









cultivated land of the above crops were 83.14, 16.48, 28.35, 39.08, 17.62, 25.29 and 41.76 respectively.

**Table 9: Crops cultivated by the sample households**

Crops	All HHs (area in acres)	
	Area	% of total
Rice	2.17	83.14
Wheat	0.43	16.48
Jute	0.74	28.35
Pulses	1.02	39.08
Oilseeds	0.46	17.62
Maize	0.66	25.29
Vegetables	1.09	41.76

HH: Households

In the study areas of Rajbari, Rajshahi, Thakurgaon and Mymensingh the main cultivated crops were rice, wheat, jute, pulses, oilseed, maize and vegetables. Total land cultivated by study areas represented by Table 10. In Rajbari total cultivated land by crops rice, wheat, jute, pulses, oilseed, and vegetables were 1.07, 0.76, 1.15, 0.58, 0.51 and 1.43 acres respectively, whereas the percentage of total land of cultivation were 0.38, 0.27, 0.41, 0.21, 0.18 and 0.51 respectively. In Rajshahi total cultivated land by crops rice, wheat, jute, pulses, oilseed, maize and vegetables were 2.18, 0.42, 0.27, 0.87, 0.44, 0.65 and 0.22 acre, respectively, whereas the percentage of total land of cultivation were 121.79, 23.46, 15.08, 48.60, 24.58, 36.31 and 12.29, respectively. In Thakurgaon total cultivated land by crops rice, wheat, jute, pulses, maize and vegetables were 2.82, 0.68, 0.55, 0.65, 0.44, 0.74 and 0.59 acre respectively, whereas the percentage of total land of cultivation were 104.44, 25.19, 20.37, 24.07, 27.41 and 21.85, respectively. In Mymensingh total cultivated land by crops rice, wheat, pulses, and vegetables were 1.87, 1.02, 0.92 and 1.03 acres respectively, whereas the percentage of total land of cultivation were 59.18, 32.28, 29.11 and 32.59, respectively.

**Table 10: Crops cultivated by the study locations**

Crops	Rajbari		Rajshahi		Thakurgaon		Mymensingh	
	Area in acre	% of total	Area in acre	% of total	Area in acre	% of total	Area in acre	% of total
Rice	1.07	0.38	2.18	121.79	2.82	104.44	1.87	59.18
Wheat	0.76	0.27	0.42	23.46	0.68	25.19	1.02	32.28
Jute	1.15	0.41	0.27	15.08	0.55	20.37	0	-
Pulses	0.58	0.21	0.87	48.60	0.65	24.07	0.92	29.11
Oilseeds	0.51	0.18	0.44	24.58	0	-	0	-
Maize	0	-	0.65	36.31	0.74	27.41	0	-
Vegetables	1.43	0.51	0.22	12.29	0.59	21.85	1.03	32.59

The cropping pattern and intensity in study areas are represented in table 11. The main cropping seasons are Rabi, Kharif I and Kharif II. For the cropping first pattern in Rajbari boro rice grows in Rabi season, jute in Kharif I and aman in Kharif II and 22% respondents cultivated this pattern of cropping system. In second cropping pattern oilseed grows in Rabi season and aus grows in Kharif I and 33% household cultivated in this pattern. In third cropping pattern wheat grows in Rabi and jute in Karif I, where 45% people used this farming system and the cropping intensity in this study area was 196.43%. In Rajshahi boro rice grows in the first cropping pattern in Rabi season, jute in Kharif I and aman in Kharif II, where 12% respondents cultivated in this pattern. In second cropping pattern wheat grows in Rabi season and Aman grows in Kharif II and 57% household cultivated by this pattern. And at third cropping pattern vegetables/pulse grows in Rabi and aus in Karif I, where 31% people used this farming system and the cropping intensity in this study area was 282.12%.

**Table 11: Major Cropping patterns and cropping intensity of the sample HH**

Location	Pattern	Rabi	Kharif I	Kharif II	% of HH	Cropping intensity (%)
Rajbari	1	Boro rice	Jute	Aman	22	196.43
	2	Oilseed/Pulses	Aus	Fallow	33	

Rajshahi	3	Wheat	Jute	Fallow	45	282.12
	1	Boro rice	Jute	Aman	12	
	2	Wheat	Fallow	Aman	57	
Thakurgaon	3	Vegetables/Pulse	Aus	Fallow	31	223.33
	1	Boro rice	Fallow	Aman	48	
	2	Wheat	Fallow	Aman	28	
Mymensingh	3	Vegetables/Pulse	Aus	Fallow	24	153.16
	1	Boro rice	Jute	Aman	35	
	2	Wheat/Boro rice	Fallow	Aman	27	
Status of CA	Old CA research sites					228.05
	New CA research sites					214.86

CA: Conservation Agriculture; HH: Households

In Thakurgaon boro rice grows in the first cropping pattern in Rabi season, aman in Kharif II, where 48% respondents cultivated in this pattern. In second cropping pattern wheat grows in Rabi season and aman grows in Kharif II and 28% household cultivated by this pattern. And at third cropping pattern vegetables/pulse grows in Rabi and aus in Karif I, where 24% people used this farming system and the cropping intensity in this study area was 223.33%. In case of Mymensingh study area boro rice grows in the first cropping pattern in Rabi season, jute in Kharif I and aman in Kharif II, where 35% respondents cultivated in this pattern. In second cropping pattern wheat/boro rice grows in Rabi season and aman grows in Kharif II and 27% household cultivated by this pattern. And at third cropping pattern vegetables/pulse grows in Rabi and aman in Karif II, where 38% people used this farming system and the cropping intensity in this study area was 153.16%.

### 3.1.8 Availability of Farm Labor

Table 12 shows the level of labor availability and the wage rate in the study areas. In Rajbari labor was moderately sufficient in Rabi season that is 81.88 followed by insufficient and highly sufficient 11.88 and 6.25%, respectively. The wage rate was BDT 256 with food and BDT 266 without food. In Kharif I, the labor availability was as like as Rabi season that is labor is moderately sufficient in Rabi season (65%) followed by insufficient and highly sufficient 33.75 and 1.25%, respectively. The wage rate was BDT 260 with food and BDT 269 without food. In the season Kharif II, labor was moderately sufficient in Rabi season that was 51.25% followed by insufficient and highly sufficient 46.25 and 2.50%, respectively. The wage rate was BDT 257 with food and BDT 343 without food.

**Table 12: Availability of labour and wage rate in the sample HH**

Location	Seasons	Level of labour availability (%)			Wage rate (BDT)	
		Highly sufficient	Moderate sufficient	Insufficient	With food	Without food
Rajbari	Rabi	6.25	81.88	11.88	256	266
	Kharif I	1.25	65.00	33.75	260	269
	Kharif II	2.50	51.25	46.25	257	343
Rajshahi	Rabi	33.61	62.18	4.20	201	252
	Kharif I	34.45	48.74	16.81	206	254
	Kharif II	17.65	50.42	31.93	208	258
Thakurgaon	Rabi	4.92	34.43	60.66	216	300
	Kharif I	13.11	42.62	44.26	223	300
	Kharif II	8.20	31.15	60.66	218	301
Mymensingh	Rabi	10.17	74.58	15.25	250	300
	Kharif I	4.24	81.36	14.41	250	300

	Kharif II	0.85	76.27	22.88	250	300
All locations	Rabi	14.19	68.56	17.25	231	280
	Kharif I	12.23	62.01	25.76	235	281
	Kharif II	6.77	54.80	38.43	233	301

HH: Households

In Rajshahi labor was moderately sufficient in Rabi season that was 62.18% followed by highly sufficient and insufficient 33.61 and 4.20%, respectively. The wage rate was BDT 201 with food and BDT 252 without food. In Kharif I, the labor availability was as like as Rabi season that is labor was moderately sufficient in Rabi season (48.74%) followed by highly sufficient and insufficient 34.45 and 16.81% respectively and the wage rate was BDT 206 with food and BDT 254 without food. In the season Kharif II, labor was moderately sufficient as Rabi season that is 50.42% followed by insufficient and highly sufficient 31.39 and 17.65%, respectively. The wage rate was BDT 208 with food and BDT 258 without food.

In Thakurgaon labor was insufficient as Rabi season that is 60.66% followed by moderately sufficient and highly sufficient 34.43 and 4.92%, respectively. The wage rate was BDT 216 with food and BDT 300 without food. In Kharif I, the labor 24 availability was as like as Rabi season that is labor is insufficient in Rabi season (44.26%) followed by moderately sufficient and highly sufficient 42.62 and 13.11%, respectively. The wage rate was BDT 223 with food and BDT 300 without food. In the season Kharif II, labor was insufficient in Rabi season that was 60.66% followed by moderately sufficient and insufficient 13.15 and 8.20%, respectively. The wage rate was BDT 218 with food and BDT 301 without food.

In Mymensingh labor was moderately sufficient in Rabi season that is 74.58% followed by insufficient and highly sufficient 15.25 and 10.17%, respectively. The wage rate was BDT 250 with food and BDT 300 without food. In Kharif I, the labor availability was as like as Rabi season that is labor was moderately sufficient in Rabi season (81.36%) followed by insufficient and highly sufficient 14.41 and 4.24%, respectively. The wage rate was BDT 250 with food and BDT 300 without food. In the season Kharif II, the labor was moderately sufficient as Rabi season that is 76.27% followed by sufficient and insufficient 22.88 and 0.85%, respectively. The wage rate was BDT 250 with food and BDT 300 without food.

#### 4. CONCLUSIONS

Based on the empirical findings through survey, FGD, personal interviewing, key informants' interviewing and field observations some

concluding remarks are made. In the crop-livestock integrated area farmers were usually in middle age having a family with more than 6 members and most of the farmers were illiterate. Agriculture was their main occupation and farmers produce crops along with livestock species. In crop-livestock interaction areas, livestock mainly used for income generation while some of farmers used livestock manure for composting to make land fertile. Thus the profit from livestock become the investment for crop production and vice versa. In this way there are always an interaction between crop and livestock in Bangladesh.

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#### CONFLICT OF INTEREST

The authors declare no conflict of interest.

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