	40.00%	33.33%
Service%	45.45%	75.00%	77.78%	76.00%	75.00%	60.00%	66.67%
All (%)	30.56%	44.44%	25.00%	69.44%	44.44%	55.56%	100.00%
Overseas							
Household (No)	1	2	0	2	2	1	3
Household (%)	33.33%	66.67%	0.00%	66.67%	66.67%	33.33%	100.00%
Non Farm Business							
Household (No)	5	6	7	13	6	12	18
Household(%)	27.78%	33.33%	38.89%	72.22%	33.33%	66.67%	100.00%

Similarly very few persons reported to be employed out side agriculture that constituted 2.20% of total eligible population that was greater than or equal to 10 years. The table indicated that out of total employed people 30.56% were in control villages and 69.44% were in treatment villages. Similarly in participating and non participating households these proportions were 44.44% and 55.46%. Also only three persons in whole sample reported to be working abroad out of which one belonged to control villages and remaining two belonged to the treatment villages. Similarly just 18 persons in the whole sample that constitutes 1.01% of the population were doing small business like *kiryana* store, general store, grinding flour or small-scale contractors. Also no person had reported to receive pension or other social security payments in whole sample. This was expected because of the design of the survey.

The unemployment rates were calculated by dividing the number of persons not working for pay or profit for household in the past 30 days preceding the interview and were willing and



able to work and were actively seeking work, by the total number in the labor force (employed plus unemployed) and are given in table 3-24.

**Table 3-24: Unemployment Rate of Household**

Unemployment	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Eligible persons	202	201	89	290	201	291	403
Total labor Force	720	601	313	914	601	1033	1321
Unemployment Rate	28.06%	33.44%	28.43%	31.73%	33.44%	28.17%	30.51%

The unemployment rate was 30.51% for the whole sample with unemployment rate of 28.06% and 31.73% for treatment and control villages. This indicated that unemployment in the region, in general, was higher and in particular, in treatment villages was little higher than in the control villages. Similarly for the participating and non participating households in the sample the unemployment rate was 33.44% and 28.17% indicating that members in participating household were more active in seeking job than members in non participating household but were not able to get a one due to lesser opportunities of job in the sample region.

### **3.9 Agricultural Landholding of Households**

The agriculture land of different types reported by the household in the sample population is given in table 3-25 with its percentage distribution. The table indicated that total land in sample population consisted of 97.68% of irrigated land, 0.11% of water logged land, 1.37% of saline land and 0.55% of other land (it is basically an agriculture land where crops are not sown for any reason and is neither water logged nor saline). Out of 97.96% of irrigated land 97.04% was located in control villages and 98.75% was located in treatment villages. Similarly the irrigated land reported by participating and non participating household was 98.29% and 97.76% respectively. Clearly the participating households owned a slightly higher percentage of land than the non participating household.

**Table 3-25: Household Reporting Agriculture Land**

Agriculture Land	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Household Reporting	138	116	58	174	116	254	312
Agriculture Land							
Rain fed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Irrigated	891.87	746.75	321.49	1068.24	746.75	1213.36	1960.11
Water Logged	1.25	1.00	0.00	1.00	1.00	1.25	2.25
Saline	15.00	12.00	0.50	12.50	12.00	15.50	27.50
Other Land	11.00	0.00	0.00	0.00	0.00	11.00	11.00
Total Land	919.12	759.75	321.99	1081.74	759.75	1241.11	2000.86

Agriculture Land	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Agriculture Land (%)							
Rain fed (%)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Irrigated (%)	97.04%	98.29%	99.84%	98.75%	98.29%	97.76%	97.96%
Water Logged (%)	0.14%	0.13%	0.00%	0.09%	0.13%	0.10%	0.11%
Saline (%)	1.63%	1.58%	0.16%	1.16%	1.58%	1.25%	1.37%
Other Land (%)	1.20%	0.00%	0.00%	0.00%	0.00%	0.89%	0.55%

The pattern of ownership of land is described in table 3-26. The table indicated that in the overall sample 97.75% own agriculture land with 99.27% and 96.55% in control and treatment villages. This proportion in participating and non participating household was 95.69% and 98.97%. The percentage of ownership in non participating household was little higher than the non participating household but was not significant.

The table also indicated the pattern of ownership; in the overall sample 59.67% of household own land between 0.0 to 6.0 acres, 27.87% of household own land between 6.0 to 12 acres, 11.80% of the household own land between 12 to 18.0 acres and 0.66% of the household own land between 18 to 26 acres. Note that the percentages of land ownership decreases with increasing acres of land suggesting that majority of land ownership lies between 0.0 to 12.0 acres in both participating and non participating households. However the proportions of land owner below 12 acres of land were higher for participating household than for non participating households. Also specially note that that only one household in member household of treatment village had reported an increase in its land ownership. This suggested that changes in land ownership were less frequent in whole sample population.

**Table 3-26: Household Ownership of Land**

Agriculture Land Holding	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Household Owning	138	116	58	174	116	196	312
No Agriculture Land	1	5	1	6	5	2	7
Agriculture Land	137	111	57	168	111	194	305
Household Owning (%)							
No Agriculture Land	0.72%	4.31%	1.72%	3.45%	4.31%	1.02%	2.24%
Agriculture Land	99.28%	95.69%	98.28%	96.55%	95.69%	98.98%	97.76%
Ownership Pattern							
0.0-6.0 Acres	82	63	37	100	63	119	182
6.0-12.0 Acres	33	37	15	52	37	48	85
12.0-18.0 Acres	21	10	5	15	10	26	36
18.0-26.0 Acres	1	1	0	1	1	1	2
All Owners	137	111	57	168	111	194	305
Ownership Pattern (%)							
0.0-6.0 Acres	59.85%	56.76%	64.91%	59.52%	56.76%	61.34%	59.67%
6.0-12.0 Acres	24.09%	33.33%	26.32%	30.95%	33.33%	24.74%	27.87%
12.0-18.0 Acres	15.33%	9.01%	8.77%	8.93%	9.01%	13.40%	11.80%

Agriculture Land Holding	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
18.0-26.0 Acres	0.73%	0.90%	0.00%	0.60%	0.90%	0.52%	0.66%
Average Ownership							
0.0-6.0 Acres	3.65	3.81	3.04	3.52	3.81	3.46	3.58
6.0-12.0 Acres	9.14	9.48	9.33	9.44	9.48	9.20	9.32
12.0-18.0 Acres	14.43	14.30	13.92	14.17	14.30	14.33	14.32
18.0-26.0 Acres	19.00	26.00	0.00	26.00	26.00	19.00	22.50
All Ownership Average	6.76	6.84	5.65	6.44	6.84	6.43	6.58
Household Reporting							
No Change in Land Ownership	138	115	58	173	115	196	311
Land Ownership had Increased	0	0	0	0	0	0	0
Land Ownership had Decreased	0	1	0	1	1	0	1

The average size of land holding per owner was also calculated and was given in table 3-26. In the overall sample the average land holding per owner was 6.58 acres with 6.76 acres per owner in control villages and 6.44 acres per owner in treatment villages. The difference in the average land ownership in both type of villages was statistically insignificant which suggested that pattern of owner ship is same. Similarly the average land holding per owner in participating and non participating household was 6.84 and 6.43 which was also statistically insignificant. This showed that there was no difference between participating and non participating household in average land holding per owner.

**Table 3-27: Household Method of Operating Agriculture Land**

Agriculture Land Operation	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
<b>Total Household</b>	<b>138</b>	<b>116</b>	<b>58</b>	<b>174</b>	<b>116</b>	<b>254</b>	<b>312</b>
Household Operating							
Agriculture Land Individually	132	111	52	163	111	184	295
Agriculture Land Jointly	6	5	6	11	5	12	17
10% Output Retained	3	0	1	1	0	4	4
25% Output Retained	0	1	1	2	1	1	2
30% Output Retained	0	2	0	2	2	0	2
50% Output Retained	3	2	4	6	2	7	9
Agriculture Land Individually (%)	95.65%	95.69%	89.66%	93.68%	95.69%	93.88%	94.55%
Agriculture Land Jointly (%)	4.35%	4.31%	10.34%	6.32%	4.31%	6.12%	5.45%
10% Output Retained	2.17%	0.00%	1.72%	0.57%	0.00%	2.04%	1.28%
25% Output Retained	0.00%	0.86%	1.72%	1.15%	0.86%	0.51%	0.64%
30% Output Retained	0.00%	1.72%	0.00%	1.15%	1.72%	0.00%	0.64%
50% Output Retained	2.17%	1.72%	6.90%	3.45%	1.72%	3.57%	2.88%
Household Reporting Agriculture Land							
Renting Out for Fix Rent	4	1	1	2	1	5	6
Renting Out for Fix Rent (%)	2.90%	0.86%	1.72%	1.15%	0.86%	2.55%	1.92%
Acres of Land Rented Out	13.75	8.00	1.25	9.25	8	15	23
Sharing Crop Out for Fix Percentage	0	0	0	0	0	0	0
Acres of Land Shared Crop Out	0	0	0	0	0	0	0
Renting In for Fix Rent	40	55	20	75	55	60	115
Renting In for Fix Rent (%)	28.99%	47.41%	34.48%	43.10%	47.41%	30.61%	36.86%
Acres of Land Rented In	232.38	282.62	88.00	370.62	282.62	320.38	603
Sharing Crop In for Fix Percentage	0	0	9	9	0	9	9
Acres of Land Shared Crop In	0	0	0	0	0	0	0

The method of operating the agriculture land reported by the household members is given in table 3-27. All households reported to either operate the agriculture land individually or jointly or by renting in or out their land on fix rent or sharing crop in or out on fix percentages. The table indicated that 94.55% of the household in the overall sample were operating the land individually with 95.65% in control villages and 93.68% in treatment villages. These high percentages showed that both in control and treatment villages the household prefer to operate the land individually. This proportion between participating and non participating households who were operating the land individually was 95.69% and 93.88% which was slightly higher in participating household.

In the overall sample 5.45% of the household reported to operate the land jointly with 4.35% in control villages and 6.32% in treatment villages. However this proportion between member and non member households in treatment villages was 4.31% and 10.34% respectively. The difference was high showing that joint operation of land was practiced more in non member household of treatment villages. In participating and non participating household member reporting jointly operated agriculture land was 4.31% and 6.15%. The higher percentage for non participating household was mainly because of higher percentages of non member

household of treatment villages. This indicated joint operation of land was practices majorly in non member households of treatment villages.

In the overall sample a total of 23 acres of land was rented out on fix rent by 1.92% of total household in the sample. The practice of renting out land for fix rent was more prevalent in control villages and non member household of treatment villages. The percentages of household renting out land for fix rent in participating and non participating households were 0.86% and 2.56% with a total of 8 acres and 15 acres of land respectively. No household in the overall sample reported to share crop out.

Similarly in the overall sample a total of 603 acres of land was rented in on fix rent by 36.86% of all household in sample. The practice of renting in land for fix rent was more prevalent in treatment villages than in control villages. The percentages of household renting in land for fix rent in control and treatment villages were 28.99% and 43.10% with a total of 232.38 acres and 370.62 acres of land respectively. Similarly the percentages of household renting in land for fix rent in participating and non participating households were 47.41% and 30.77% with a total of 282.62 acres and 320 acres of land respectively. The percentages of household in participating household were much higher than the percentages of household in non participating household. No household in the overall sample reported to share crop in.

Because of renting in of land on fix rent the operational land of the household will increase. The operational land of each household was calculated by adding total land owned, land rented-in and sharecropped-in and then subtracting from it land rented-out and sharecropped-out. Thus, operational land holdings include all rain fed and irrigated lands that are cultivated, sown or fallowed or planted to orchards/trees. Table 3-28 describes the operational land of household and percentage increase in the land. The overall sample indicated that the operational land of household increased by 28.99%, with 23.79% and 33.41% increase in the treatment and control villages. This increase in treatment and control villages was not statistically significant. However the percentage increase in participating and non participating household was 36.15% and 24.61% and was statistically significant. This indicated that the percentage increase in the operational land of participating household was higher than the percentage increase in the operational land on non participating household.

**Table 3-28: Household Operational Land**

Agriculture Land	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Total Land	919.12	759.75	321.99	1081.74	759.75	1241.11	2000.86
Operational Land	1137.75	1034.38	408.74	1443.12	1034.38	1546.49	2580.87
Difference	218.63	274.63	86.75	361.38	274.63	305.38	580.01
Percentage Increase	23.79%	36.15%	26.94%	33.41%	36.15%	24.61%	28.99%

Four conclusions were apparent from above discussion. First the household in the sample region prefer to operate the land individually than to operate it jointly. Second these household prefer and practice to rent in the agriculture land than to rent it out. Third, sharing crop in or out was not practiced or not liked by these household. Fourth, the operational land of participating household was higher than the operational land of non participating household.

### 3.10 Household Crop Production and Distribution

#### 3.10.1 Wheat

The number of household reporting production of wheat, its yield per acre (in mounds) and its distribution are given in table 3-29. In the overall sample population 88.46% of the household were reported to grow wheat in 988.5 acres of land, getting a production of 26414 mounds of wheat. The yield per acre was 26.72 mounds per acre. In control villages 86.23% of household were reported to grow wheat in 512.50 acres of land, getting a production of 13426 mounds. However, in treatment villages 90.23% of household were reported to grow wheat in 476 acres of land, getting a production of 12988 mounds. The yields per acre in control and treatment villages were 26.20 and 27.29 mounds per acre. The difference in yield per acre was statistically significant indicating that treatment villages were able to get better yield of wheat per acre than control villages.

**Table 3-29: Household Wheat Production & Distribution**

Crop: Wheat	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Total Household	138	116	58	174	116	196	312
Wheat Production							
Household Reporting	119	106	51	157	106	170	276
Using improved Variety	24	7	2	9	7	26	33
Household Reporting (%)	86.23%	91.38%	87.93%	90.23%	91.38%	66.93%	88.46%
Using improved Variety (%)	17.39%	6.03%	3.45%	5.17%	6.03%	13.27%	10.58%
Total Acres	512.50	334.00	142.00	476.00	334	654.5	988.5
Total Production (Mounds)	13426	9197	3791	12988	9197	17217	26414
Yield Mounds/Acre	26.20	27.54	26.70	27.29	27.54	26.31	26.72

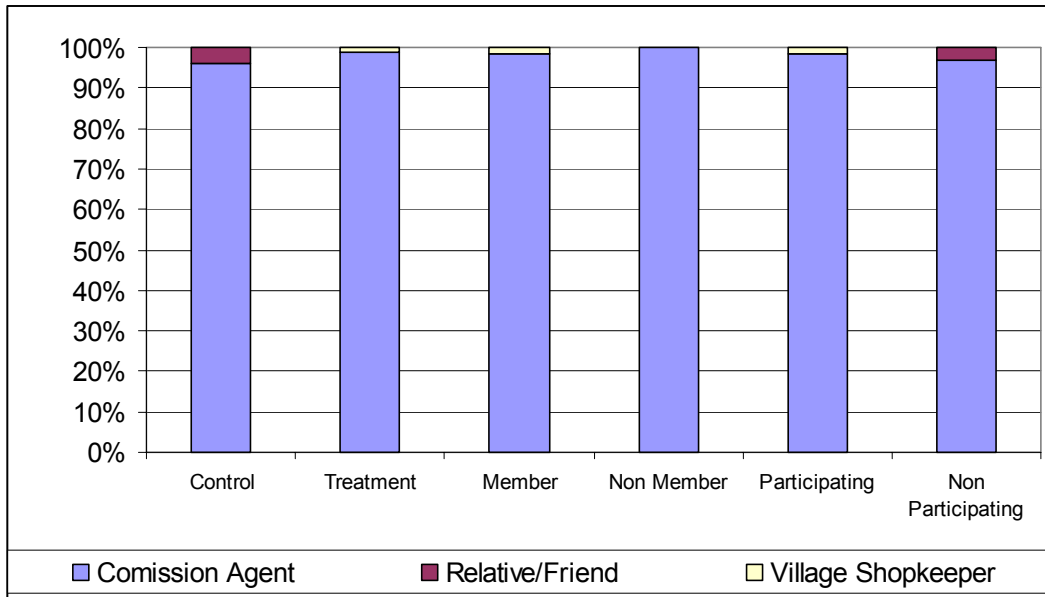
Crop: Wheat	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Wheat Distribution (%)							
Sold Quantity	32.79%	37.56%	30.81%	35.59%	37.56%	32.36%	34.17%
Landlord Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Household Quantity	50.59%	43.17%	50.04%	45.17%	43.17%	50.47%	47.93%
Wages Quantity	6.70%	8.37%	8.02%	8.27%	8.37%	6.99%	7.47%
Seed Quantity	5.38%	5.09%	5.12%	5.10%	5.09%	5.32%	5.24%
Friends/Relative Quantity	2.85%	3.54%	3.90%	3.65%	3.54%	3.08%	3.24%
Livestock Quantity	1.70%	2.27%	2.11%	2.23%	2.27%	1.79%	1.96%

Similarly 91.38% of participating households were reported to grow wheat in 334 acres of land, getting a production of 9197 mounds with 27.54 mounds of yield per acre. However, only 66.93% of non participating households were reported to grow wheat in 654.5 acres of land, getting a production of 17217 mounds with 26.31 mounds of yield per acre. The difference in yield per acre was statistically insignificant indicating that yield per acre of wheat in participating and non participating household was same.

In the overall sample 10.58% of the household had reported using improved variety of wheat with 17.39% in the control villages and 5.17% in treatment villages. These proportions between participating and non participating households were 6.03% and 10.24%. This showed that household in control villages had higher preference for using improved variety of wheat over households in treatment villages.

The distribution of wheat in overall sample reflected that 47.93% of wheat was kept for household use, 34.17% was sold in market, 7.47% was paid as wages, 5.24% was kept for seed, 3.24% was given to friends/relatives and 1.96% was given to livestock as feed. This pattern of distribution of wheat was approximately same in control and treatment villages and in participating and non participating households.

**Figure 3-9: Primary Buyer of Wheat Crop**



The primary buyer of the wheat crop in the sample population is depicted at figure 3-9 and their percentage in table 3-30. It indicated that 97.45% of wheat was sold to commission agents, 1.99% was sold to Relative/friends and 0.55% was sold to the village shopkeepers. The wheat was sold to relative/friends in control villages and was sold to village shopkeepers in treatment villages. In all cases the commission agent was the chief buyer therefore it can be concluded that wheat was sold to commission agent in the overall sample.

**Table 3-30: Percentage Distribution of Primary Buyer of Wheat**

Crop: Wheat	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Commission Agent	95.91%	98.55%	100.00%	98.92%	98.55%	96.77%	97.45%
Relative/Friend	4.09%	0.00%	0.00%	0.00%	0.00%	3.23%	1.99%
Village Shopkeeper	0.00%	1.45%	0.00%	1.08%	1.45%	0.00%	0.55%

### 3.10.2 Cotton

The number of household reporting production of cotton, its yield per acre and its distribution is given in table 3-31. In the overall sample population 78.21% of the households were reported to grow cotton in 844.74 acres of land, getting a production of 14918 mounds and a yield of 17.66 mounds per acre. In control villages 85.51% of household were reported to grow cotton in 465.74 acres of land, getting a production of 7956 mounds. However, in treatment villages 72.41% of household were reported to grow cotton in 379 acres of land, getting a production of 6962 mounds. The yields per acre in control and treatment villages were 17.08 and 18.37 mounds per acre. The difference in yield per acre was statistically insignificant indicating that yield in both type of villages was same.



**Table 3-31: Household Cotton Production and Distribution**

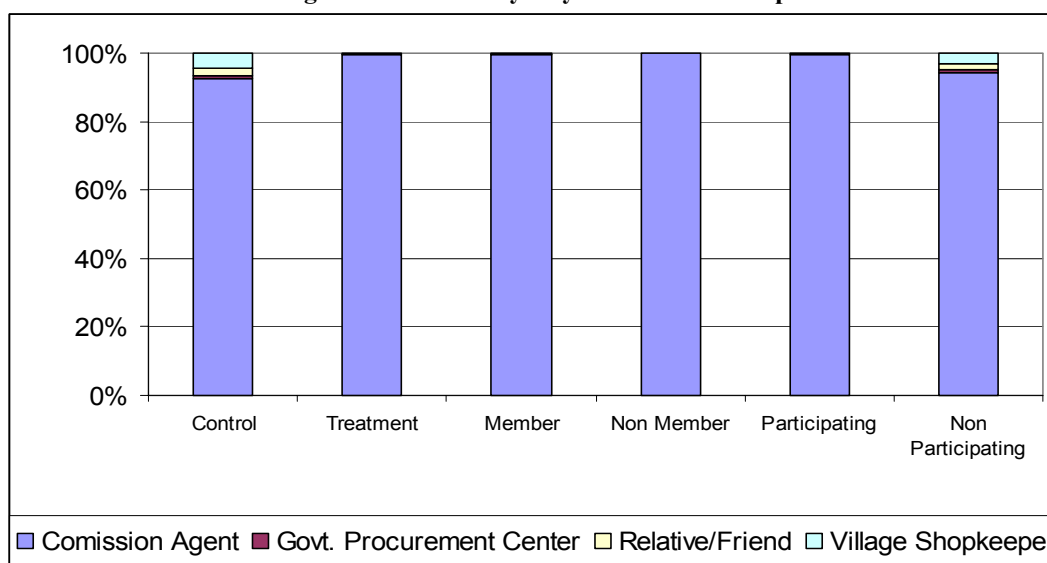
Crop: Cotton	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Total Household	138	116	58	174	116	196	312
Cotton Production							
Household Reporting	118	81	45	126	81	163	244
Using improved Variety	41	12	7	19	12	48	60
Household Reporting (%)	85.51%	69.83%	77.59%	72.41%	69.83%	83.16%	78.21%
Using improved Variety (%)	29.71%	10.34%	12.07%	10.92%	10.34%	24.49%	19.23%
Total Acres	465.74	245.50	133.50	379.00	245.5	599.24	844.74
Total Production (Mounds)	7956	4562	2400	6962	4562	10356	14918
Yield Mounds/Acre	17.08	18.58	17.98	18.37	18.58	17.28	17.66
Cotton Distribution (%)							
Sold Quantity	98.40%	99.52%	99.46%	99.50%	99.52%	98.65%	98.91%
Landlord Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Household Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Wages Quantity	0.19%	0.00%	0.08%	0.03%	0.00%	0.16%	0.11%
Seed Quantity	1.41%	0.48%	0.46%	0.47%	0.48%	1.19%	0.97%
Friends/Relative Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Livestock Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Similarly 69.83% of participating households were reported to grow cotton in 245.5 acres of land, getting a production of 4562 mounds with 18.58 mounds of yield per acre. However, 83.16% of non participating households were reported to grow cotton in 599.24 acres of land, getting a production of 10356 mounds with 17.28 mounds of yield per acre. The difference in yield per acre was statistically insignificant indicating that yield per acre of cotton in participating and non participating household was same.

In the overall sample 19.23% of the household had reported using improved variety of cotton with 29.71% in the control villages and 10.92% in treatment villages. These proportions between participating and non participating households were 10.34% and 24.49%. This indicated that in control villages the improved variety of cotton was preferred. Similarly the proportions between participating and non participating households for using improved variety of cotton was 10.34% and 24.49% indicating again that non participating household had higher preference for using improved variety of cotton over participating households.

The distribution of cotton in overall sample reflected that 98.91% of cotton was sold in market, 0.11% was paid as wages and 0.97% was kept for seed. This pattern of distribution of cotton was approximately same in control and treatment villages and in participating and non participating households with one small difference that in control villages a little higher percentage of production was retained for seed.

**Figure 3-10: Primary Buyers of Cotton Crop**



The primary buyer of cotton crop in overall sample population is depicted at figure 3-10 and their percentage distribution is given in table 3-32. It indicated that 95.96% of cotton was sold to commission agents, 0.45% was sold to government procurement center, 1.14% was sold to Relative/friends and 0.55% was sold to the village shopkeepers. The practice of selling cotton to relative/friends or village shopkeeper or government procurement center was present only in control villages. Note that the commission agent was the primary buyer of the cotton crop therefore it can be concluded that cotton was sold to commission agent in the sample region.

**Table 3-32: Percentage Distribution of Primary Buyers of Cotton**

Crop: Cotton	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Commission Agent	92.71%	99.45%	100.00%	99.64%	99.45%	94.41%	95.96%
Govt. Procurement Center	0.86%	0.00%	0.00%	0.00%	0.00%	0.66%	0.45%
Relative/Friend	2.15%	0.00%	0.00%	0.00%	0.00%	1.64%	1.14%
Village Shopkeeper	4.29%	0.55%	0.00%	0.36%	0.55%	3.29%	2.45%

### 3.10.3 Sugarcane

The number of household reporting production of sugarcane, its yield per acre and its distribution are given in table 3-33. In the overall sample population 100% of the households were reported to grow sugarcane in 1164.57 acres of land, getting a production of 868881 mounds and a yield of 746.10 mounds per acre. In control villages all of household were reported to grow sugarcane in 416.82 acres of land, getting a production of 269676 mounds. However, in treatment villages all of household were reported to grow sugarcane in 553 acres of land, getting a production of 463670 mounds. The yields per acre in control and

treatment villages were 646.98 and 838.46 mounds per acre and were statistically significant. This indicated that yield per acre of sugarcane was better than in control villages. However difference of yield per acre between member and non member households (836.46 and 695.94 mounds per acre) with in treatment villages was statistically insignificant indicating that the yield per acre of both was same.

Similarly all participating households were reported to grow sugarcane in 553 acres of land, getting a production of 463670 mounds with 838.46 mounds of yield per acre. However, all non participating households were reported to grow sugarcane in 611.57 acres of land, getting a production of 405211 mounds with 662.58 mounds of yield per acre. The difference in yield per acre was statistically significant indicating that yield per acre of sugarcane in participating household was higher than in non participating household.

**Table 3-33: Household Sugarcane Production and Distribution**

Crop Sugarcane	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Total Household	138	116	58	174	116	196	312
Sugarcane Production							
Household Reporting	138	116	58	174	116	196	312
Using improved Variety	23	5	4	9	5	27	32
Household Reporting (%)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Using improved Variety (%)	16.67%	4.31%	6.90%	5.17%	4.31%	13.78%	10.26%
Total Acres	416.82	553.00	194.75	747.75	553	611.57	1164.57
Total Production (Mounds)	269676	463670	135535	599205	463670	405211	868881
Yield Mounds/Acre	646.98	838.46	695.94	801.34	838.46	662.58	746.10
Sugarcane Distribution (%)							
Sold Quantity	93.57%	95.50%	96.15%	95.65%	95.50%	94.43%	95.00%
Landlord Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Household Quantity	0.55%	0.06%	0.11%	0.07%	0.06%	0.40%	0.22%
Wages Quantity	0.49%	0.28%	0.11%	0.25%	0.28%	0.36%	0.32%
Seed Quantity	5.40%	4.15%	3.63%	4.03%	4.15%	4.80%	4.46%
Friends/Relative Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Livestock Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

In the overall sample 10.26% of the household had reported using improved variety of sugarcane with 16.67% in the control villages and 5.17% in treatment villages. These proportions between participating and non participating households were 4.31% and 13.78% respectively. This indicated that in control villages the improved variety of sugarcane was preferred. Similarly the proportions between participating and non participating households for using improved variety of sugarcane was 4.31% and 13.78% indicating again that non participating household had higher preference for using improved variety of sugarcane over participating households.

The distribution of sugarcane in overall sample reflected that 95.00% of sugarcane was sold

in market, 0.22% was kept for household use, 0.32% was paid as wages and 4.46% was kept for seed. This pattern of distribution of sugarcane was approximately same in control and treatment villages and in participating and non participating households with small variation in percentages.

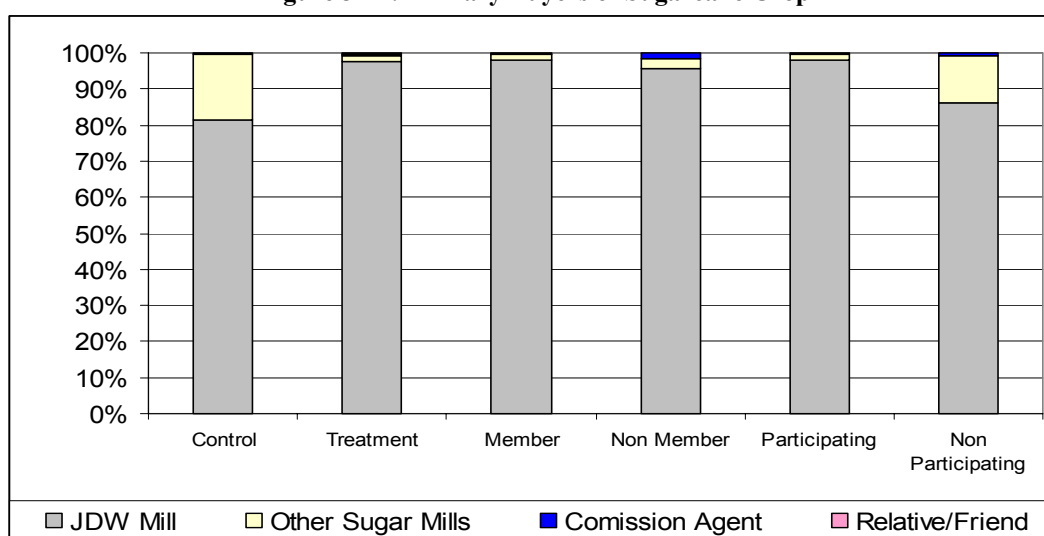
The percentage distribution of primary buyers of sugarcane crop is given in table 3-34. It indicated that 92.51% of sugarcane was sold to Jamal Din Wali Mill, 0.45% was sold to commission agents, 6.85% was sold to other sugar mills and 0.19% was sold to the relative/friends.

**Table 3-34: Percentage Distribution of Primary Buyers of Sugarcane**

Crop: Sugarcane	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Commission Agent	0.40%	0.16%	1.53%	0.47%	0.16%	0.78%	0.45%
JDW Mill	81.25%	97.99%	95.71%	97.47%	97.99%	86.17%	92.51%
Other Sugar Mills	18.36%	1.49%	2.76%	1.78%	1.49%	13.05%	6.85%
Relative/Friend	0.00%	0.36%	0.00%	0.28%	0.36%	0.00%	0.19%

The practice of selling sugarcane to relative/friends was observed only in the participating households. However it was interesting to note that 1.78% of the sugarcane produced in the treatment villages was sold to other sugar mills with 1.49% in member household and 2.76% in non member of households. This proportion in control villages was higher, 18.36% of the sugarcane was sold to other sugar mills. From previous discussion it was clear that Jamal Din Wali was the chief buyer of the sugarcane crop in the sample region. The primary buyers of sugarcane crop in sample population are given at figure 3-11

**Figure 3-11: Primary Buyers of Sugarcane Crop**



### 3.10.4 Fodder

The number of household reporting production of fodder, its yield per acre and its distribution are given in table 3-35 In the overall sample population 73.72% of the households were reported to grow fodder in 222.18 acres of land, getting a production of 4165 mounds and a yield of 18.75 mounds per acre. In control villages 71.01% of household were reported to grow fodder in 416.82 acres of land, getting a production of 1927 mounds. However, in treatment villages 75.86% of household were reported to grow fodder in 117.37 acres of land, getting a production of 828 mounds. The yields per acre in control and treatment villages were 18.39 and 19.07 mounds per acre and were statistically insignificant. This indicated that yield per acre of fodder was same in both villages. Also the yields per acre in participating and non participating household were 19.22 and 18.75 that were also statistically insignificant indicating that there was no difference in the yield per acre between the two.

**Table 3-35: Household Fodder Production and Distribution**

Crop Fodder	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Total Household	138	116	58	174	116	196	312
Fodder Production							
Household Reporting	98	86	46	132	86	144	230
Using improved Variety	22	11	4	15	11	26	37
Household Reporting (%)	71.01%	74.14%	79.31%	75.86%	74.14%	73.47%	73.72%
Using improved Variety (%)	15.94%	9.48%	6.90%	8.62%	9.48%	13.27%	11.86%
Acres	104.81	73.37	44.00	117.37	73.37	148.81	222.18
Production	2170	1410	828	2238	1410	2998	4408
Production/Acre	20.70	19.22	18.82	19.07	19.22	20.15	19.84
Fodder Distribution (%)							
Sold Quantity	7.05%	5.18%	9.90%	6.93%	5.18%	7.84%	6.99%
Landlord Quantity	7.93%	4.04%	1.33%	3.04%	4.04%	6.10%	5.44%
Household Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Wages Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Seed Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Friends/Relative Quantity	1.24%	1.35%	1.21%	1.30%	1.35%	1.23%	1.27%
Livestock Quantity	83.78%	89.43%	87.56%	88.74%	89.43%	84.82%	86.30%

In the overall sample 11.86% of the household had reported using improved variety of fodder with 15.94% in the control villages and 8.62% in treatment villages. This indicated that in control villages the improved variety of fodder was preferred. Similarly the proportions between participating and non participating households for using improved variety of fodder was 9.48% and 13.27% respectively indicating again that non participating household had higher preference for using improved variety of fodder over participating households.

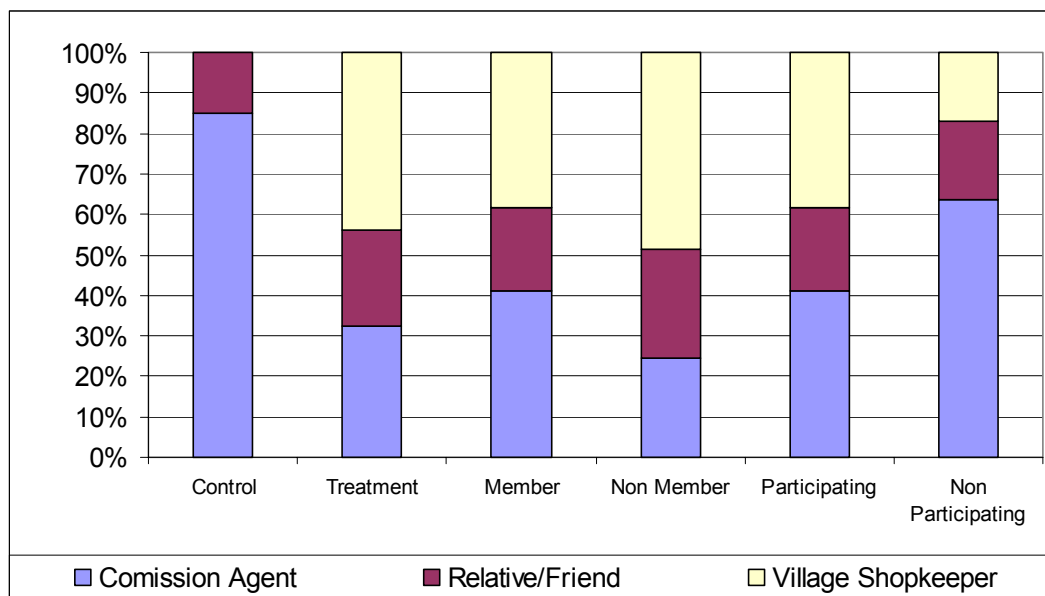
The distribution of fodder in overall sample reflected that 86.30% of fodder was fed to livestock, 5.44% was given to landlords, 6.99% were sold in market and 1.27% was given to relatives/friends. This pattern of distribution of sugarcane was approximately same in control and treatment villages and in participating and non participating households with small variation in percentages.

**Table 3-36: Percentage Distribution of Primary Buyers of Fodder**

Crop: Fodder	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Fodder							
Commission Agent	84.97%	41.10%	24.39%	32.26%	41.10%	63.83%	58.44%
Relative/Friend	15.03%	20.55%	26.83%	23.87%	20.55%	19.15%	19.48%
Village Shopkeeper	0.00%	38.36%	48.78%	43.87%	38.36%	17.02%	22.08%

The percentage distribution of primary buyers of fodder is given in table 3-36. It indicated that 58.44% of fodder was sold to commission agents, 19.48% was sold to relative/friends and 22.08% was sold to the village shopkeepers. The practice of selling fodder to village shopkeeper was observed only in treatment villages where 43.87% of the fodder was sold to them. The primary buyer of fodder crop in overall sample population is given at figure 3-12.

**Figure 3-12: Primary Buyers of Fodder Crop**



### 3.10.5 Rice

The number of household reporting production of rice, its yield per acre and its distribution are given in table 3-37. In the overall sample population 3.21% of the households were reported to grow rice in 17.25 acres of land, getting a production of 389 mounds and a yield of 22.55 mounds per acre. In control villages 2.90% of household were reported to grow rice

in 9 acres of land, getting a production of 198 mounds. However, in treatment villages 3.45% of household were reported to grow rice in 8.25 acres of land, getting a production of 191 mounds. The yields per acre in control and treatment villages were 22 and 23.15 mounds per acre. The difference in yield per acre was statistically insignificant indicating that yield in both type of villages was same. The yields per acre for participating and non participating households were 23.04 and 22.27 respectively and the difference in yield was statistically insignificant.

**Table 3-37: Household Rice Production and Distribution**

Crop: Rice	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Total Household	138	116	58	174	116	196	312
Rice Production							
Household Reporting	4	4	2	6	4	6	10
Using improved Variety	1	0	1	1	0	2	2
Household Reporting (%)	2.90%	3.45%	3.45%	3.45%	3.45%	3.06%	3.21%
Using improved Variety (%)	0.72%	0.00%	1.72%	0.57%	0.00%	1.02%	0.64%
Total Acres	9.00	6.25	2.00	8.25	6.25	11	17.25
Total Production (Mounds)	198	144	47	191	144	245	389
Yield Mounds/Acre	22.00	23.04	23.50	23.15	23.04	22.27	22.55
Rice Distribution (%)							
Sold Quantity	68.18%	66.67%	34.04%	58.64%	66.67%	61.63%	63.50%
Landlord Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Household Quantity	31.82%	26.39%	55.32%	33.51%	26.39%	36.33%	32.65%
Wages Quantity	0.00%	2.08%	4.26%	2.62%	2.08%	0.82%	1.29%
Seed Quantity	0.00%	0.00%	2.13%	0.52%	0.00%	0.41%	0.26%
Friends/Relative Quantity	0.00%	4.86%	4.26%	4.71%	4.86%	0.82%	2.31%
Livestock Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

In the overall sample 0.64% of the household had reported using improved variety of rice with 0.72% in the control villages and 3.45% in treatment villages. It is difficult to conclude the preference for use of improved variety of rice because of smaller number of household reporting to grow rice. Similarly the proportions between participating and non participating households for using improved variety of rice were 0.00% and 1.02% respectively. The 0% in participating household was again due to smaller number of households reporting to grow rice.

The distribution of rice in overall sample reflected that 63.50% of rice was sold in market, 32.65% were kept for household use, 1.29% was paid in wages, 0.26% was kept for seed and 2.31% was given to friends/relatives. It showed that all 100% of the rice was sold to commission agents. Due to smaller proportion of rice growers it was difficult to comment on the distribution pattern of rice with certainty. However it was safe to conclude that the pattern of distribution of rice in overall sample was approximately same in control and treatment villages and in participating and non participating households with obviously some variation

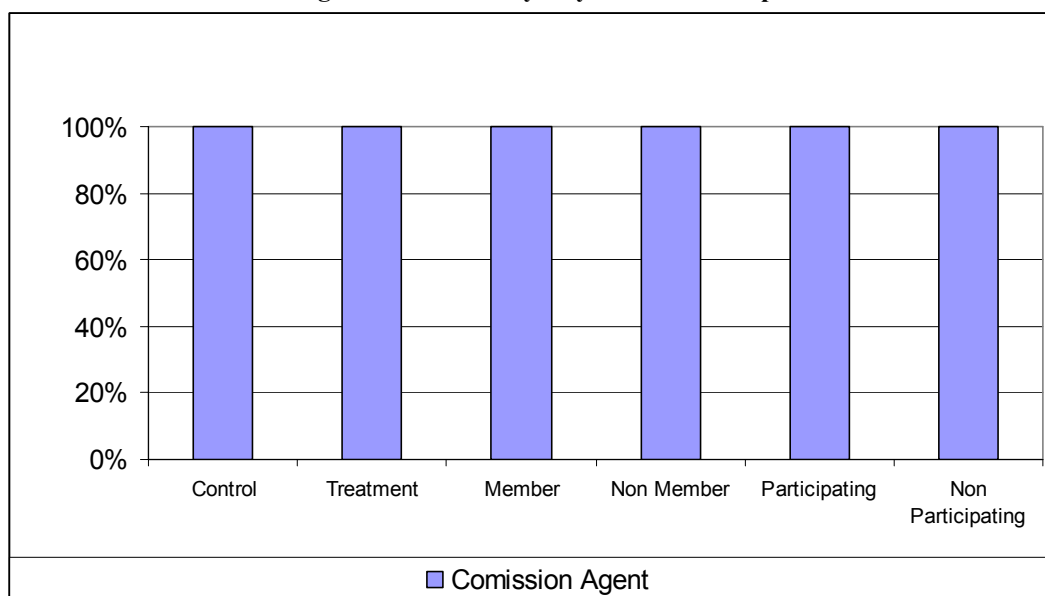
in percentages.

**Table 3-38: Percentage Distribution of Primary Buyers of Rice**

Crop: Rice	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Rice Commission Agent	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

The percentage distribution of primary buyers of rice is given in table 3-33. It indicated that 100% of rice was sold to commission agents. The primary buyer of rice crop in overall sample population is given at figure 3-13.

**Figure 3-13: Primary Buyers of Rice Crop**



Due to smaller number of households reporting production of rice it was safe to conclude that rice was basically sown for household use. However the quantity more than the needs of household was sold in market for profit.

### 3.10.6 Onion

The number of household reporting production of rice, its yield per acre and its distribution are given in table 3-39. In the overall sample population 2.88% of the households were reported to grow onion in 17.25 acres of land, getting a production of 950 mounds and a yield of 95 mounds per acre. The yield per care of onion in treatment and control villages were 95.20 and 94.40 mounds per acre and were statistically insignificant indicating that there was no difference in the yield per acre of onion in both villages. Similarly the yields per acre of onion in participating and non participating household were 97.14 and 94.55. The



difference in yields per acre between participating and non participating household were statistically insignificant which again showed that there was no difference in the yield per acre of onion.

**Table 3-39: Household Production and Distribution of Onion**

Crop: Onion	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Total Household	138	116	58	174	116	196	312
Onion Production							
Household Reporting	4	3	2	5	3	6	9
Using improved Variety	1	0	0	0	0	1	1
Household Reporting (%)	2.90%	2.59%	3.45%	2.87%	2.59%	3.06%	2.88%
Using improved Variety (%)	0.72%	0.00%	0.00%	0.00%	0.00%	0.51%	0.32%
Acres	7.50	1.75	0.75	2.50	1.75	8.25	10
Production	714	170	66	236	170	780	950
Production/Acre	95.20	97.14	88.00	94.40	97.14	94.55	95.00
Onion Distribution (%)							
Sold Quantity	81.23%	82.35%	83.33%	82.63%	82.35%	81.41%	81.58%
Landlord Quantity	13.31%	0.00%	0.00%	0.00%	0.00%	12.18%	10.00%
Household Quantity	4.20%	12.35%	16.67%	13.56%	12.35%	5.26%	6.53%
Wages Quantity	0.28%	0.00%	0.00%	0.00%	0.00%	0.26%	0.21%
Seed Quantity	0.70%	1.18%	0.00%	0.85%	1.18%	0.64%	0.74%
Friends/Relative Quantity	0.28%	4.12%	0.00%	2.97%	4.12%	0.26%	0.95%
Livestock Quantity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

The distribution of onion in overall sample reflected that 81.58% of onion was sold in market, 10% was given to landlords, 6.53% was kept for household use, 0.21% was paid in wages, 0.74% was kept for seed and 0.95% was given to friends/relatives. Due to smaller proportion of onion growers it was difficult to comment on the distribution pattern of onion with certainty. However it was safe to conclude that the pattern of distribution of onion in overall sample was approximately same in control and treatment villages and in participating and non participating households with obviously some variation in percentages.

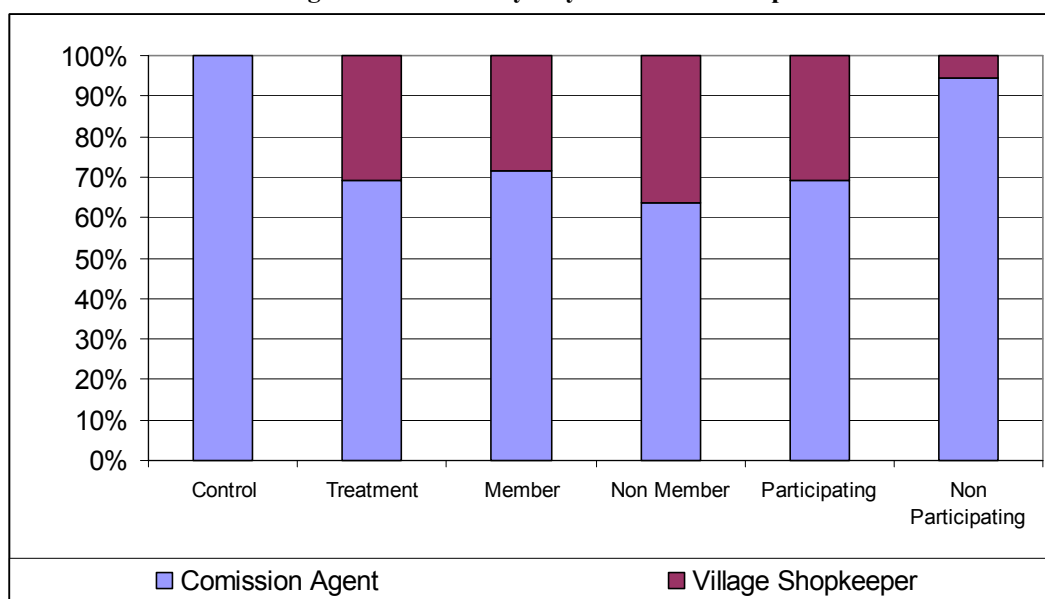
**Table 3-40: Percentage Distribution of Primary Buyers of Onion**

Crop: Onion	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Onion							
Commission Agent	100.00%	71.43%	63.64%	69.23%	71.43%	96.85%	92.26%
Village Shopkeeper	0.00%	28.57%	36.36%	30.77%	28.57%	3.15%	7.74%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

The percentage distribution of primary buyers of onion is given in table 3-40. It indicated that 92.25% of onion was sold to commission agents and 7.74% was sold to the village shopkeepers. The practice of selling onion to village shopkeeper was observed only in

treatment villages where 30.77% of the onion was sold to them. The primary buyer of onion crop in overall sample population is given at figure 3-14.

**Figure 3-14: Primary Buyers of Onion Crop**



Due to smaller number of households reporting production of onion it was safe to conclude that onion was basically sown for casual purposes like gaining some profit between the sowing of two major crops. The quantity needed for home was kept and rest was sold in market.

### 3.10.7 Mango

In the whole sample region the households reported to produce the mango as a major fruit of the region. The number of household reporting production of mango, average number of trees per household, its yield per acre and its distribution are given in table 3-41. In the overall sample population 28.21% of the households had reported production of mango with 23.19% in control villages and 32.18% in treatment villages. With in the member and non member households in treatment villages, 29.31% and 37.93% had reported production of mango respectively. Similarly these proportions between participating and non participating household were 29.31% and 27.55%. However if the number of trees reported by households were compared, it indicated that participating household have less number of mango trees. This suggested that mango production was a preferred or major activity of non participating household.

**Table 3-41: Household Mango Production & Distribution**

Fruit: Mango	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Total Household	138	116	58	174	116	196	312
Mango Production							
Household Reporting	32	34	22	56	34	54	88
No of Trees	1143	663	1184	1847	663	2327	2990
Household Reporting (%)	23.19%	29.31%	37.93%	32.18%	29.31%	27.55%	28.21%
Avg No of Trees/HH	8.28	5.72	20.41	10.61	5.72	11.87	9.58
Avg No of Trees/Acre	27.54	19.51	32.00	26.02	19.51	29.64	26.58
Total Acres	41.5	33.99	37	70.99	33.99	78.5	112.49
Total Production (Mounds)	2696	1507	2555	4062	1507	5251	6758
Yield/Acre	64.96	44.34	69.05	57.22	44.34	66.89	60.08
Mango Distribution (%)							
Sold Quantity	93.03%	89.58%	95.03%	93.01%	89.58%	94.00%	93.02%
Landlord Quantity	0.00%	0.33%	0.00%	0.12%	0.33%	0.00%	0.07%
Household Quantity	5.45%	8.23%	3.17%	5.05%	8.23%	4.34%	5.21%
Wages Quantity	1.52%	1.86%	1.80%	1.82%	1.86%	1.66%	1.70%

In the overall sample on 112.49 acres of land 2990 trees were present giving a production of 6758 mounds. The average number of trees per acre and household were 26.58 and 9.58 respectively and the yield per acre was 60.08 mounds per acre which was quite low. The yield per acre in control and treatment villages was 64.96 and 57.22 mounds per acre which was statistically insignificant. Also, with in the treatment villages the yield per acre for member and non member household was 44.34 and 69.05 which was statistically insignificant. Similarly the yield per acre between participating and non participating households was 44.34 and 66.89 mounds per acre which was also statistically insignificant. This was unexpected because the numbers of tree were higher in non participating households. Therefore it was safe to conclude that these results were due to low production of mango for the year of survey in sample villages.

The distribution of mango in overall sample reflected that 93.02% of mango was sold in market, 0.07% was given to landlords, 5.21% was kept for household use and 1.70% was paid in wages. This pattern of distribution of mango in overall sample was approximately same in control and treatment villages and in participating and non participating households with small variation in percentages.

### **3.11 Household Livestock Practices**

The numbers of animal owned by household, average number of livestock per household and distribution of livestock across whole sample is given in table 3-42. The maximum numbers of animal reported by household in whole sample was goat (1053 goats) with 455 goats in control and 598 goats in treatment villages and 278 and 473 goats in participating

and non participating households respectively. The next important animal reported by household was buffalo which were 757 in number in whole sample. The numbers of buffalo in control and treatment villages were 344 and 413 respectively. Similarly the numbers of buffalo in participating and non participating household were 278 and 479 respectively. The numbers of cattle in whole sample was 211 with 97 and 114 cattle in control and treatment villages respectively. However the numbers of sheep across whole sample was 88 which were the least number.

**Table 3-42: Household Livestock**

Livestock	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Total Households	138	116	58	174	116	196	312
Household Reporting							
Cattle	97	85	29	114	85	126	211
Buffalo	344	278	135	413	278	479	757
Sheep	52	30	6	36	30	58	88
Goat	455	414	184	598	414	639	1053
Camels	2	0	0	0	0	2	2
Horses	10	2	1	3	2	11	13
Donkey/Mules	18	11	2	13	11	20	31
Poultry	124	91	58	149	91	182	273
Average Animal/HH							
Cattle	0.70	0.73	0.50	0.66	0.73	0.64	0.68
Buffalo	2.49	2.40	2.33	2.37	2.40	2.44	2.43
Sheep	0.38	0.26	0.10	0.21	0.26	0.30	0.28
Goat	3.30	3.57	3.17	3.44	3.57	3.26	3.38
Camels	0.01	0.00	0.00	0.00	0.00	0.01	0.01
Horses	0.07	0.02	0.02	0.02	0.02	0.06	0.04
Donkey/Mules	0.13	0.09	0.03	0.07	0.09	0.10	0.10
Poultry	0.90	0.78	1.00	0.86	0.78	0.93	0.88
Percent Distribution							
Cattle	45.97%	40.28%	13.74%	54.03%	40.28%	59.72%	100.00%
Buffalo	45.44%	36.72%	17.83%	54.56%	36.72%	63.28%	100.00%
Sheep	59.09%	34.09%	6.82%	40.91%	34.09%	65.91%	100.00%
Goat	43.21%	39.32%	17.47%	56.79%	39.32%	60.68%	100.00%
Camels	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Horses	76.92%	15.38%	7.69%	23.08%	15.38%	84.62%	100.00%
Donkey/Mules	58.06%	35.48%	6.45%	41.94%	35.48%	64.52%	100.00%
Poultry	45.42%	33.33%	21.25%	54.58%	33.33%	66.67%	100.00%

As expected, draught animals were mostly reported in control villages as was evident from the percentages in table 3-42. However the numbers of domestic poultry birds reported by household were low. In the whole sample only 273 poultry birds were reported which was less than one bird per household. Keeping in view the time spent by members in poultry care this seems to be correct. Therefore it was concluded that keeping poultry was insignificant in sample region.

The average number of animals per household indicates that goats and buffalos were the major animal kept by household in the whole sample with an average of 3.38 and 2.43 animals per household. The difference in the proportion between treatment and control villages and between participating and non-participating households was statistically insignificant.

**Table 3-43: Household Livestock Statistics**

Livestock	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
<b>Cattle</b>							
Born	18	18	12	30	18	30	48
Slaughtered	0	1	0	1	1	0	1
Received as Gift	0	0	0	0	0	0	0
Given as Gift	0	0	0	0	0	0	0
Died	0	0	0	0	0	0	0
Tending No's	0	0	0	0	0	0	0
<b>Buffalo</b>							
Born	102	56	36	92	56	138	194
Slaughtered	0	0	0	0	0	0	0
Received as Gift	0	0	0	0	0	0	0
Given as Gift	0	0	0	0	0	0	0
Died	0	0	0	0	0	0	0
Tending No's	0	0	0	0	0	0	0
<b>Sheep</b>							
Born	10	3	3	6	3	13	16
Slaughtered	0	0	0	0	0	0	0
Received as Gift	0	0	0	0	0	0	0
Given as Gift	0	0	0	0	0	0	0
Died	0	0	0	0	0	0	0
Tending No's	0	0	0	0	0	0	0
<b>Goat</b>							
Born	103	76	37	113	76	140	216
Slaughtered	4	1	4	5	1	8	9
Received as Gift	0	0	0	0	0	0	0
Given as Gift	0	0	1	1	0	1	1
Died	0	0	0	0	0	0	0
Tending No's	0	0	0	0	0	0	0

The numbers of important livestock animals born, slaughter, given or received as gift, died and tended is given at table 3-43. It indicated that 48 cattle, 194 buffalo, 16 sheep and 216 goats were born. Only one cattle and 9 goats were reported to be slaughtered.

**Table 3-44: Household Sales and Purchase of Livestock**

Livestock	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Cattle							
Sold	4	0	1	1	0	5	5
Purchased	4	5	0	5	5	4	9
Buffalo							
Sold	7	11	4	15	11	11	22
Purchased	11	5	2	7	5	13	18
Sheep							
Sold	0	0	0	0	0	0	0
Purchased	0	1	0	1	1	0	1
Goat							
Sold	11	17	3	20	17	14	31
Purchased	5	3	0	3	3	5	8
Donkey/Mules							
Sold	0	0	0	0	0	0	0
Purchased	0	1	0	1	1	0	1

The sales and purchase of livestock in overall sample is given at table 3-44. It indicated that sales and purchase of cattle, buffalo and goats were reported in the sample with the maximum sales of goats, followed by buffalo and then cattle. In overall sample 5 cattle were sold and 9 were purchased, 22 buffalo were sold and 18 were purchased. The goats were sold nearly by all household in the overall sample. The sales and purchase of draught animals and sheep was negligible in the whole sample population.

It was interesting to note that member household in treatment villages were purchasing cattle and was selling buffalos and except for cattle the purchases were lower than the sales. The highest numbers of animals sold were goat, buffalo and cattle in decreasing order of sales. Similarly the highest number of animal purchased were buffalo, cattle and goat in decreasing order of purchase.

## 3.12 Household Farm Income and Expenditure

### 3.12.1 Farm Income

The average income of households from agriculture in the sample population, its components and contributions in total components are given at table 3-45. It indicated that the income per household from agriculture in the overall sample was 283,653 per annum with Rs 240,270 and 318,061 per annum in treatment and control villages and Rs 354,915 and Rs 241,478 in the participating and non participating household. The annual income per household and per acre between control and treatment villages was statistically significant

which indicated that the income of treatment villages was higher than the income from the control villages. Also with in the member and non member households in treatment villages the difference of income was statistically significant. This indicated that the income of member household in treatment villages was higher than the income of non member households. Similarly, the difference of income in participating and non participating household was statistically significant proving that the income of participating household was higher than the income of non-participating households.

**Table 3-45: Household Farm Income**

Household Income	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Income/Acre	21,866	33,916	27,413	31,974	33,916	23,276	27,254
Income/Household	240,270	354,915	244,352	318,061	354,915	241,478	283,653
Income/Household							
Crop	223,465	341,716	213,786	299,072	341,716	220,601	265,631
Fruits	10,476	7,303	24,862	13,156	7,303	14,733	11,971
Farm Services	3,581	3,195	2,622	3,004	3,195	3,297	3,259
Farm Production	1,810	2,081	2,910	2,357	2,081	2,136	2,115
Farm Rentals	938	621	172	471	621	712	678
Contribution (%)							
Crop	93.01%	96.28%	87.49%	94.03%	96.28%	91.35%	93.65%
Fruits	4.36%	2.06%	10.17%	4.14%	2.06%	6.10%	4.22%
Farm Services	1.49%	0.90%	1.07%	0.94%	0.90%	1.37%	1.15%
Farm Production	0.75%	0.59%	1.19%	0.74%	0.59%	0.88%	0.75%
Farm Rentals	0.39%	0.17%	0.07%	0.15%	0.17%	0.29%	0.24%

The table also indicated the income per household from components of agriculture income. The average income from crop included the income from production of various crop and from the by products sold. It may also please be noted that only the by product of wheat was reported by various farmers from the sample households some of which was sold and some of which was feed to livestock. The income from by product includes only its sales.

The gross income per household derived from the sales of crops and it's by products constitutes 93.01% in overall sample. In the overall sample the average income from crops and its by products was Rs 265, 631/- per annum with the income of Rs 223, 465 and Rs 299,072 per annum in control and treatment villages. The difference of crop income between control and treatment villages was statistically significant. Similarly the difference of crop income between member and non member households of treatment villages and between participating and non participating household was statistically significant. This shows that the average income derived from crops by participating house hold was statistically significant.

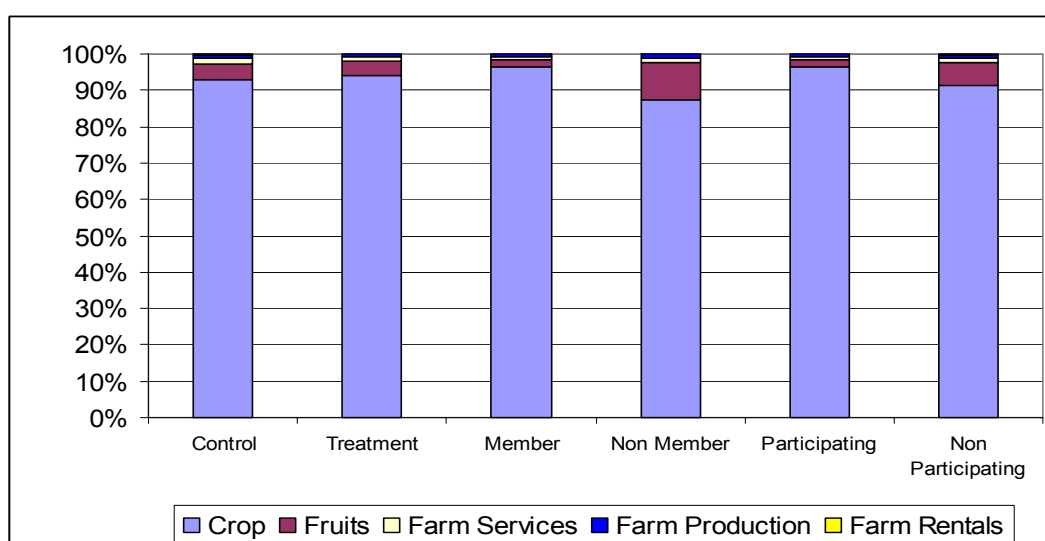
Similarly the average gross income derived from the sales of fruit (mango only) constitutes 4.23% of the total average income in overall sample. In the overall sample the average income from fruits was Rs 11, 971/- per annum with the income of Rs 10, 476 and Rs 13,156 per annum in control and treatment villages. The difference of fruit income between control and treatment villages was statistically insignificant. However the difference of fruit income between member and non member households of treatment villages was statistically significant indicating that the income from fruits in non member households was higher. Also the difference between participating and non participating household was statistically insignificant. This must be a consequence of some anomaly in mango production. If accepted like this then it can be concluded that the income from the fruits was not different in participating and non participating households.

The gross income per household from farm services included sales of tube well water, hiring out of drought animals, tractors, trolleys, threshers and any other farm equipment etc. In the overall sample the income derived from the farm services was Rs 3,259 constituting 1.15% of total income per household. The income from farm services was statistically significant between treatment and control villages and between member and non member household of treatment villages. This means that the income derived from farm services in control villages was higher than in control villages but had no difference with in the treatment villages. Similarly the income from farm services was statistically different between participating and non participating households suggesting that non participating households had more means to derive income from it.

The average gross income derived from the farm production consisted of sales of farm products (gur etc), dairy products (ghee, milk, and butter), poultry products (eggs, poultry meat) and livestock products (meat, wool, hair, hides/skins). The income per household derived from the farm production in overall sample was Rs 2,115 and constitutes only 0.75% of total income. Also the income derived from the land rentals in overall sample was Rs 678 per annum which constitutes 0.24% of the total income.



**Figure 3-15: Components of Agriculture Income**



Clearly the share of crops in the income of household was significant as shown in figure 3-15 both between participating and none participating and between treatment and control villages. Therefore it was necessary to develop a proper understanding of crop income.

The crop income consisted of sales of wheat and its by product, cotton sugarcane, fodder, rice and onion. The average gross income derived from various crop, their percentage distribution and income per acre is given at table 3-46. The table indicated that the income from the sales of the sugarcane was 67.2% of the total crop income in the overall sample with 53.6% in control villages and 75.3% in the treatment villages. The difference of income between control and treatment villages was statistically significant indicating that the income of sugarcane crop was higher in the treatment villages. Similarly 78.0% and 66.7% of the total crop income was derived from the sales of the sugarcane in the member and non member household with in treatment villages which was also statistically significant. Also the difference of average gross income from sugarcane crop between participating and non participating household was significant.

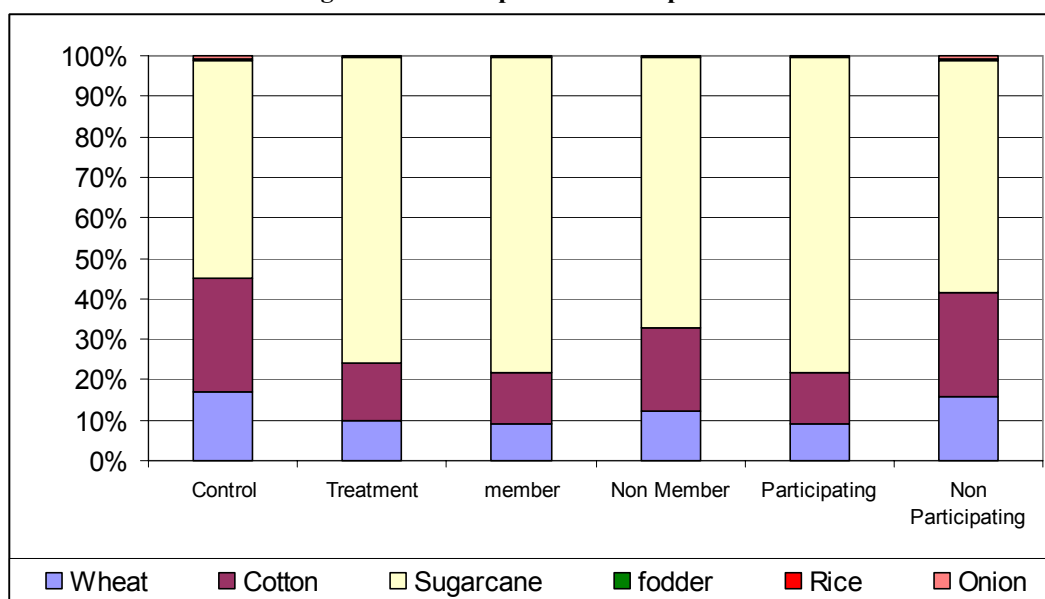
**Table 3-46: Components of Crop Income**

Agriculture Income	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Average/Household							
Wheat	38,042	31,365	25,744	29,491	31,365	34,403	33,273
Cotton	61,858	42,000	43,749	42,583	42,000	56,499	51,108
Sugarcane	118,775	264,521	141,675	223,572	264,521	125,551	177,220
Fodder	464	375	247	332	375	400	391
Rice	487	377	442	399	377	474	438
Onion	2,025	570	412	517	570	1,548	1,184
Contribution In Total (%)							
Wheat	17.2%	9.2%	12.1%	9.9%	9.2%	15.7%	12.6%

Agriculture Income	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Cotton	27.9%	12.4%	20.6%	14.3%	12.4%	25.8%	19.4%
Sugarcane	53.6%	78.0%	66.7%	75.3%	78.0%	57.4%	67.2%
Fodder	0.2%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%
Rice	0.2%	0.1%	0.2%	0.1%	0.1%	0.2%	0.2%
Onion	0.9%	0.2%	0.2%	0.2%	0.2%	0.7%	0.4%
Gross Income Per Acre							
Wheat	10,244	10,893	10,515	10,780	10,893	10,302	10,502
Cotton	18,329	19,845	19,007	19,550	19,845	18,480	18,877
Sugarcane	39,324	55,487	42,193	52,025	55,487	40,238	47,479
Fodder	611	593	325	493	593	527	549
Rice	7,474	6,994	12,831	8,409	6,994	8,448	7,921
Onion	37,261	37,800	31,840	36,012	37,800	36,768	36,949

The gross income per acre of sugarcane crop in the overall sample was Rs 47,479 with Rs 39,324 and Rs 52,025 in control and treatment villages respectively. Within the treatment villages the gross income per acre was Rs55,487 and Rs42,193 in member and non member households respectively. Similarly the income per acre in participating and non-participating household was Rs 55,487 and Rs 47,479 respectively. The difference in income per acre between control and treatment villages, members and non member household in treatment villages and between participating and non participating households was statistically significant. The other major component of agriculture crop was cotton and wheat constituting 19.4% and 2.6% of the total crop income. Remaining of the crop income was derived from other crops like fodder, onion and rice. These are shown graphically in figure 3-16.

Figure 3-16: Components of Crop Income



It was concluded that the income from sugarcane crop was higher in participating

households than in non-participating households and was a major source of earning in sample villages.

### 3.12.2 Agricultural Expenditures

The average expenditure of households on agriculture in the sample population, its components and contributions in total components are given at table 3-47.

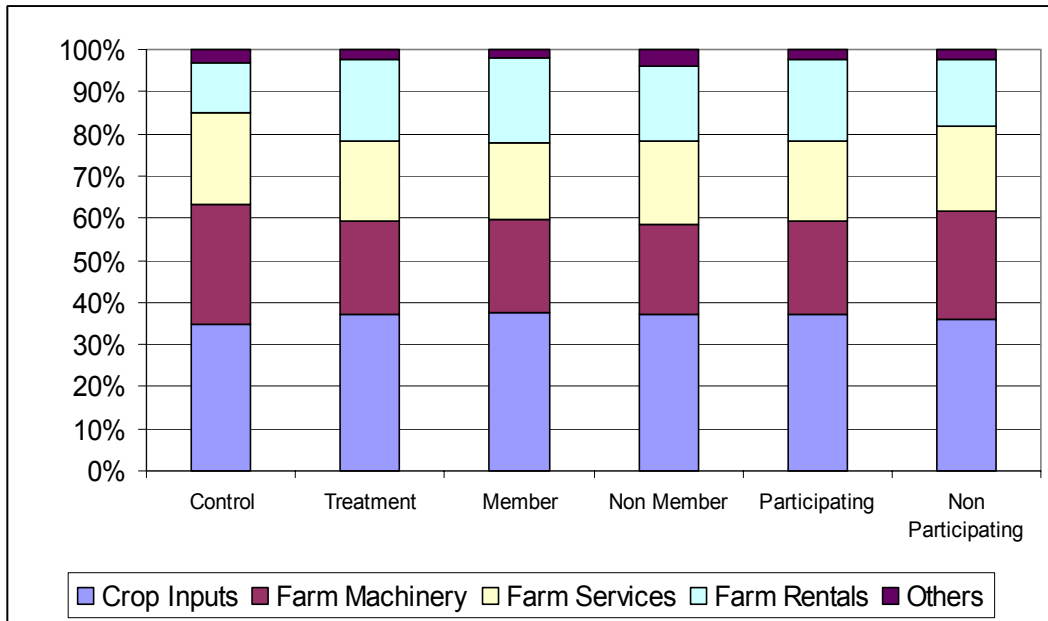
**Table 3-47: Household Gross Agriculture Expenditures**

Household Expenditures	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Expenditure/Acre	8,177	9,708	8,849	9,452	9,708	8,348	8,857
Expenditure/Household	89,856	101,591	78,881	94,021	101,591	86,608	92,179
Expenditure/Household							
Crop Inputs	31,283	37,961	29,383	35,101	37,961	30,721	33,413
Farm Machinery	25,474	22,751	16,904	20,802	22,751	22,938	22,869
Farm Services	19,727	18,569	15,806	17,648	18,569	18,567	18,568
Farm Rentals	10,601	20,371	14,155	18,299	20,371	11,653	14,894
Others	2,769	1,940	3,012	2,297	1,940	2,841	2,506
Contribution (%)							
Crop Inputs	34.81%	37.37%	37.25%	37.33%	37.37%	35.47%	36.25%
Farm Machinery	28.35%	22.39%	21.43%	22.12%	22.39%	26.49%	24.81%
Farm Services	21.95%	18.28%	20.04%	18.77%	18.28%	21.44%	20.14%
Farm Rentals	11.80%	20.05%	17.95%	19.46%	20.05%	13.45%	16.16%
Others	3.08%	1.91%	3.82%	2.44%	1.91%	3.28%	2.72%

It indicated that the expenditure made per acre in the overall sample was Rs8,857 per annum with Rs8,177 and Rs9,42 per annum in treatment and control villages and Rs9,708 and Rs8,348 in the participating and non participating household. The annual expenditure made per acre by households in treatment and control villages was statistically significant indicating that expenditure made per acre by households in treatment villages was higher. However with in the member and non member households in treatment villages the difference of expenditure was statistically insignificant. The difference of expenditures made per acre in participating and non participating household was statistically significant indicating that the expenditure patterns in both type of households was not similar or participating spends more per acre than participating household. Note that this difference was not apparent if the expenditure per household were not adjusted for their acres.

The contribution of crop inputs, farm machinery, farm services, farm rentals and other expenditures in total expenditure was 36.25%, 24.81%, 20.14%, 16.16% and 2.72% respectively in the overall sample. These are shown graphically in figure 3-17.

**Figure 3-17: Components of Agriculture Expenditures**



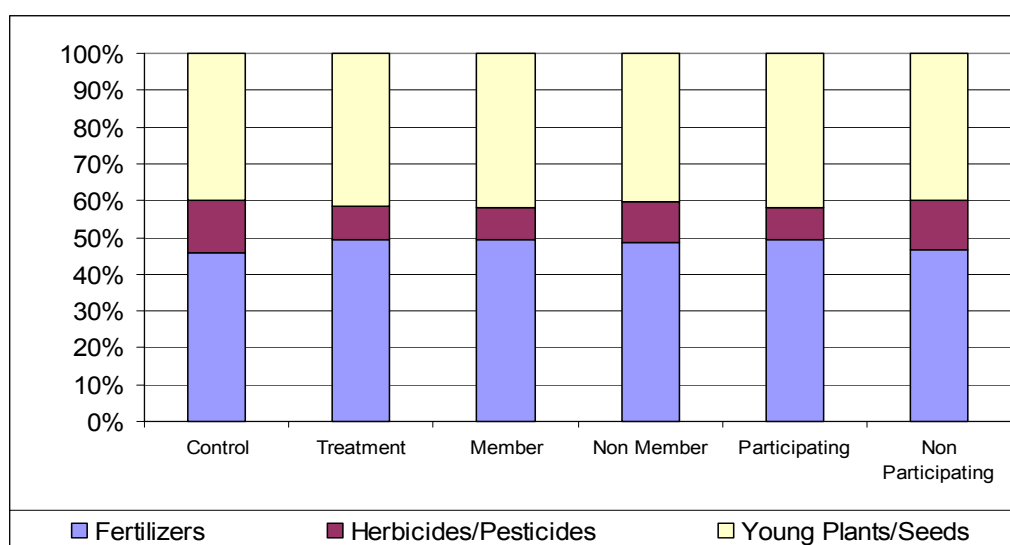
The expenditures on crops inputs included purchase of seed/young plants, fertilizers and herbicides / pesticides for different crops. The difference of average expenditure per households on inputs between control and treatment was statistically significant indicating that treatment villages spend more on inputs than control villages. However the difference of expenditures on inputs between member and non member households with in treatment villages was statistically insignificant indicating that both household spend in similar fashion. Finally the difference of expenditure on inputs between participating and non participating household was statistically significant. This was sufficient to conclude that participating spend more on inputs than non-participating households.

The components of input costs are described in table 3-48. The three main components of input cost were fertilizers, herbicides/pesticides and young plant or seeds contributing 47.8%, 11.5% and 40.7% of total input cost respectively. These are shown graphically in figure 3-18. Clearly the biggest contribution was of fertilizers and the crop that required most fertilizers was sugarcane. Similarly the next contribution in total expenditure was of young plants with highest expenditures in sugarcane again. Finally the last contributing factor was herbicides/pesticides with highest expenditures in cotton crop.

**Table 3-48: Components of Input Cost**

Components of Input Cost	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
<b>Fertilizers</b>							
Wheat	20.7%	15.5%	15.4%	15.5%	15.5%	19.1%	17.5%
Cotton	23.4%	10.2%	18.8%	12.5%	10.2%	22.0%	16.8%
Sugarcane	54.7%	73.4%	64.3%	70.9%	73.4%	57.5%	64.5%
Fodder	1.0%	0.8%	1.4%	0.9%	0.8%	1.1%	1.0%
Rice	0.2%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%
Onion	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
<b>Total On Fertilizer</b>	<b>45.8%</b>	<b>49.4%</b>	<b>48.6%</b>	<b>49.2%</b>	<b>49.4%</b>	<b>46.6%</b>	<b>47.8%</b>
<b>Herbicides/Pesticides</b>							
Wheat	22.5%	24.6%	21.2%	23.4%	24.6%	22.2%	22.9%
Cotton	67.3%	56.9%	63.6%	59.1%	56.9%	66.4%	63.3%
Sugarcane	6.8%	14.6%	11.0%	13.4%	14.6%	7.8%	10.0%
Fodder	2.7%	3.3%	3.8%	3.5%	3.3%	3.0%	3.1%
Rice	0.3%	0.5%	0.3%	0.4%	0.5%	0.3%	0.4%
Onion	0.4%	0.2%	0.1%	0.2%	0.2%	0.3%	0.3%
<b>Total Herbicides/Pesticides</b>	<b>14.5%</b>	<b>8.7%</b>	<b>11.1%</b>	<b>9.4%</b>	<b>8.7%</b>	<b>13.5%</b>	<b>11.5%</b>
<b>Young Plants/Seeds</b>							
Wheat	19.3%	11.8%	13.4%	12.2%	11.8%	17.6%	15.1%
Cotton	10.9%	5.4%	7.7%	6.0%	5.4%	10.0%	8.0%
Sugarcane	65.9%	80.7%	75.9%	79.4%	80.7%	68.7%	73.9%
Fodder	2.5%	1.6%	2.5%	1.9%	1.6%	2.5%	2.1%
Rice	0.3%	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%
Onion	1.1%	0.3%	0.3%	0.3%	0.3%	0.9%	0.6%
<b>Total Young Plants/Seeds</b>	<b>39.8%</b>	<b>41.8%</b>	<b>40.3%</b>	<b>41.4%</b>	<b>41.8%</b>	<b>39.9%</b>	<b>40.7%</b>

**Figure 3-18: Components of Input Cost**



The expenditure on farm machinery included the cost of rental, fuel, repairs and maintenance. The expenditure on farm services included cost of tube well fuel, repair and maintenance, cost on purchase of tube well water, cost on hiring of draught animals and

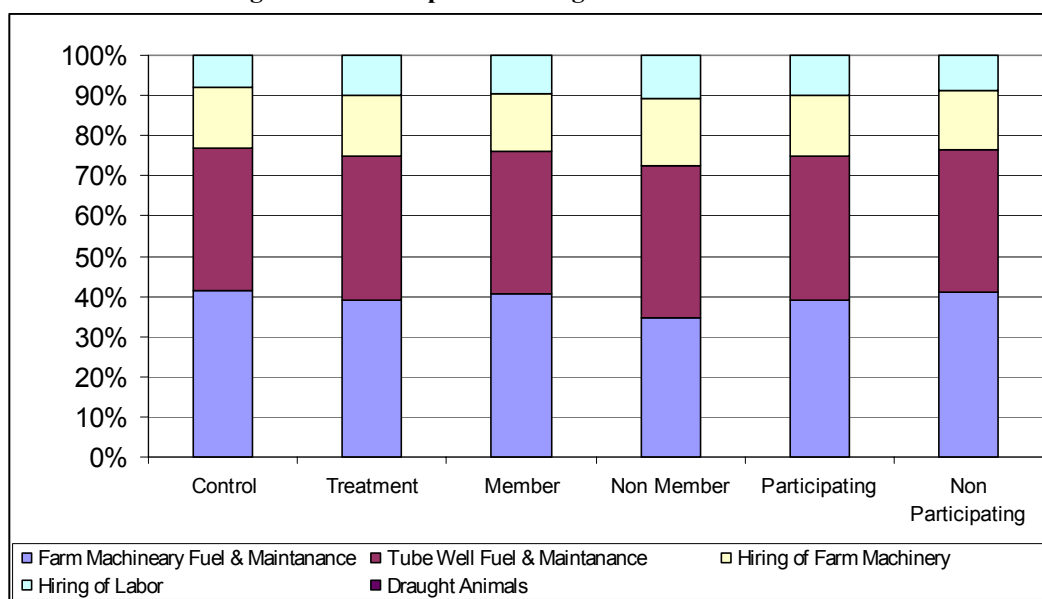
labor of all types (casual, permanent, unpaid or exchanged labor). The difference of average expenditure on services and farm machinery per household between treatment and control villages, between member and non member household in treatment villages and between participating and non participating household was statistically insignificant indicating that expenditure on services in sample population had no difference.

**Table 3-49: Components of Agriculture Services Cost**

Household Income	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Farm Machinery Fuel & Maintenance	41.42%	40.57%	34.69%	38.90%	40.57%	39.84%	40.11%
Tube Well Fuel & Maintenance	35.52%	35.50%	37.72%	36.13%	35.50%	36.03%	35.84%
Hiring of Farm Machinery	14.94%	14.49%	16.85%	15.16%	14.49%	15.39%	15.05%
Hiring of Labor	8.12%	9.41%	10.72%	9.78%	9.41%	8.73%	8.98%
Draught Animals	0.01%	0.03%	0.02%	0.03%	0.03%	0.01%	0.02%

The components of service costs are shown in table 3-49. The three main components of service costs were farm machinery fuel and maintenance, Tube well fuel and maintenance (purchase of tube well and canal water was also included) and the farm machinery contributing 43.66%, 26.89% and 113.80% of total cost on services respectively. These are shown graphically in figure 3-19. Note that the purchase of farm machinery in non-participating household was higher than in participating households but was statistically insignificant, indicating that there was no difference in the purchases of the farm machinery in the sample population.

**Figure 3-19: Components of Agriculture Services Cost**



Expenditure on land rentals included the cost incurred on renting the land from some landlord for agriculture purposes. All farmers reported the renting of land on fixed rent basis.

The difference of average expenditure per household on land rentals between treatment and control villages and between participating and non participating household was statistically significant indicating that participating household practice renting of land more than non participating households. The difference of this expenditure between member and non member household in treatment villages was however insignificant that leads to conclusion that renting of land was more common in treatment villages.

Finally, other expenditure included the cost incurred on transport of crop to market, on bags or container used for holding crops, on land improvements, on repair and maintenance of the water courses, on commissions and CESS or other direct and indirect taxes. The difference of average other expenditure per household between participating and non participating household, between control and treatment villages was statistically significant. This showed that participating households spend less for other expenditures than non participating household.

The components of other expenditures are described in table 3-50. The two main components of other expenditures were transportation and taxes contributing 49.36% and 25.32% of total other cost respectively. The difference of transportation charges between treatment and control villages and between participating and non participating household was statistically significant indicating that non participating household spent more in transportation. The difference between the taxes paid was statistically insignificant indicating that there was no difference in the payment of taxes in the sample villages.

**Table 3-50: Components of Other Expenditures**

Household Agriculture Other Expenditure	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Commission Charges	7.03%	7.44%	4.84%	6.31%	7.44%	6.35%	6.66%
Containers	1.93%	5.42%	3.29%	4.49%	5.42%	2.36%	3.24%
Crops Storage	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Land Improvement	8.19%	3.60%	5.67%	4.50%	3.60%	7.40%	6.30%
Equipment Improvement	1.83%	5.33%	6.58%	5.88%	5.33%	3.32%	3.90%
Taxes	29.74%	25.46%	15.45%	21.09%	25.46%	25.26%	25.32%
Transportation	48.98%	39.81%	62.50%	49.73%	39.81%	53.22%	49.36%
Water Course Maintenance	2.29%	12.93%	1.66%	8.00%	12.93%	2.10%	5.21%

The difference on the expenditures in the water course maintenance between treatment and control villages, between member and non member household in treatment villages and between participating and non participating households was also statistically significant. This showed that participating households gave more attention to their water courses than non participating households by spending more on it.

Further the difference on the expenditure on land improvement between treatment and control villages, between member and non member household in treatment villages and between participating and non participating households was statistically significant indicating that non participating household spent more for land improvement than participating household.

### 3.13 Households Seeking Assistance in Agriculture

The number of households seeking the help of agriculture assistance is given at table 3-51. It indicated that 58.97% of the households discussed their crops with agriculture assistance out of which 34.78% were in control villages and 78.16% were in the treatment villages. The difference in percentages was quite high that indicated that better opportunities of agriculture assistance existed in treatment villages than in control villages. Similarly in participating and non participating households 97.41% and 36.22% of households respectively discussed their crops with agriculture assistance. Again the difference in proportion was quite high indicating that participating household practiced/preferred more to seek the advice of agriculture assistants than non-participating households.

**Table 3-51: Household Seeking Assistance in Agriculture**

Agriculture Assistance	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Total Households	138	116	58	174	116	196	312
Assistance Reported	34.78%	97.41%	39.66%	78.16%	97.41%	36.22%	58.97%
Agriculture Department	89.58%	13.27%	65.22%	22.06%	13.27%	81.69%	39.67%
Extension Office/SPEP	10.42%	86.73%	34.78%	77.94%	86.73%	18.31%	60.33%

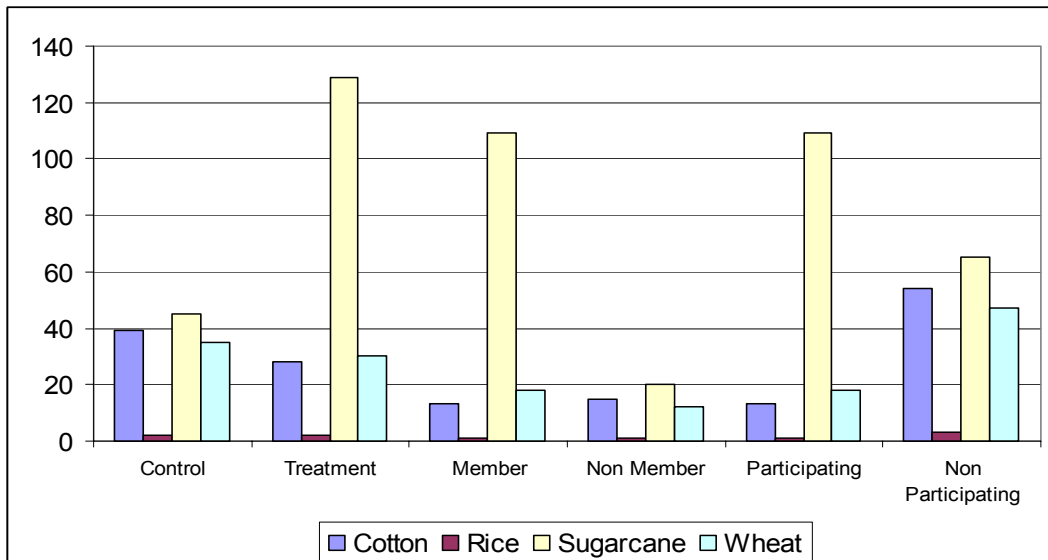
The agriculture assistance was either provided by government department or by extension offices of SPEP. In overall sample 60.33% of households reported to discuss their crop with extension offices of SPEP and 39.67% of households reported to discuss their crops with government agriculture department. Note the strong presence of government agriculture department in control villages and strong presence of extension offices in treatment villages. Some household, especially non member household in treatment villages were benefiting the presence of both departments for assistance.

The crop discussed with agriculture department is depicted at figure 3-20. Note that the crop discussed most was sugarcane, followed by cotton and then wheat. Also note that the

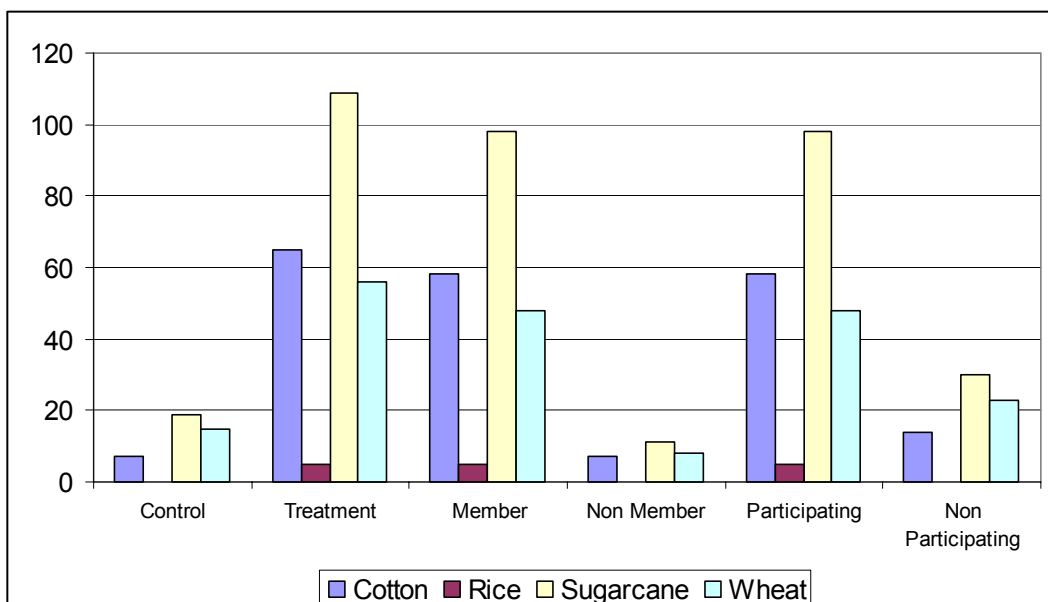


participating household was discussing sugarcane whereas non-participating household were discussing sugarcane, cotton and wheat. This indicated that important crops for which non participating household required assistance from agriculture department were sugarcane, cotton and wheat in decreasing order of importance where as it was sugarcane for the participating households.

**Figure 3-20: Crops Discussed With Agriculture Department**



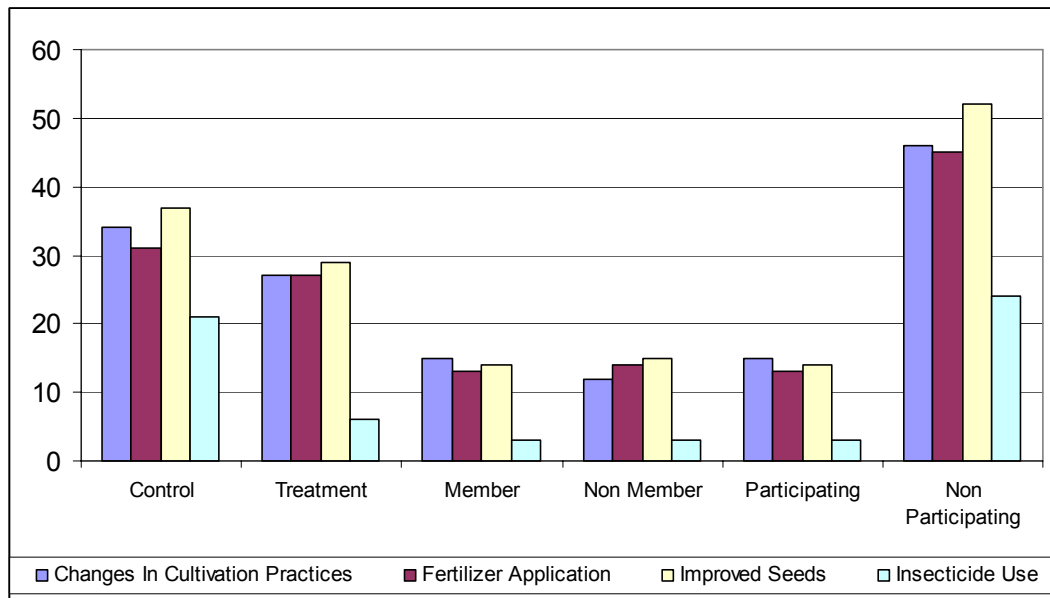
**Figure 3-21: Crops Discussed With SPEP Extension Department**



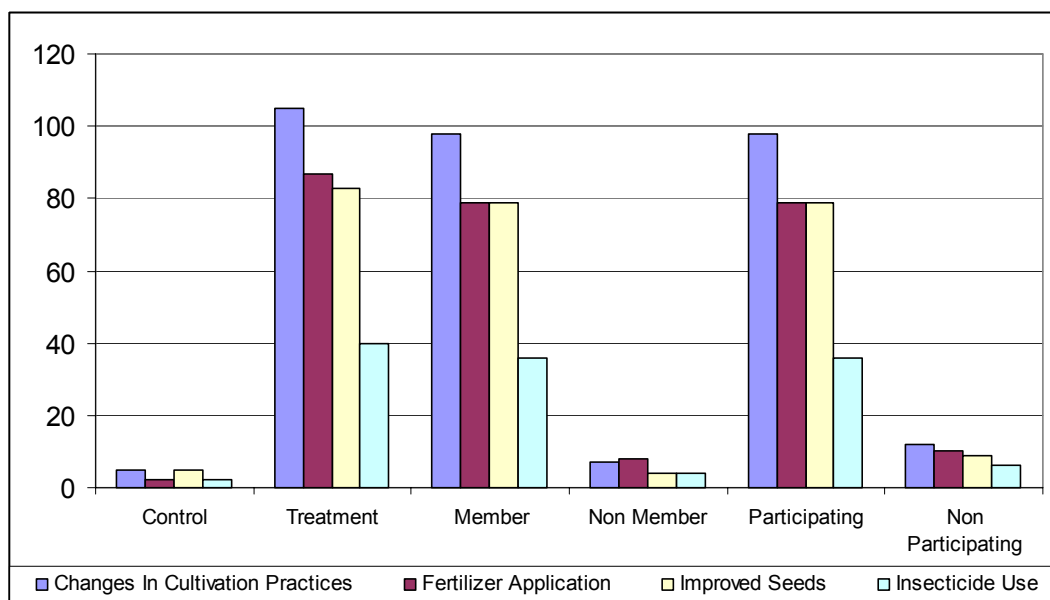
Similarly the crops discussed by with SPEP extension department are depicted in figure 3-21. Note that the crop discussed most was sugarcane, followed by cotton and wheat. Also note that the participating households were discussing sugarcane, cotton and wheat whereas non-participating households were discussing only sugarcane and wheat. This

indicated that important crops for which participating household required assistance from SPEP extension department were sugarcane, cotton and wheat in decreasing order of importance where as it was sugarcane and wheat for the non-participating households.

**Figure 3-22: Recommendations Given by Agriculture Department**



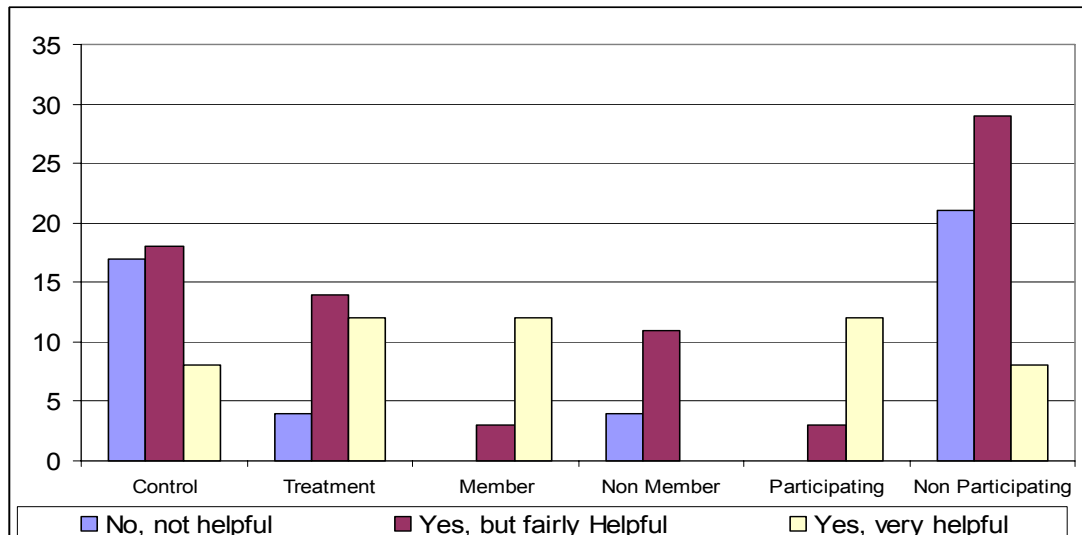
**Figure 3-23: Recommendations Given by SPEP Department**



The recommendations of the Agriculture Department and SPEP department are shown in figures 3-22 and 3-23. Note that to both the participating and non-participating households the recommendations of the Agriculture Department were improved seed, fertilizer application and changes in cultivation practices and pesticide use in decreasing order of

proportions. The recommendations of SPEP department to both participating and non-participating households were changes in cultivation practices, fertilizer application, improved seeds and insecticide use again in decreasing order of proportions. The important difference between the recommendations of the two departments was that agriculture department emphasized improved seeds and the SPEP department emphasized changes in cultivation practices.

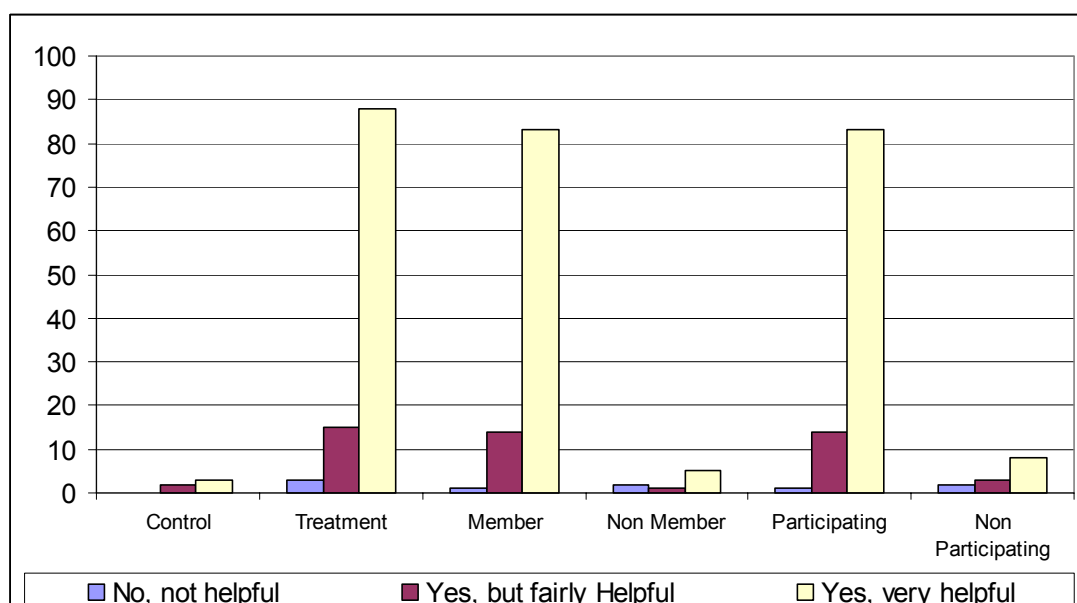
**Figure 3-24: Usefulness of Agriculture Assistance As perceived by Households**



The usefulness of recommendations as perceived by the respondents advised by agriculture department is given in figure 3-24. The majority of non-participating household considered the recommendations of agriculture department as fairly helpful and least number of households considered these as very helpful. Rest all did not considered these recommendations as helpful. Similarly majority of participating households considered the recommendation of agriculture department as very helpful and the least number of household considered these recommendations as fairly helpful. However, none of the participating household had considered these recommendations as not helpful.

Similarly the usefulness of recommendations as perceived by the respondents advised by SPEP extension department is given in figure 3-25. The majority of participating household considered these recommendations as very helpful and least number of households considered these as not very helpful. Rest all considered these recommendations as fairly helpful. Similarly majority of participating households considered the recommendation of SPEP department as very helpful and the least number of household considered these recommendations as not very helpful. Remaining all respondents considered these recommendations as fairly helpful. This showed that a large number of household in sample population consider these recommendations as effective and useful in farming practices.

**Figure 3-25: Usefulness of SPEP Assistance As perceived by Households**



### 3.14 Household Income

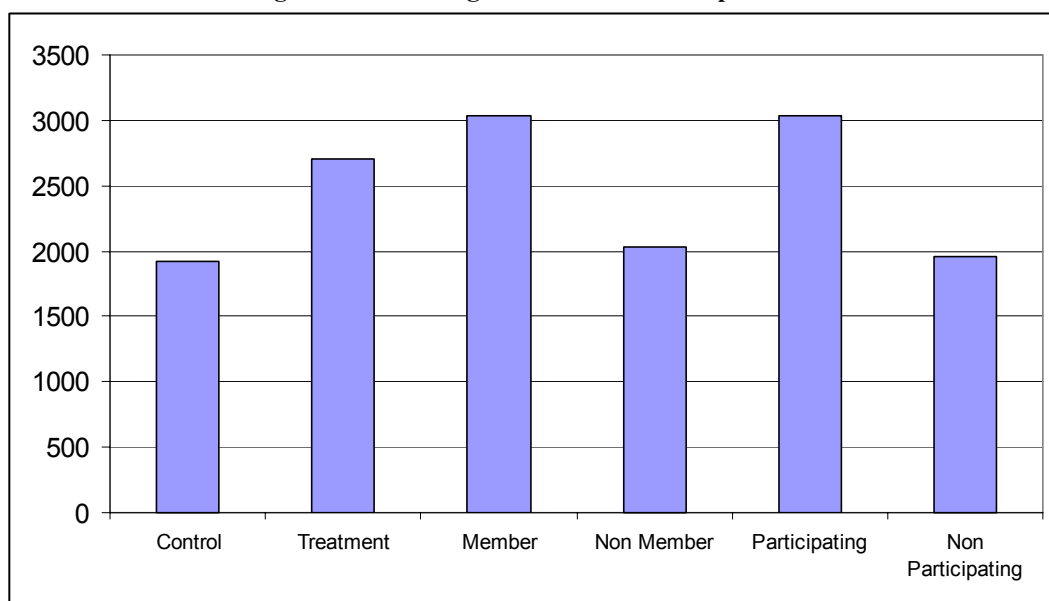
The average household income is given in table 3-52. The monthly per capita income of sample household was 2,365 with Rs1, 921 and Rs 2, 700 in control and treatment villages, respectively. The monthly per capita income of for member and non-member households within treatment villages was Rs 3,037 and Rs 2,027 respectively. The monthly per capita income for participating and non-participating household was Rs 3,037 and Rs 1,954 respectively. The sample region showed a higher monthly per capita income.

**Table 3-52: Household Income**

Household Income	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Income / HH	163,885	272,107	181,989	242,068	272,107	169,242	207,487
Income / Capita	23,054	36,449	24,321	32,400	36,449	23,443	28,381
Monthly per Capita	1,921	3,037	2,027	2,700	3,037	1,954	2,365
Monthly Per Capita Groups (%)							
0-Up to Rs 439	7.25%	2.59%	5.17%	3.45%	2.59%	6.63%	5.13%
1-Rs 439-659	7.25%	4.31%	1.72%	3.45%	4.31%	5.61%	5.13%
2-Rs 659-879	7.25%	2.59%	10.34%	5.17%	2.59%	8.16%	6.09%
3-Rs 879-1098	5.07%	6.90%	15.52%	9.77%	6.90%	8.16%	7.69%
4-Rs 1098-1757	26.09%	12.07%	15.52%	13.22%	12.07%	22.96%	18.91%
5-Rs 1757 or Over	47.10%	71.55%	51.72%	64.94%	71.55%	48.47%	57.05%
Income Sources (%)							
Agriculture	91.78%	93.10%	90.67%	92.49%	93.10%	91.43%	92.24%
Business	4.28%	3.61%	5.04%	3.97%	3.61%	4.52%	4.08%
Jobs	1.06%	2.21%	3.92%	2.64%	2.21%	1.97%	2.09%
Remittance	0.31%	0.62%	0.00%	0.46%	0.62%	0.21%	0.41%
Others	2.57%	0.46%	0.38%	0.44%	0.46%	1.87%	1.18%

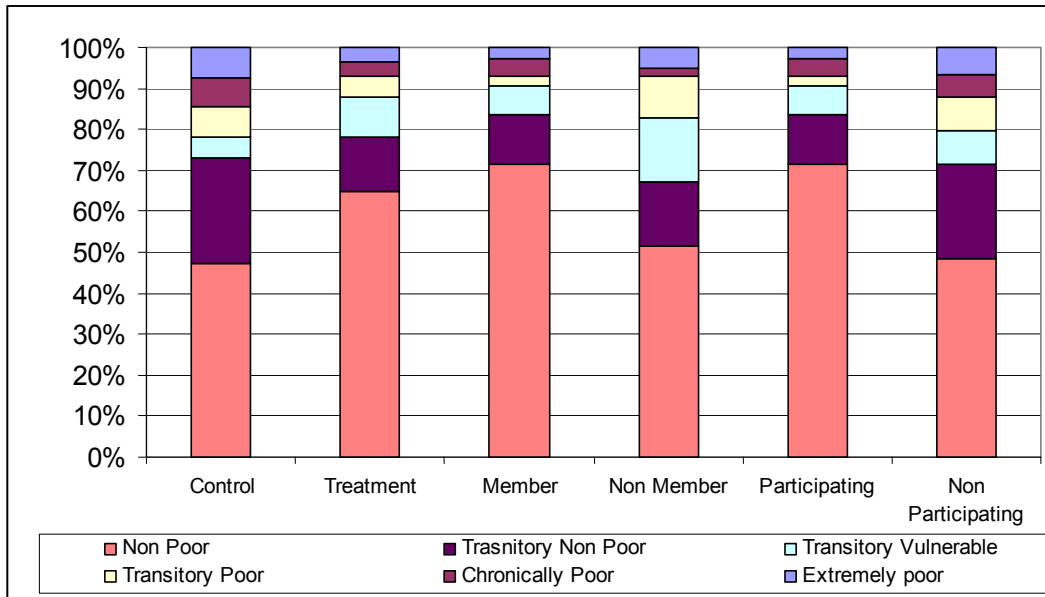
The mean difference in monthly per capita income between treatment and control villages was statistically significant, indicating that the treatment villages had a higher income. The mean difference in monthly per capita income between member and non-member household of treatment villages was also statistically significant, which reflects that member households had a higher income. The monthly per capita income in participating and non-participating households was statistically significant. From this it was concluded that the monthly per capita income of the participating households was higher, resulting in a higher cumulative household income than the non-participating households. These differences were also evident from the average income per household which are shown graphically in figure 3-26.

**Figure 3-26: Average Household Income per Year**



The income groups (monthly per capita) were defined using the poverty bands. If the monthly per capita income of the household was less than Rs439 then it was categorized as extremely poor household, if the monthly per capita income of household was between Rs 440 to Rs 659 then the household was chronically poor, the monthly per capita income of transitory poor household was between Rs 659-879, of transitory vulnerable was between Rs 879-1,098, of transitory non-poor was between Rs1,098-1,757 and finally the monthly per capita income of non-poor households was above Rs 1,757.

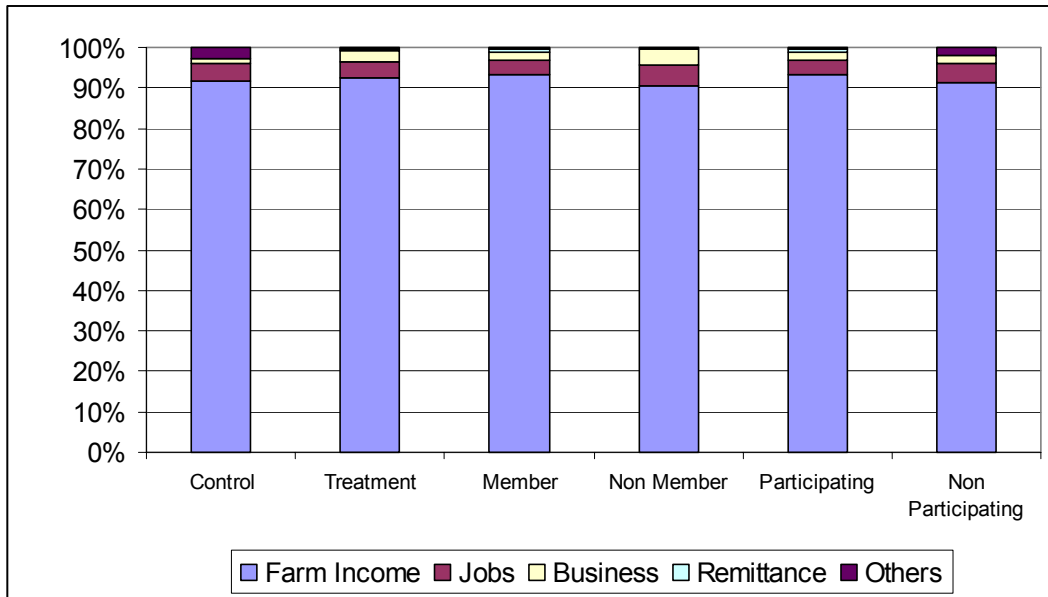
**Figure 3-27: Household Distribution According to Monthly per Capita Income**



For participating households the 'poverty band' percentages were extremely poor (2.59%), chronically poor (4.31%), transitory poor (2.59%), transitory vulnerable (6.90%), transitory non-poor (12.07%) and non-poor (71.55%). These percentages for non-participating households were 6.63%, 5.61%, 8.16%, 8.16%, 22.96%, and 48.47% respectively. Figure 3-25 reflects these figures graphically. It is concluded that majority of participating households were non-poor and fewer were either chronically or transitorily poor which reflects the financial stability of participating households.

Figure 3-28 shows the sources of household income. The biggest source of income in overall sample was farm income, which contributed 92.24%. This was followed by income from business, jobs and remittances with a share of 3.81%, 2.09% and 0.38%, respectively. The other sources included income received from social safety nets and interest on saving or other accounts, gifts (other than remittance) and transfer etc. Its contribution in total income accounts for 1.18% in the overall sample. Since this pattern of contribution was more or less same in participating and non-participating households, it is concluded that the households in overall sample were mainly dependent on agriculture for their income.

**Figure 3-28: Sources of Household Income**



### **3.15 Household Expenditures**

The average household expenditure per annum, shown in table 3-53, for the overall sample was Rs. 88,969, with Rs 92,413 and Rs 86,931 respectively in participating and non-participating households. The mean difference between participating and non participating households was statistically insignificant reflecting almost a similar expenditure patterns. The difference of household expenditure between households in treatment and control villages was also statistically insignificant. It can be inferred from these findings that the expenditure per household was same in whole population.

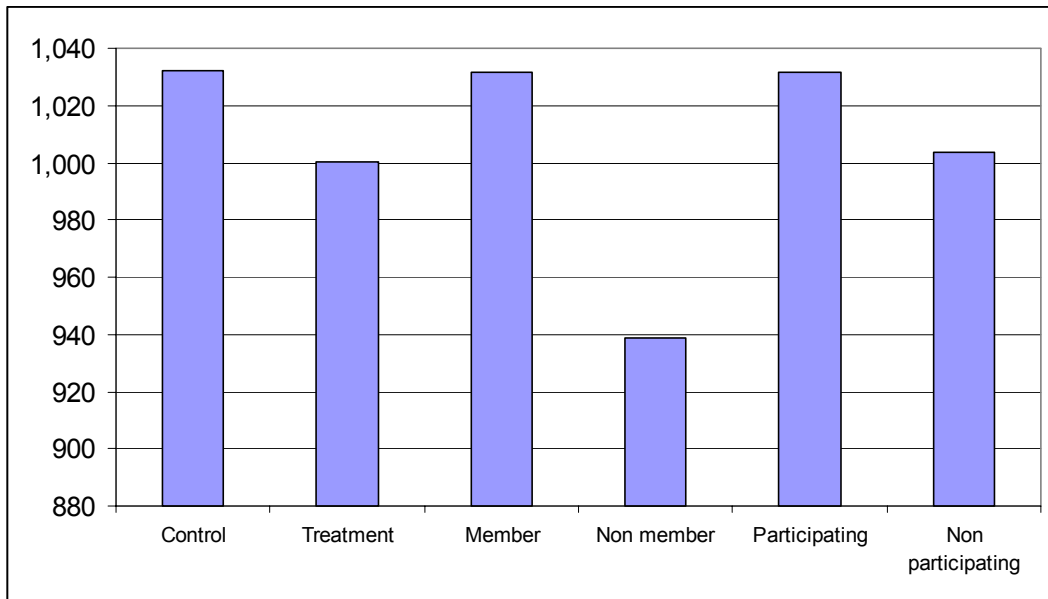
**Table 3.53: Household Expenditures**

Household Expenditures	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Expenditure / Household	88,048	92,413	84,274	89,700	92,413	86,931	88,969
Expenditure / Capita	12,386	12,379	11,262	12,006	12,379	12,041	12,169
Monthly per Capita	1,032	1,032	939	1,000	1,032	1,003	1,014
Expenditure Sources (%)							
Food	47.5%	47.3%	49.4%	48.0%	47.3%	48.1%	47.8%
Clothing	11.4%	12.0%	10.8%	11.6%	12.0%	11.2%	11.5%
Housing	8.5%	8.6%	8.9%	8.7%	8.6%	8.6%	8.6%
Education	6.9%	6.4%	7.7%	6.8%	6.4%	7.2%	6.9%
Transportation	6.2%	6.5%	4.7%	5.9%	6.5%	5.8%	6.1%
Dowries	5.3%	4.4%	3.9%	4.2%	4.4%	4.9%	4.7%
Social Events	4.4%	4.5%	3.7%	4.3%	4.5%	4.2%	4.3%
Health Care	3.2%	3.5%	4.3%	3.8%	3.5%	3.5%	3.5%
Household Equipments	2.3%	2.2%	2.2%	2.2%	2.2%	2.3%	2.2%
Household Consumables	1.2%	1.5%	1.7%	1.6%	1.5%	1.3%	1.4%
Mobiles Cards / Bills	1.1%	1.2%	1.1%	1.2%	1.2%	1.1%	1.1%
Tax & Legal Expenses	0.4%	0.4%	0.1%	0.3%	0.4%	0.3%	0.3%
Cigarette / Other Tobacco	0.1%	0.1%	0.3%	0.2%	0.1%	0.2%	0.2%
Sundry Expenditures	1.4%	1.4%	1.2%	1.3%	1.4%	1.3%	1.4%

The average household expenditure per year was then adjusted for the differences in the size of the household to calculate the average monthly per capita expenditure. The monthly per capita expenditures for the overall sample was Rs 1,014 and no significant difference was observed between participating and non participating households and between control and treatment villages. The monthly per capita expenditures are presented graphically in figure 3-27.

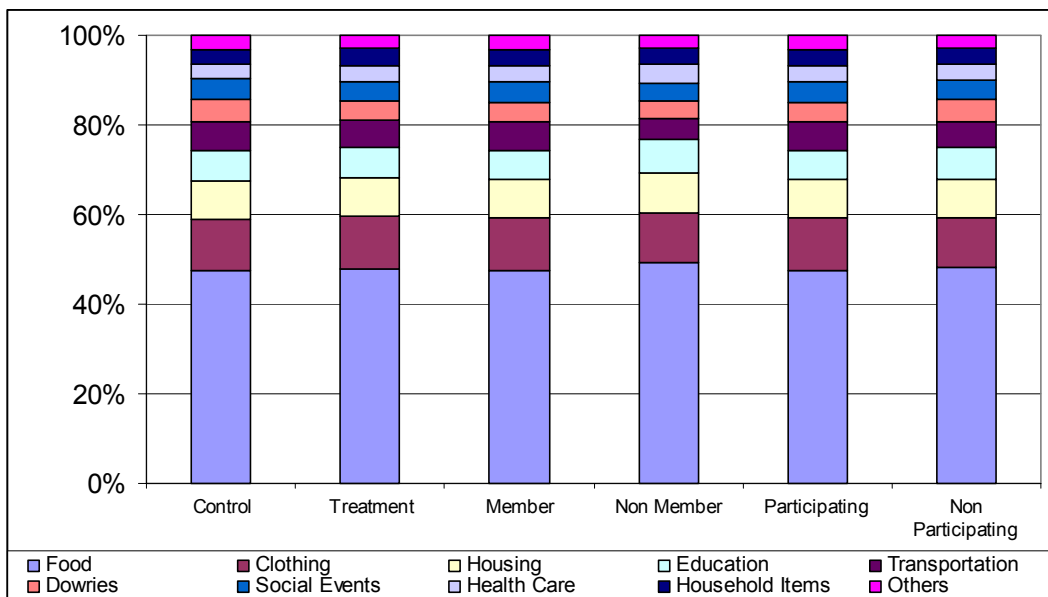


**Figure 3-29: Monthly Per Capita Expenditure**



The main sources of household expenditure are shown in figure 3-30. Food consumed the largest share of expenditure in overall sample i.e. 47.8%. This was followed by the expenditures on clothing/footwear and housing (utility bills and fuel) with a contribution of 11.5% & 8.6%, respectively in total expenditure. The share of education, transportation, dowries and social events was 6.9%, 6.1%, 4.7% and 4.3% respectively. Derived by statistical estimation and based on the monthly data collected, the health expenditure accounted for 3.5% in total household expenditures. The expenditures on household equipment and consumables were 2.5%. These are shown graphically at figure 3-30.

**Figure 3-30: Sources of Household Expenditure**



It is worth noting that expenditures on mobiles phones were almost equal to the expenditures on household consumables, although higher than expenditures incurred on cigarettes. The household taxes and legal expenses were the lowest. A striking similarity was noted in the expenditure percentages which were because of the insignificant mean differences in expenditures.

### 3.16 Household Assets

Table 3-54 reflects the average value of assets per household. In overall sample this average value was Rs 2,048,101 with Rs 2,126,653 in the control villages and Rs 1,985,800 in treatment villages. The average value of assets per household in member and non member household of treatment villages was Rs 2,074,056 and Rs 1,809,289 respectively, and for participating and non participating household was Rs 2,074,056 and Rs2,032,739 respectively. The value of assets for control villages or non-participating household was slightly higher but was not statistically significant.

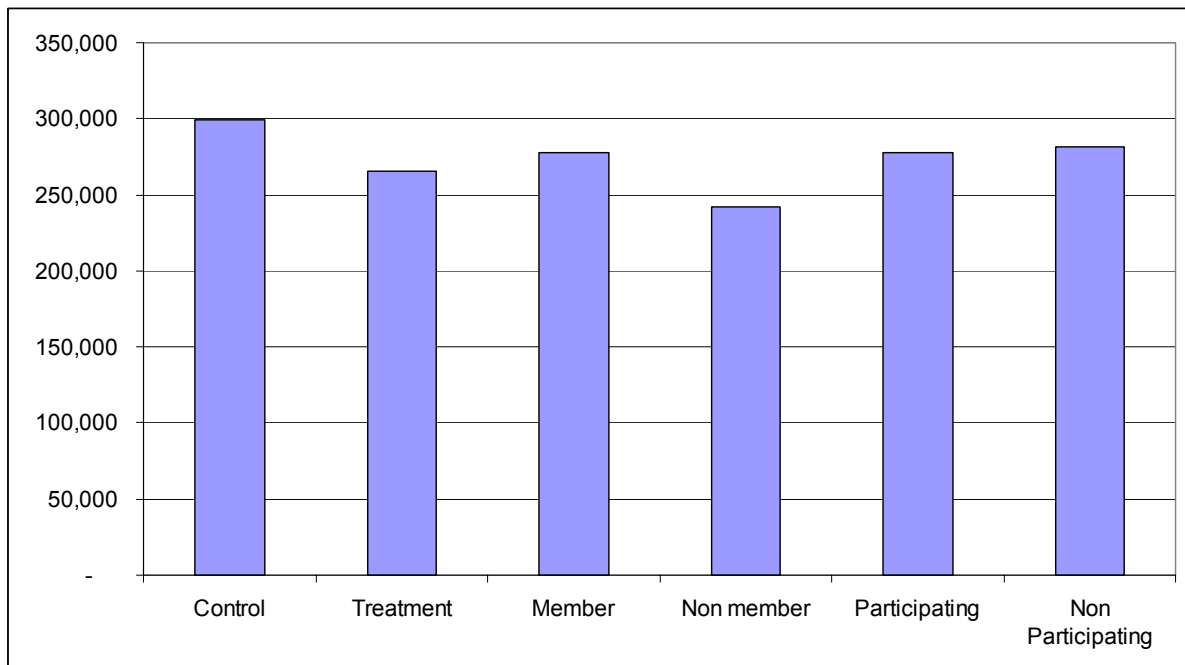
**Table 3-54: Household Assets**

Household Income	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
No Of Households	138	116	58	174	116	196	312
No Of Members	981	866	434	1300	866	1415	2281
Total Value	293,478,175	240,590,522	104,938,750	345,529,272	240,590,522	398,416,925	639,007,447
Value / HH	2,126,653	2,074,056	1,809,289	1,985,800	2,074,056	2,032,739	2,048,101
Value / Capita	299,162	277,818	241,794	265,792	277,818	281,567	280,144
<b>Assets Sources (%)</b>							
Agriculture Land	73.98%	75.11%	73.99%	74.77%	75.11%	73.98%	74.41%
Livestock	5.49%	5.80%	5.19%	5.61%	5.80%	5.41%	5.56%
Agriculture Equipments	6.96%	7.17%	5.45%	6.65%	7.17%	6.56%	6.79%
Trees	0.40%	0.29%	1.13%	0.55%	0.29%	0.60%	0.48%
Dwelling	7.92%	6.57%	7.82%	6.95%	6.57%	7.89%	7.39%
Consumer Durables	5.01%	4.80%	5.39%	4.98%	4.80%	5.11%	4.99%
Business	0.14%	0.12%	0.97%	0.38%	0.12%	0.36%	0.27%
Property	0.03%	0.08%	0.00%	0.06%	0.08%	0.03%	0.05%
Investments	0.07%	0.06%	0.06%	0.06%	0.06%	0.07%	0.06%
<b>Value of Assets</b>							
Purchased / Household	14,247	14,023	6,123	11,390	14,023	11,843	12,653
Sold / Household	278	23	24	23	23	203	136

The average value of assets was then adjusted for the differences in the size of the household to calculate the average per capita assets value. The average per capita value of assets in over all samples was Rs 280,144 with Rs 299,162 and Rs 265,792 in control and treatment villages and was 277,818 and Rs 281,567 respectively. However, the mean difference of assets per capita was statistically insignificant between treatment and control

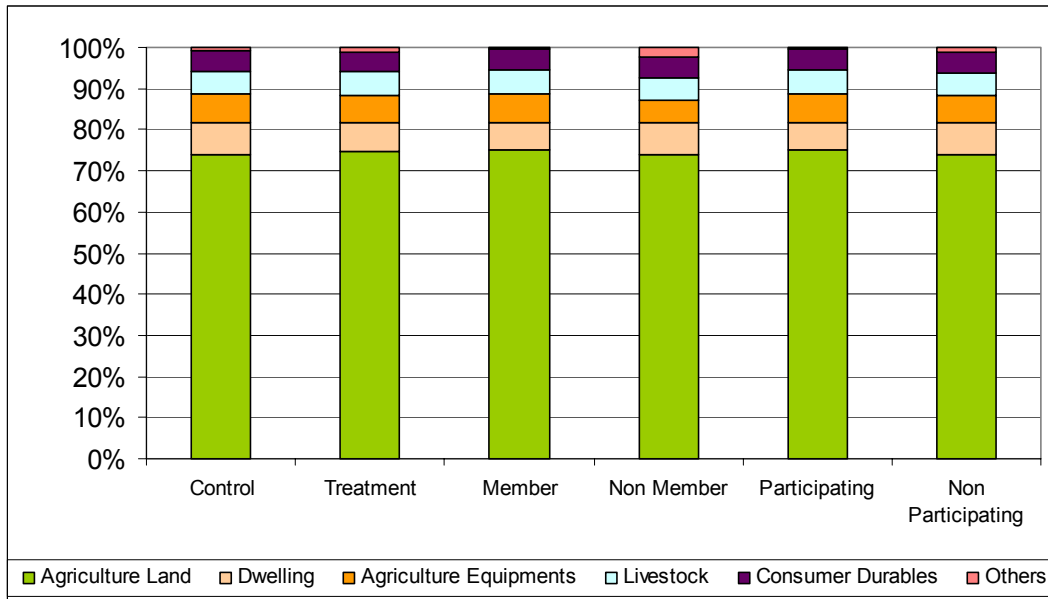
villages and between participating and non participating household. It can be attributed to approximately same average family size. The average per capita value of assets is shown at figure 3-31.

**Figure 3-31: Average per Capita Value of Assets**



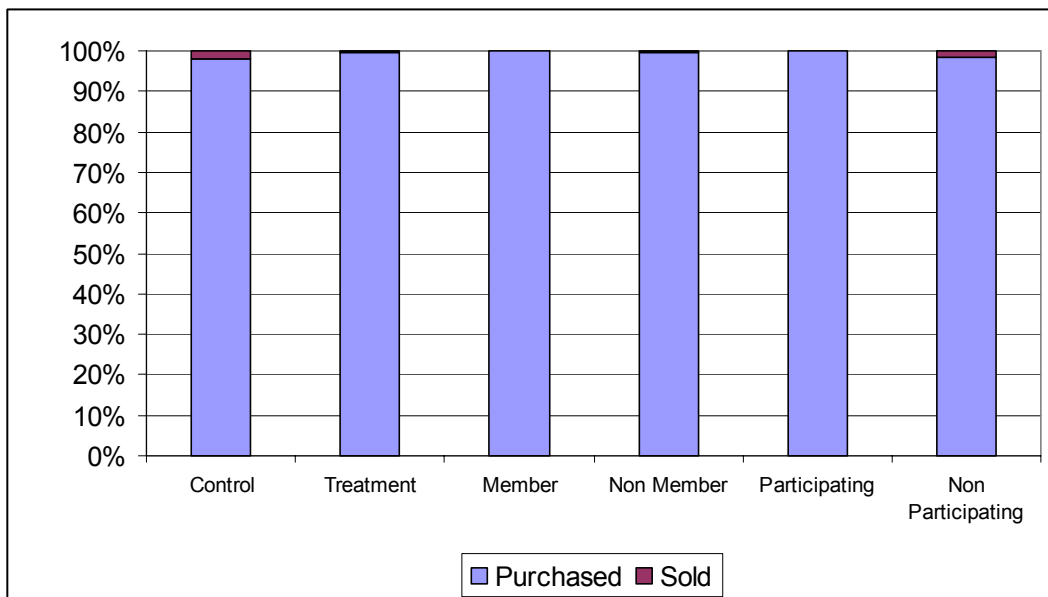
The components that constitute the value of assets are shown in figure 3-32. The four most valuable assets were agriculture land, dwelling, agriculture equipment, consumer durables and livestock accounting for 74.41%, 7.39%, 6.79% and 5.56% respectively in total assets.

**Figure 3-32: Components of Household Assets**



The trends of the sales and purchase of asset indicated that household in sample region were actively involved in it but with one very important difference; non participating household were making asset on credit money whereas the participating household were making assets from their earnings. The sales and purchase of assets is shown graphically in figure 3-33.

**Figure 3-33: Value of Assets Purchased/Sold Per Household**



### 3.17 Household Credit

The numbers of households which had taken credit, credit availed per household, credit to income ratio and percentage distribution of credit sources are summarized in table 3-55. Nearly 61% of the household in the sample population were reported to take credit with 39.1% in control and 77.6% in treatment villages. The percentage between member and non member household with in treatment villages was 97.4% and 37.9% and between participating and non participating household was 97.4% and 38.8%, respectively. Clearly the participating households were in practice of taking more credit.

**Table 3-55: Household Credit in 2005-06**

Household Income	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Household taking Credit (%)	39.1%	97.4%	37.9%	77.6%	97.4%	38.8%	60.6%
Credit / Household	46,978	33,836	22,328	30,000	33,836	39,684	37,510
Credit to Income Ratio (%)	28.7%	12.4%	12.3%	12.4%	12.4%	23.4%	18.1%
Credit Source (%)							
Agriculture Bank	87.31%	30.55%	56.91%	37.09%	30.55%	82.24%	64.91%
Commercial Bank	9.56%	0.00%	16.22%	4.02%	0.00%	10.67%	7.09%
Commission Agent	0.00%	0.00%	14.29%	3.54%	0.00%	2.38%	1.58%
Input Supplier	1.23%	0.00%	1.93%	0.48%	0.00%	1.35%	0.90%
JDW Sugar Mill	0.32%	0.15%	0.00%	0.11%	0.15%	0.27%	0.23%
Money Lender	0.72%	0.00%	4.25%	1.05%	0.00%	1.31%	0.87%
NRSP/SPEP	0.00%	69.30%	0.00%	52.11%	69.30%	0.00%	23.24%
Relative/Friend	0.85%	0.00%	5.25%	1.30%	0.00%	1.58%	1.05%

The average size of credit taken per household in overall sample was Rs 37,510 with Rs 46,978 and Rs 30,000 in control and treatment villages, respectively. The average size of loans taken by participating and non participating household was Rs 33,836 and Rs 39,684 respectively. It can be noted that the higher percentages of participating households took credits of smaller sizes whereas smaller percentages of non participating households took credit of larger size. This resulted in higher contribution of credits in the net income of non participating households and smaller contribution of credits in the net income of participating households. In the overall sample the credit amount taken was equivalent to 18.1% of the household income. This was higher for non participating households than participating household.

The most important source of loans for sample population was agriculture bank that accounted for 64.91% of total loan, with 30.5% and 82.24% in participating and non participating households respectively. The NRSP/SPEP has been the next important source

of credit in the overall sample which contributed for 23.2% of total loans with 69.30% in participating households. The higher contribution of Agriculture banks is attributed to the larger amounts of loan given to households in control villages and in non member in treatment villages. NRSP/SPEP provided timely but smaller amounts of loan.

Table 3-56 reflects the various uses of the availed credit and suggests that in overall sample 89.05% of the household reported to use credit for farm inputs, 1.99% for other agriculture cost, 1.00% for purchase of agriculture land, 4.98% for purchase of agriculture machinery, 0.50% for purchase of livestock and 2.49% used credit for purchase/improvement of land/building or equipment.

**Table 3-56: Use/Purpose of Loan**

Household Credit Purpose	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Credit Purpose							
Farm Inputs	76.79%	95.04%	87.50%	93.79%	95.04%	80.00%	89.05%
Other Agriculture Cost	0.00%	1.65%	8.33%	2.76%	1.65%	2.50%	1.99%
Purchase of Agriculture Land	0.00%	1.65%	0.00%	1.38%	1.65%	0.00%	1.00%
Purchase of Agriculture Machinery	14.29%	0.83%	4.17%	1.38%	0.83%	11.25%	4.98%
Purchase of Livestock	0.00%	0.83%	0.00%	0.69%	0.83%	0.00%	0.50%
Purchase / Improvement of Land / Building / Equipment	8.93%	0.00%	0.00%	0.00%	0.00%	6.25%	2.49%

The important purposes for taking credits in non participating household were farm inputs (80%), purchase of agriculture machinery (11.25) and purchase/improvement of land/building/equipment (6.25%). The participating households used credit for farm inputs (95.04%), other agriculture cost (1.65%), purchase of agriculture land (1.65%), purchase of agriculture machinery (0.83%) and purchase of livestock (0.83%).

The numbers of households in debt, debt per household, debt to asset ratio and percentage distribution of debt to sources are summarized in table 3-57. Nearly 58.65% of the household in the sample were in debt with 37.68% in control and 75.29% in treatment villages. This percentage between member and non member household was 94.83% and 36.21% and between participating and non participating household was 94.83% and 37.24% respectively.

**Table 3-57: Household Current Debt**

Household Income	Control Villages	Treatment Villages			All Villages		
		Member	Non Member	Total	Member	Non Member	Total
Household in Debt (%)	37.68%	94.83%	36.21%	75.29%	94.83%	37.24%	58.65%
Debt / Household	40,638	29,483	14,517	24,494	29,483	32,908	31,635
Debt to Asset Ratio	1.9%	1.4%	0.8%	1.2%	1.4%	1.6%	1.5%
Debt to Source (%)							
Agriculture Bank	85.77%	22.78%	57.84%	61.69%	22.78%	82.12%	61.56%
Commercial Bank	11.06%	0.00%	1.43%	6.42%	0.00%	9.80%	6.40%
Commission Agent	0.00%	0.00%	21.97%	1.88%	0.00%	2.87%	1.87%
Input Supplier	1.43%	0.00%	2.97%	1.07%	0.00%	1.63%	1.06%
JDW Sugar Mill	0.37%	0.18%	0.00%	0.27%	0.18%	0.33%	0.27%
Money Lender	0.39%	0.00%	8.31%	0.75%	0.00%	1.43%	0.93%
NRSP/SPEP	0.00%	77.05%	0.00%	26.72%	77.05%	0.00%	26.70%
Relative/Friend	0.98%	0.00%	7.48%	1.20%	0.00%	1.83%	1.20%

The current debt per household in the overall sample was Rs 31,635 with Rs 40,638 and Rs 24,494 in treatment and control villages. Similarly the average debt amount between participating and non-participating households was Rs 29,483 and Rs 32, 908. The debt to asset ratio was nearly 1.5% , which was quite small.

The control village household owed 85.77% of the total debt to agriculture bank, 11.06% to commercial banks, 1.43% to input supplier, 0.37% to JDW mills, 0.39% to money lender and 0.98% to relative/friends. The member households of treatment village owed 22.78% of their total credit to the Agriculture Bank and 77.05% to NRSP. The same ratio prevails in participating and non-participating households.

### 3.18 SPEP Impact Analysis

To determine the impact of the SPEP programs on the living standards of the participating households the regression analysis was applied using the following model<sup>3</sup>.

$$Y_{ij} = \alpha X_{ij} + \beta V_j + \gamma M_{ij} + \delta COMM_{ij} + \mu_{ij}$$

$Y_{ij}$  is the outcome variable for impact measurement,  $X_{ij}$  is the vector of household characteristics,  $V_j$  is the vector of village characteristics,  $M_{ij}$  is the membership dummy variable and is 1 if household self selects into program otherwise 0,  $COMM_{ij}$  is the number of months that the treatment members have been in the CO and  $\mu_{ij}$  is the random variation in the model.

<sup>3</sup> Adopted from Mehmood Hassan Khan's *Methods of Assessment of Rural Poverty, Projects and Programme Impact: A Handbook for Practitioners in Rural Support Programmes*.

For the above model the dependents variables  $Y_{ij}$  used were; household income, household farm income, household sugarcane income, household expenditures, household assets, household consumer durables and household savings. The  $X_{ij}$  independent or household characteristics used were; age of respondent, number of adults at home, literacy of respondent i.e. respondent was literate or not, operational land of household, cost of inputs and number of fruit trees household possesses. The village fixed effects  $V_j$  used were; presence of main *mandi* in village, presence of metalled road in village, more than 75% of village was having electricity, number of tube wells in village and more than 25% of water courses in villages were brick-lined. Many other village fixed effects were also used initially like presence of telephone service, distance of sugarcane or floor mill from village, presence of BHU, RHU, or government hospital or its distance and no of primary, middle and secondary schools in village, but these were redundant and therefore were dropped from model at latter stages. Treatment members were used for membership dummy variable  $M_{ij}$  and number of months of CO membership in treatment villages was used for impact measurement. Using these variables the ordinary least square (OLS) regression was applied and the results are summarized in table 3-58.

The regression estimates showed that the coefficient for the number of months of CO membership in the treatment villages was positive and statistically significant for household income, household farm income, household income from sugarcane and for household expenditures. It was also positive but statistically insignificant for household assets, consumer durables and savings.

**Table 3-58: Economic Impact of SPEP on Member Household**

	Respondent Age	Adults In Household	Respondent Literate	Operational Land	Fruit Trees NO	Farm Inputs	Treatment Members	Months In CO
(ln) Household Income	0.1159	0.0585	2.1838	0.1465	0.6359	0.0000	0.7932	0.0039
P-Value	(0.000)**	(0.032)*	(0.000)**	(0.000)**	(0.032)*	(0.000)**	(0.011)*	(0.042)*
(ln) Farm Income	0.1153	0.0479	2.0958	0.1516	0.6144	0.0000	0.8452	0.0057
P-Value	(0.000)**	(0.047)*	(0.000)**	(0.000)**	(0.037)*	(0.000)**	(0.046)*	(0.025)*
(ln) Sugarcane Income	0.1112	0.0333	2.0177	0.1387	0.3364	0.0000	1.1276	0.0078
P-Value	(0.000)**	(0.543)	(0.000)**	(0.000)**	(0.259)	(0.000)**	(0.026)*	(0.003)**
(ln) Household Expenditures	0.1181	0.0771	2.0587	0.1347	0.3617	0.0000	0.5577	0.0011
P-Value	(0.000)**	(0.013)*	(0.000)**	(0.000)**	(0.200)	(0.005)**	(0.243)	(0.048)*
Household Assets	0.1520	0.0463	2.6268	0.1763	0.5749	0.0000	0.7091	0.0002
P-Value	(0.000)**	(0.049)*	(0.000)**	(0.000)**	(0.018)*	(0.001)**	(0.051)	(0.298)
(ln) Consumer Durables	0.1070	0.0575	2.4689	0.1208	0.5692	0.0000	0.2993	0.0027
P-Value	(0.000)**	(0.013)*	(0.000)**	(0.000)**	(0.051)	(0.000)**	(0.542)	(0.065)
(ln) Savings	0.0018	0.0456	-0.1503	-0.0088	1.0941	0.0000	8.1826	0.0066
P-Value	(0.843)	(0.399)	(0.564)	(0.740)	(0.000)**	(0.833)	(0.000)**	(0.679)

\* means significant at 95% confidence and \*\* means significant at 99% confidence



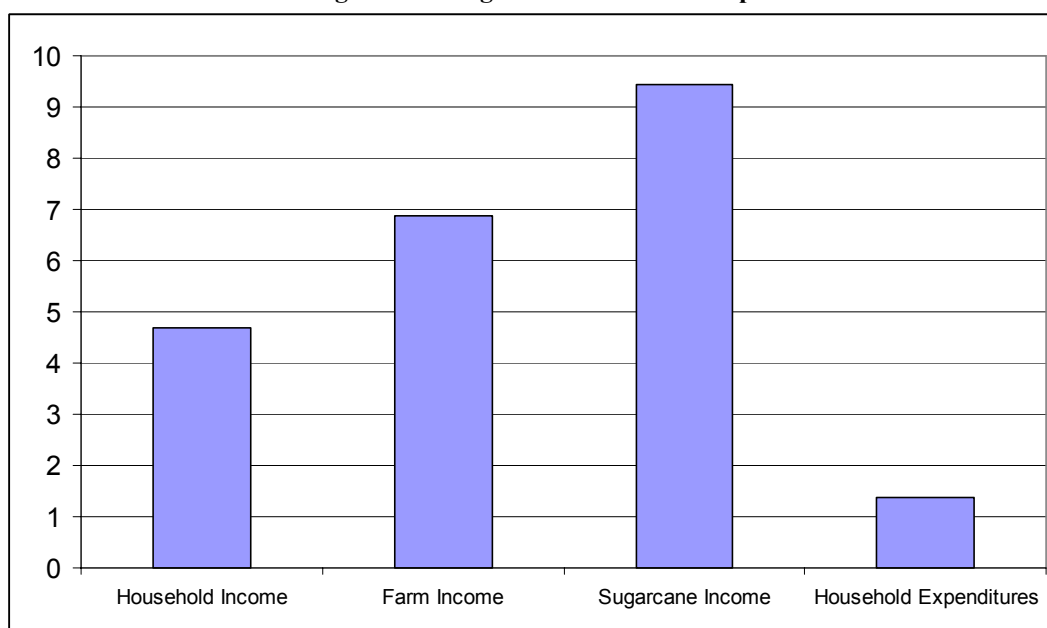
The SPEP program had a significant positive impact on total household income, farm income, sugarcane income and household expenditures. The regression analysis determined that “each month of CO membership in the treatment villages makes a difference of 0.39% to the household income”. This means that the income of the participating household would be lower by 4.7% per annum if it had not the access to program. Similar interpretation follows for other significant impacts given in table 3-59.

**Table 3-59: Specific Economic Impact of SPEP**

Economic Outcome	Impact / Month (%)	Impact / Year (%)
Household Income	0.39	4.7
Farm Income	0.57	6.87
Sugarcane Income	0.79	9.45
Household Expenditures	0.11	1.37

However, not all indicators were significant which means that the SPEP program had no impact on them. These were household assets, consumer durable and household savings. A significant impact was noted on the savings of members at 99% confidence interval but was insignificant for their membership months in CO. This shows that savings do not grow with respect to increasing time in the CO.

**Figure 3-34: Significant Economic Impact of SPEP**



Based on the overall results, it was concluded that SPEP program has significant impact on the income of participating households in treatment villages especially for those rural households that participate in CO over longer periods.