

**POVERTY AND SUSTAINABLE LIVELIHOODS IN THE  
SEASONALLY SUBMERGED *HAOR* AREA OF NETROKONA  
DISTRICT, BANGLADESH**

**TALUKDER GOLAM RABBY**

**THESIS SUBMITTED IN FULFILMENT  
OF THE REQUIREMENTS  
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY**

**FACULTY OF ECONOMICS AND ADMINISTRATION  
UNIVERSITY OF MALAYA  
KUALA LUMPUR**

**2012**

# UNIVERSITI MALAYA

## ORIGINAL LITERARY WORK DECLARATION

Name of Candidate: **Talukder Golam Rabby** (I.C/Passport No: **V0168945**)

Registration/Matric No: **EHA 080020**

Name of Degree: **Doctor of Philosophy**

Title of ~~Project Paper/Research Report/Dissertation~~ **Thesis** ("this Work"):

**POVERTY AND SUSTAINABLE LIVELIHOODS IN THE SEASONALLY SUBMERGED HAOR AREA OF NETROKONA DISTRICT, BANGLADESH**

Field of study: **Development Economics**

I do solemnly and sincerely declare that:

- (1) I am the sole author/writer of this work;
- (2) This work is original;
- (3) Any use of any work in which copyright exists was done by way of fair dealing and for permitted purposes and any excerpt or extract from, or reference to or reproduction of any copyright work has been disclosed expressly and sufficiently and the title of the Work and its authorship have been acknowledged in this work;
- (4) I do not have any actual knowledge nor do I ought reasonably to know that the making of this work constitutes an infringement of any copyright work;
- (5) I hereby assign all and every rights in the copyright to this Work to the university of Malaya ("UM"), who henceforth shall be owner of the copyright in this Work and that any reproduction or use in any form or by any means whatsoever is prohibited without the written consent of UM having been first had and obtained;
- (6) I am fully aware that if in the course of making this Work I have infringed any copyright whether intentionally or otherwise, I may be subject to legal action or any other action as may be determined by UM.

Candidate's Signature

Date

Subscribed and solemnly declared before,

Witness's Signature

Date

Name:

Designation:

## ABSTRACT

Being geographically remote, ecologically vulnerable and environmentally isolated, poverty is severe and livelihood is onerous in the northeastern *Haor* area in Bangladesh. Thus, this research which explores the nexus of poverty and livelihood in the *Haor* area focuses on four specific objectives: characterizing poverty and the poor, causes and consequences of poverty; examining the income determinants of the poor households; exploring the dynamics of poverty and the impact of seasonal domestic migration of the poor on poverty.

A mixed methodology of research is applied to analyze the cross-sectional primary data collected through field surveys. The results demonstrate that the incidence of income poverty is 73% among the sample households of which 29% and 44% can be considered the moderately and extremely poor, respectively. The poor are primarily uneducated, landless, unemployed and female-headed households with the latter two groups constituting the extremely poor strata. The household income of the poor households is highly influenced by public credit accessibility, remittances (by migrant household members), dry season income, household size, employment status and age of household head. The poverty dynamics reveal that the exposure of resource pauperization to poverty has increased overtime in the *Haor* area. The monsoonal deluge (in the wet season), mono-cropping, flashfloods, seasonal unemployment, capital deficiencies and policy weaknesses are among the most important causes of poverty in the *Haor* area. The poor who are uneducated and capital deficient resort to seasonal domestic migration as an income diversifying strategy but one which is largely ineffective. Persistent poverty has serious consequences on the livelihood strategies of the poor; as current poverty reduction strategies in the *Haor* area

have limited impact, there is a need to examine and formulate appropriate policy interventions aimed at generating steady sources of income for the poor households. Among others, they include revitalizing *Haor* agriculture, establishing non-farm sector work opportunities (handicrafts, transportation, communication, storage services, etc), investment in infrastructure facilities and cooperative activities. The theoretical and empirical findings of this research can provide inputs for policymakers to create a long term framework for poverty reduction and sustainable livelihood development for the poor households in the *Haor* area of Bangladesh.

## ABSTRAK

Terletak di kawasan yang terpencil, *Haor*, kawasan di timur laut Bangladesh mempunyai keadaan ekologi yang terdedah dengan perubahan cuaca yang melampau. Ini menyebabkan kemiskinan yang berleluasa di kalangan penduduk di situ. Kajian ini yang bertujuan untuk memahami hubungan di antara kemiskinan dan kehidupan di *Haor*, mempunyai empat objektif yang utama: mencirikan kemiskinan dan golongan miskin, meneliti sebab dan akibat kemiskinan, mengkaji punca pendapatan di kalangan penduduk miskin dan mengkaji kesan migrasi domestik yang bermusim ke atas penduduk.

Penyelidikan ini menggunakan metod variasi kuantitatif dan kualitatif yang digunakan untuk pungutan data. Hasil penyelidikan ini menunjukkan bahawa kadar kemiskinan pendapatan adalah 73% di kalangan sampel penduduk yang mana 29% dianggap sederhana, manakala 44% dianggap sangat miskin. Golongan yang termiskin terdiri daripada yang tidak berpendidikan, yang tidak bertanah, yang tiada pekerjaan dan juga keluarga yang diketuai wanita. Pendapatan seisi keluarga dipengaruhi oleh akses ke atas kredit, kiriman wang daripada keluarga yang bekerja di luar, pendapatan musim kering, saiz keluarga, status pekerjaan dan umur ketua keluarga. Kajian ini juga menunjukkan kemiskinan semakin meningkat di sekitar kawasan *Haor* dan ini berpunca daripada banjir monsun, banjir kilat, cara tanaman ‘monocropping’, pengangguran bermusim, kekurangan modal dan dasar polisi yang lemah. Golongan miskin yang tidak berpendidikan dan yang mempunyai modal yang terhad, menggunakan cara migrasi sebagai strategi untuk menjana pendapatan, tetapi cara ini tidak seberapa berkesan. Oleh kerana kemiskinan yang berterusan mempunyai kesan yang serius terhadap golongan yang miskin, ditambah pula dengan polisi yang tidak berkesan, adalah penting untuk meneliti dan merangka intervensi dasar yang sesuai supaya pendapatan yang stabil dapat diperolehi

untuk penduduk di situ. Antara lain, strategi seperti memulihkan cara pertanian di *Haor*, pertubuhan sektor bukan pertanian seperti kraftangan, pengangkutan, komunikasi, perkhidmatan penyimpanan, pelaburan dalam infrastruktur dan aktiviti koperasi dianggap penting untuk membasmi kemiskinan. Penemuan teori dan empirik kajian ini dapat memberikan input bagi penggubal dasar untuk mewujudkan rangka kerja jangka panjang untuk mengurangkan kemiskinan dan meningkatkan sumber pendapatan bagi golongan miskin di kawasan *Haor* di Bangladesh.

## ACKNOWLEDGEMENT

My special gratitude goes to Dr. Leo Jocelyn Fredericks for his careful supervision, meaningful advice and critical comments. Sharing his knowledge and experience enabled me to pursue this research with a high degree of commitment since our first meeting. His way of supervision motivated me greatly and encouraged me to adopt a critical approach in my research. His inspiration and guidance inspired me to write journal articles based on my doctoral research. I am also indebted to Associate Professor Dr Sulochana Nair for her excellent supervision and advice. She guided, encouraged and motivated me with a multitude of valuable comments and insights on my research topic. I am overwhelmed with gratitude to Dr. Lee Hwok Aun for his valuable comments and suggestions on my research work.

For occasional comments and discussions, I am also indebted to Professor Dr. Goh Kim Leng, Associate Professor Dr. Fatimah binti Kari, Dr. Cheong Kee Cheok as well as other anonymous referees who provided inputs to improve my analysis and findings. I am likewise indebted to my brothers and sister-in-laws and my friends Kamaludin Ahmed Sheikh and Sharifah Muhairah Shahabudin for their encouragement and moral support.

I am extremely grateful to the people in the five *Haor* villages who gave of their valuable time during my primary survey. I would also like to record my appreciation to the two girls and four men who assisted me in the fieldwork for their outstanding dedication. Also, I must record my deep gratitude to the University of Malaya for its financial support in my fieldwork and data collection in Bangladesh.

Last, but not least, I would like to thank my mother who was always stood by me and supported me spiritually.

## TABLE OF CONTENTS

<b>ABSTRACT</b>	iii
<b>ACKNOWLEDGEMENT</b>	vii
<b>TABLE OF CONTENTS</b>	viii
<b>LIST OF FIGURES</b>	xii
<b>LIST OF TABLES</b>	xiv
<b>LIST OF MAPS</b>	xvii
<b>1. INTRODUCTION</b>	1
1.1 Motivation of the study	1
1.2 Background of Bangladesh	3
1.3 Floodplains in Bangladesh	6
1.4 Background of the study area	7
1.5 <i>Haor</i>	8
1.5.1 Identifying the <i>Haor</i> area	8
1.5.2 Genesis of the <i>Haor</i> Basin	9
1.5.3 Human settlement in the <i>Haor</i> area	10
1.5.4 Distinctive features of the <i>Haor</i> area	11
1.5.5 Poverty in the <i>Haor</i> area	12
1.5.6 Pre-monsoon floods in the <i>Haor</i> areas may cause food crisis by 2050	13
1.6 Study area: Location and some statistics	15
1.7 Livelihoods in the study area	18
1.8 Sources of income in the study area	19
1.9 Choice of the study area	20
1.10 Problem statement	20
1.11 Scope of the study	23
1.12 Objectives	23
1.13 Research questions	24
1.14 Thesis structure	24
<b>2. POVERTY CONCEPT, THEORIES, THEORETICAL AND CONCEPTUAL FRAMEWORK</b>	27
2.1 Introduction	27
2.2 Concept and definition of poverty	27
2.3 Poverty Measurement	28
2.3.1 Direct Calorie Intake (DCI) method	29
2.3.2 Food-Energy Intake (FEI) method	30
2.3.3 Cost of Basic Needs (CBN) method	31
2.3.4 Summary	32
2.4 Theories of poverty	33
2.5 Theoretical framework of the study	36
2.6 Conceptual framework of the study	38
2.6.1 Absolute poverty	39
2.6.2 Relative poverty	40
2.6.3 Self-perception of poverty	40
2.6.4 Income estimation	41
2.6.5 Unit of analysis	42



<b>3. POVERTY AND LIVELIHOOD DISCOURSES</b>	43
3.1 Introduction	43
3.2 Ecology and worldviews of spatial poverty	44
3.3 Understanding poverty in Bangladesh	48
3.3.1 Exploring the quantitative studies	48
3.3.2 Exploring the qualitative studies	59
3.3.3 Exploring the mixed method studies	64
3.4 Understanding poverty in the <i>Haor</i> area	67
3.4.1 The poor in the <i>Haor</i> villages	67
3.4.2 Poverty status of the local community	68
3.4.3 Food security and poverty	70
3.5 Synthesis of poverty literature	72
3.6 Livelihoods and rural livelihoods in Bangladesh	76
3.6.1 Concept of sustainable livelihood	76
3.6.2 Livelihood diversification	80
3.6.3 Poverty and livelihood diversification	81
3.6.4 Resource endowment and livelihood diversification	82
3.6.5 Livelihoods in rural Bangladesh	85
3.7 Seasonal migration: A livelihood strategy	88
3.7.1 Understanding flood-induced seasonal migration	88
3.7.2 Linkage between poverty and seasonal migration	90
3.7.3 Identifying the migrant	90
3.7.4 Causes of migration	91
3.7.5 Consequences of migration	92
3.7.6 <i>Haor</i> people's livelihood in Bangladesh: Socio-economic issues	93
3.8 Poverty and vulnerability	94
3.9 Summary	95
<b>4. METHODOLOGY</b>	97
4.1 Introduction	97
4.2 Method and methodological implications	97
4.3 Significance of mixed method	98
4.4 Sample selection	98
4.4.1 Selection of the study area	98
4.4.2 Data collection	99
4.4.3 Methodological limitations	104
4.5 Method	106
4.5.1 Qualitative approach	106
4.5.2 Quantitative approach	112
4.5.3 Conclusion	125
<b>5. FINDINGS</b>	127
5.1 Introduction	127
5.2 General information of the <i>Haor</i> households	127
5.2.1 Income structure of the <i>Haor</i> villages	129
5.3 Poverty and income flow of the <i>Haor</i> households	133
5.3.1 Poverty profile	133
5.3.2 Seasonal income distribution among households	141
5.3.3 Seasonal changes in occupation	143

	5.3.4	Major economic activities of the <i>Haor</i> households	161
	5.3.5	Mediators of <i>Haor</i> household income	167
	5.3.6	Conclusion	169
5.4		Econometric model building and multivariate analysis	171
	5.4.1	Data normality	172
	5.4.2	The full model: long regression	176
	5.4.3	Backward elimination: short regression	180
	5.4.4	Multivariate regression of income determinants of the <i>Haor</i> households	182
	5.4.5	The empirical results	184
	5.4.6	Conclusion	205
5.5		Dynamics of poverty in the <i>Haor</i> area	207
	5.5.1	Purposes of using SLA	207
	5.5.2	Technique of analysis	208
	5.5.3	Context of vulnerability	210
	5.5.4	Assets and livelihood	215
	5.5.5	Access to and magnitude of assets owned by the <i>Haor</i> households	234
	5.5.6	Transforming structure and process (TSP)	242
	5.5.7	Adopted livelihood strategies and relevant outcomes	253
	5.5.8	Livelihood outcomes	256
	5.5.9	Overall implication of the livelihood diversification outcomes	257
	5.5.10	Conclusion	258
5.6		Poverty –migration nexus	260
	5.6.1	Attributes of migrants and their households	260
	5.6.2	Analysis of the simultaneous equation model (SEM)	265
	5.6.3	Relationship between poverty and seasonal domestic migration	276
	5.6.4	Conclusion	280
<b>6.</b>		<b>DISCUSSION, CONCLUSION AND POLICY RECOMMENDATIONS</b>	282
6.1		Introduction	282
6.2		Discussion	282
	6.2.1	Socio-demographic characteristics of the <i>Haor</i> archipelago	282
	6.2.2	The poor in the sample villages	284
	6.2.3	Sources of income in the sample villages	286
	6.2.4	Management of income in the study households	288
	6.2.5	Major income determinants of the sample households	289
	6.2.6	Interruptions to household livelihood	292
	6.2.7	Livelihood diversification strategies	294
	6.2.8	Asset accessibility and household poverty status	296
	6.2.9	Migrants in the <i>Haor</i> villages	303
	6.2.10	Causes of migration	304
	6.2.11	Impact of seasonal domestic migration	304
	6.2.12	Causes of poverty	305
	6.2.13	Consequences of poverty	309
	6.2.14	Coping with vulnerabilities	310

6.3	Conclusion	312
6.4	Policy recommendations	312
6.4.1	Increasing income	313
6.4.2	Attainment of sustainability	318
6.5	Contribution	319
6.5.1	Methodological implications	319
6.5.2	Theoretical implications	321
6.5.3	Policy implications	322
6.6	Limitations of the study	324
6.7	Future research	326
	<b>INSTRUMENTATION</b>	328
	<b>APPENDICES</b>	336
	<b>REFERENCES</b>	341

## LIST OF FIGURES

Figure 2.1	Conceptual framework	39
Figure 3.1	Major themes in the poverty discourse	44
Figure 3.2	An illustration of flood induced seasonal migration	89
Figure 4.1	Income flow approach (IFA)	107
Figure 4.2	Sustainable livelihood approach (SLA)	109
Figure 4.3	Extent and direction of assets accessibility	110
Figure 4.4	Linkage between four analytical approaches: An integrated approach	126
Figure 5.1	Poverty in the 5 <i>Haor</i> villages	134
Figure 5.2	Education and poverty in the <i>Haor</i> villages	138
Figure 5.3	Household size and poverty in the 5 <i>Haor</i> villages	139
Figure 5.4	Landownership and poverty in the <i>Haor</i> sample households	140
Figure 5.5	Schematic presentation of HH dry season occupation (HHD_OC), for the non-poor HH, 2010	145
Figure 5.6	Schematic presentation of HH wet season occupation (HHW_OC), for the non-poor HH including unemployment, 2010	146
Figure 5.7	Cluster diagram of non-poor HH occupation mobility from dry to wet season including unemployment, 2010	147
Figure 5.8	Schematic presentation of HH dry season occupation (HHD_OC) or unemployment for the moderately poor HH, 2010	150
Figure 5.9	Schematic presentation of HH wet season occupation (HHW_OC) or unemployment for the moderately poor HH , 2010	151
Figure 5.10	Cluster diagram of moderately poor HH occupation mobility from dry to wet season including unemployment, 2010	152
Figure 5.11	Schematic presentation of HH dry season occupation , for the extremely poor HH including unemployment, 2010	156
Figure 5.12	Schematic presentation of HH wet season occupation , for the extremely poor HH including unemployment, 2010	157
Figure 5.13	Cluster diagram of extremely poor HH occupation mobility from dry to wet season including unemployment, 2010	158
Figure 5.14	Paddy supply chain and returns to the households in the 5 <i>Haor</i> villages	168
Figure 5.15	Fish supply chain and returns to the households in the 5 <i>Haor</i> villages	169
Figure 5.16	Normal P-P plot for average sample household income and age of household head	173
Figure 5.17	Normal P-P plot for household size and dry season income of household	174
Figure 5.18	Normal P-P plot for remittances and land of household	175
Figure 5.19	Access direction and magnitude of assets by the female-headed <i>Haor</i> households, 2010	241
Figure 5.20	Access direction and magnitude of assets by the male-headed moderately poor <i>Haor</i> households, 2010	241
Figure 5.21	Access direction and magnitude of assets by the male-headed extremely poor <i>Haor</i> households, 2010	242
Figure 5.22	Guided outcomes and the interacting flows between structures and process	242
Figure 6.1	Schematic arrangement of causes of poverty for the female-headed households in the <i>Haor</i> area, 2010	307

Figure 6.2	Schematic arrangement of causes of moderate poverty in the <i>Haor</i> area, 2010	308
Figure 6.3	Schematic arrangement of causes of extreme poverty in the <i>Haor</i> area, 2010	309
Figure 6.4	Sequence of coping strategies for the poor <i>Haor</i> households, 2010	311

## LIST OF TABLES

Table 1.1	Poverty incidence (headcount rate) (%)	2
Table 1.2	Proportion of depth-of-flooding land types in Bangladesh's floodplain area	7
Table 1.3	General information about households in the studied area in comparison to <i>Union, Upazila</i> , District, Division and Country	17
Table 2.1	Nutritional basket of Bangladesh	29
Table 2.2	Poverty estimates in Bangladesh using DCI method	30
Table 2.3	CBN Poverty line in Bangladesh (per capita per month in Taka)	32
Table 3.1	Attributes of the poor identified based on a sample studies in different underprivileged regions in the world	46
Table 3.2	Causes of spatial poverty identified by a sample of studies in different underprivileged regions in the world	47
Table 3.3	Characteristics of poor identified in different quantitative studies in Bangladesh	59
Table 3.4	Causes of poverty identified by quantitative studies in Bangladesh	59
Table 3.5	Causes of rural poverty in Bangladesh	60
Table 3.6	Characteristics of poor identified by qualitative studies in Bangladesh	64
Table 3.7	Causes of poverty identified by qualitative studies in Bangladesh	64
Table 3.8	Causes of poverty identified by a hybrid study	66
Table 3.9	Characteristics of poor identified by different studies in the <i>Haor</i> area	71
Table 3.10	Causes of poverty identified by different studies in the <i>Haor</i> area	72
Table 4.1	Poverty line of 2008 for the households in the 5 <i>Haor</i> villages	100
Table 4.2	Distribution of population in the 5 <i>Haor</i> villages	100
Table 4.3	Checklists of the research questions and tools of analysis	101
Table 4.4	Population and sample of households of the study area	102
Table 4.5	Summary of the strengths and weaknesses of the SLA as an analytical framework to study the dynamics of poverty	112
Table 4.6	Specification of variables for multivariate analysis, Equation 4.3	117
Table 4.7	Explanation of variables for Equation 4.6	123
Table 4.8	Explanation of variables for Equation 4.7	124
Table 5.1	Characteristics of <i>Haor</i> households (HH), 2010	128
Table 5.2	Average household income of 1265 households in 5 <i>Haor</i> villages, 2010	130
Table 5.3	Occupational structure of 1265 <i>Haor</i> households during dry and wet season, 2010	131
Table 5.4	Incidence of poverty in 5 <i>Haor</i> villages, 2010	133
Table 5.5	Household poverty corresponding to HH head earning status in the 5 <i>Haor</i> villages, 2010	135
Table 5.6	Poverty and gender of HH head in 5 <i>Haor</i> villages, 2010	136
Table 5.7	Household income poverty in respect to the age of HH head in 5 <i>Haor</i> villages, 2010	136
Table 5.8	Marital status of HH head and poverty in 5 <i>Haor</i> villages, 2010	137
Table 5.9	Education level of HH head and poverty in 5 <i>Haor</i> villages, 2010	137
Table 5.10	Household size and poverty in 5 <i>Haor</i> villages, 2010	138
Table 5.11	Cultivable landownership and household income poverty in 5 <i>Haor</i> villages, 2010	139

Table 5.12	Income structure of different types of <i>Haor</i> sample households, 2010	142
Table 5.13	Seasonal expenditure structure of different types of <i>Haor</i> sample households, 2010	142
Table 5.14	Engagement in dry season occupation by non-poor HH in 5 <i>Haor</i> villages, 2010	144
Table 5.15	Engagement in wet season occupation or unemployment among non-poor HH in 5 <i>Haor</i> villages, 2010	145
Table 5.16	Switching and distribution of dry season occupation during wet season by the non-poor household in 5 <i>Haor</i> villages including unemployment, 2010	148
Table 5.17	Engagement in dry season occupation or unemployment among moderately poor HH in 5 <i>Haor</i> villages, 2010	149
Table 5.18	Engagement in wet season occupation or unemployment among moderately poor HH in 5 <i>Haor</i> villages, 2010	150
Table 5.19	Switching and distribution of dry season occupation during wet season by the moderately poor household in 5 <i>Haor</i> villages including unemployment, 2010	154
Table 5.20	Engagement in dry season occupation by extremely poor HH in 5 <i>Haor</i> villages including unemployment, 2010	155
Table 5.21	Engagement in wet season occupation by extremely poor HH in 5 <i>Haor</i> villages including unemployment, 2010	156
Table 5.22	Switching and distribution of dry season occupation during wet season by the extremely poor household in 5 <i>Haor</i> villages including unemployment, 2010	160
Table 5.23	Income activities of non-poor households by month in 5 <i>Haor</i> villages, 2010	162
Table 5.24	Income activities of moderately poor households by month in 5 <i>Haor</i> villages, 2010	164
Table 5.25	Income activities of extremely poor households by month in 5 <i>Haor</i> villages, 2010	166
Table 5.26	Regression results of the full model (Equation 5.1)	177
Table 5.27	TOL and VIF for coefficients	178
Table 5.28	Statistics of the gradual improvement of the model towards the best fit	180
Table 5.29	Regression results of the best fit model (Equation 5.2)	181
Table 5.30	Determinants of per capita income: Log-linear regression results of the 5 <i>Haor</i> villages, 2010	199
Table 5.31	Determinants of per capita income: Log-linear regression results of labour households in the 5 <i>Haor</i> villages, 2010	200
Table 5.32	Determinants of per capita income: Log-linear regression results of landless households in the 5 <i>Haor</i> villages, 2010	201
Table 5.33	Determinants of per capita income: Log-linear regression results of non-poor households in the 5 <i>Haor</i> villages, 2010	202
Table 5.34	Determinants of per capita income: Log-linear regression results of aggregated poor households in the 5 <i>Haor</i> villages, 2010	203
Table 5.35	Determinants of per capita income: Log-linear regression results of moderately poor households in the 5 <i>Haor</i> villages, 2010	204
Table 5.36	Determinants of per capita income: Log-linear regression results of extremely poor households in the 5 <i>Haor</i> villages, 2010	205

Table 5.37	Dynamic analysis of livelihoods and resources in the <i>Haor</i> area, 2010	216
Table 5.38	List of holding assets and relevant effects (RE) for the female-headed <i>Haor</i> household, 2010	235
Table 5.39	List of holding assets and relevant effects (RE) for the male headed moderately poor <i>Haor</i> household, 2010	237
Table 5.40	List of holding assets and relevant effects (RE) for the male headed extremely poor <i>Haor</i> household, 2010	239
Table 5.41	Leadership ( <i>matabbor</i> ) in the <i>somaj</i> in the <i>Haor</i> community, 2010	250
Table 5.42	Observed informal institutions in the <i>Haor</i> community	251
Table 5.43	Adopted livelihood strategies by the female-headed household	254
Table 5.44	Adopted livelihood strategies by the landless daily labourer	254
Table 5.45	Adopted livelihood strategies by landless daily labourer-sharecropper	254
Table 5.46	Adopted livelihood strategies by the daily labourer owning homestead land	255
Table 5.47	Adopted livelihood strategies by the marginal farmer-daily labourer-no education	255
Table 5.48	Adopted livelihood strategies by educated marginal farmer-daily labourer	255
Table 5.49	Adopted livelihood strategies by farmer-medium land owner-tenant	255
Table 5.50	Profile of migrant households (MH) in the <i>Haor</i> study area, 2010	261
Table 5.51	Landownership of MH in poverty status, for income poverty, 2010	262
Table 5.52	Landownership of MH in poverty status, for self- perception poverty, 2010	262
Table 5.53	Profile of migrants in the <i>Haor</i> study area, 2010	264
Table 5.54	OLS regression results for Equation 4.6, for income poverty	267
Table 5.55	OLS regression results for Equation 4.7 without interacting factor, for income poverty	267
Table 5.56	OLS regression results for Equation 4.7 with interacting factor, for income poverty	269
Table 5.57	Results of Hausman endogeneity error test, for income poverty	270
Table 5.58	Results of 2SLS regression, for income poverty	271
Table 5.59	OLS regression results for Equation 4.6, for self perception poverty	272
Table 5.60	OLS regression results for Equation 4.7 without interacting factor, for self perception poverty	272
Table 5.61	OLS regression results for Equation 4.7 with interacting factor, for self perception poverty	273
Table 5.62	Results of Hausman endogeneity error test, for self perception poverty	275
Table 5.63	Results of 2SLS regression, for self perception poverty	276
Table 5.64	OLS and 2SLS estimates of the impact of seasonal domestic migration on income poverty status of the <i>Haor</i> households	279
Table 5.65	OLS and 2SLS estimates of the impact of seasonal domestic migration on self perception poverty status of the <i>Haor</i> households	280
Table 6.1	Different income sources of 5 sample villages, 2010	287
Table 6.2	Income determinants for the community, 2010	289
Table 6.3	Income determinants for the daily labour- headed households, 2010	289
Table 6.4	Income determinants for the landless households, 2010	290
Table 6.5	Income determinants for the non-poor households, 2010	290
Table 6.6	Income determinants for the aggregated poor households, 2010	290



Table 6.7	Income determinants for the moderately poor households, 2010	290
Table 6.8	Income determinants for the extremely poor households, 2010	291

## LIST OF MAPS

Map 1	The study area	15
-------	----------------	----

## LIST OF ABBREVIATIONS AND GLOSSARY

2SLS	Two Stage Least Squares
ADB	Asian Development Bank
AIC	Akaike Information Criterion
ASA	Association for Social Advancement
BBS	Bangladesh Bureau of Statistics
BIDS	Bangladesh Institute of Development Studies
BRAC	Bangladesh Rural Advancement Committee
Boro Crop	Dry Season Paddy
BWDB	Bangladesh Water Development Board
CBN	Cost of Basic Needs
CIDA	Canadian International Development Agency
DCI	Direct Calorie Intake
DER	Disaster and Emergency Response
DFID	Department for International Development
DSHE	Directorate of Secondary and Higher Education
DSI	Dry Season Income
EC	European Commission
EGE	Ecological Geographical Environmental
FEI	Food Energy-Intake
FAO	Food and Agriculture Organization
FSSAP	Female Secondary School Assistance Project
GDP	Gross Domestic Product
GOB	Government of Bangladesh
GR	Gratuitous Relief
Gushti	Lineage
HH	Household
HIES	Household Income Expenditure Survey
IFA	Income Flow Approach
IUCN	The International Union for Conservation of Nature
LVC	Local Village Club
MFDM	Ministry of Food and Disaster Management
MDG	Millennium Development Goal
MH	Migrant Households
MLGD	Ministry of Local Government Rural Development and Cooperatives
MOE	Ministry of Education
MPME	Ministry of Primary and Mass Education
MSW	Ministry of Social Welfares
MWCA	Ministry of Women and Children Affairs

MWR	Ministry of Water Resources
NFI	Non-farm Income
NGO	Non-governmental Organization
OLS	Ordinary Least Squares
PESP	Primary Education Stipend Project
PKSF	Palli Karma-Sahayak Foundation
POPY	People's Oriented Program Implementation
RNF	Rural Non-farm Sector
SDM	Seasonal Domestic Migration
SEM	Simultaneous Equation Model
SIC	Schwarz Information Criterion
SL	Sustainable Livelihood
SLA	Sustainable Livelihood Approach
Somiti	Village Club
SSA	Sub-Saharan Africa
SSE	Sum of Square Residual
TOL	Tolerance
TR	Test Relief
TSP	Transforming Structure and Process
UNB	United News of Bangladesh
UP	Union Porishad
USC	Uncontrolled Semi-controlled Controlled
VGD	Vulnerable Group Development
VGF	Vulnerable Group Feeding
VIF	Variance-Inflating Factor
WCED	World Commission on Environment and Development
WFP	World Food Program
WSI	Wet Season Income
WHO	World Health Organization

### **Currency and Equivalents**

Taka (TK)

US \$ 1 = TK. 72.00 (approximate), April 10, 2010.

# 1. INTRODUCTION

## 1.1 Motivation of the study

On average, global poverty has experienced a steady reduction of 41.7% in 1990 to 25.5% in 2005<sup>1</sup>. In South Asia, the reduction of poverty is also remarkably high: 51.71% to 40.34% for the same period<sup>2</sup>; Bangladesh is only second, after India in the region, in reducing poverty from 57% to 40% in the same period (only 8% between 1990-2000 and 9% between 2000-2005). The two-round Household Income Expenditure Survey (HIES) during 2000-2005 reports that 18% (from 49% to 40%) and 27% (from 34% to 25%) of moderate and extreme poverty decline, respectively in Bangladesh. The steady annual economic growth in Bangladesh together with stable domestic demand and relatively low income inequality, have played a critical role in such progress (World Bank, 2008). Such growth has transformed the country economically through increasing returns to human and physical assets, higher labour productivity and wages and occupational mobility from low income farming to higher income off-farm and non-farm work. As well, the increasing literacy rate, decreasing fertility and mortality rates and declining gender disparity in education have contributed markedly to ameliorating the prevalence of poverty in Bangladesh.

While poverty reduction is remarkable nationally, the phenomenon remains largely rural exhibiting a high incidence (29%) of extreme poverty (Table 1.1). In terms of the population, 6 and 8.3 million people escaped moderate and extreme poverty, respectively, in Bangladesh during 2000-2005. Despite the implementation of diverse poverty reduction

---

<sup>1</sup> World Bank PovcalNet "Replicate the World Bank's Regional Aggregation" at <http://iresearch.worldbank.org/PovcalNet/povDuplic.html> (accessed February 4, 2012).

<sup>2</sup> World Bank PovcalNet "Replicate the World Bank's Regional Aggregation" at <http://iresearch.worldbank.org/PovcalNet/povDuplic.html> (accessed February 4, 2012).

projects after the 1990's, rural poverty has not significantly improved raising the question why poverty continues to be a critical rural problem in Bangladesh. While many studies (Hossain, 2009; Ahmed, 2010; Rahman, 2009; World Bank, 2008, among others) have examined rural poverty in Bangladesh, there is a paucity of poverty analysis in the northeastern *Haor* area of Bangladesh.

Table 1.1: Poverty incidence (headcount rate) (%)

	Upper poverty line		Lower poverty line	
	2000	2005	2000	2005
National	48.9	40.0	34.3	25.1
Urban	35.2	28.4	19.9	14.6
Rural	52.2	43.8	37.9	28.6

Sources: World Bank, 2008 and HIES 2000 and 2005; using poverty lines estimated with HIES (2005) and deflated to adjust for inflation during 2000-05.

As there is an uneven regional distribution of poverty in Bangladesh, a high poverty concentration in one area could inflate the national poverty statistics and cast a shadow on the progress attained. The *Haor* basin constitutes one such area which is criss-crossed by numerous rivers constraining development and poverty reduction interventions. However, the World Bank (2008) reports that the highest rates of poverty reduction were in the Dhaka and Sylhet divisions in which this study is located. But this finding is moot since a high concentration of 73% poor households of which 44% are extremely poor have been found in the *Haor* area (Rabby *et al.*, 2011a) significantly higher than the national average of 25% in 2005 (Table 1.1). This research can, therefore, contribute to the identification of the poor, examine the causes, consequences and dynamics of poverty and formulate appropriate and effective anti-poverty strategies for the region.

## 1.2 Background of Bangladesh

Bangladesh has a relatively small land mass of 147,570 sq. km (about 0.03% of the world's land surface), and a population of 120.44 million people making it the 8<sup>th</sup> densely populated (843 person km<sup>-2</sup>) country globally [Bangladesh Bureau of Statistics (BBS), 2001] of which 23.53% and 76.47% live in the urban and rural areas, respectively. Despite the decreasing natural growth rate (from 2.01 in 1991 to 1.42 in 2004) the urban density of population<sup>3</sup> between 1991-2004 at 26.48% exceeds and is increasing faster than that of the rural area (12.22%) (BBS, 2004). The average household size<sup>4</sup> is also decreasing: 5.78, 5.45 and 4.88 in 1981, 1991 and 2001, respectively (BBS, 2001).

Bangladesh has the earth's largest delta formed by the confluence of the Ganges, Brahmaputra and Meghna rivers significantly supporting its agricultural activities on which over 60% of its population is directly or indirectly involved. Agriculture is the main source of livelihood in Bangladesh contributing about 22% of its GDP; agriculture, forestry and fisheries together absorb 48.52% of the total labour force. But these sectors are highly vulnerable to such natural calamities as floods, tropical cyclones, droughts, tidal bores, etc. which occur almost every year pushing the rural people to the edge of despair. Bangladesh comprises 25.3 million households of which 98.2% are dwelling households<sup>5</sup>. Male-headed households constitute 89.6% and the balance is female-headed. According to 2002-2003 labour force survey, the total active labour force in Bangladesh was about 44.3 million working in different major industries (BBS, 2006). By major occupation, the aggregate

---

<sup>3</sup> The population density is 2756 in urban and 694 person/sq.km in rural area (BBS 2001).

<sup>4</sup> In Bangladesh household size has been grouped under three categories - dwelling, institutional and others. The size of the dwelling household is 4.9 in rural area. This dwelling type has also been stemmed out by structure of household into four types – jupri, kutcha, semi-pucka and pucka. From the 25.3 million households 98.2% are dwelling household in which male headed household is 86.6% and the rest 10.4% is female headed.

<sup>5</sup> Defined in the census as those used for residential purposes.

agricultural labour force decreased from 19.5% in May 1999 to 13.4% in March 2004 while the non-agricultural labour participation rate rose from 8.0% to 13.4%.

As Bangladesh is a country of rivers, livelihood is constrained by such natural calamities as flooding and cyclones. The primary causes of excessive flooding can be traced to the climate, geology, geomorphology, deforestation in the Himalayas and global warming (Khandaker, 1992). Floods, although a fortune<sup>6</sup> to the Bangladeshi farmer, bring a magnitude of devastation that impact severely on the socio-economic condition of the whole nation.

Being land-scarce and with a high population growth rate, there was a 5% increase in the landless cohort during 1990-2005; the proportion of landless households has increased to 10.7% in 2005 compared to 10.2% in 1996 (BBS, 2005). Landlessness and poverty are correlated; the higher the degree of landlessness, the higher the incidence of poverty (Kam, Hossain, Bose and Villano, 2005). Ownership of land as a natural resource or capital can positively impact on human capital (e.g., education) because education increases the self-esteem of the poor, extends social networks and eases employment diversification into the more lucrative off-farm and non-farm sectors (Rabby *et al.* 2011a).

Like land, education is also critical to the understanding of the dynamics of poverty in Bangladesh; although primary education is mandatory, its rate of dissemination and uptake is far less than projected. Despite different motivational programs to encourage children to enter the school system, the overall literacy rate is still low; it was 47.5% in 2001 and only 51.6% in 2005 indicating 0.82% annual growth. One probable reason for such slow progress is poverty which makes the opportunity cost of sending children to

---

<sup>6</sup> The truth is that without annual deposition of organic-rich silts from the Ganges and Brahmaputra Rivers, intensive rice and jute cultivation characteristics of the country would be impossible (Khandaker, 1992).

school too high to bear in terms of the foregone labour inputs into agriculture or the wages from work (Table B-1Appendix B).

Poverty is a spatial phenomenon contextually concentrated in the rural areas of Bangladesh. Research by Kam *et al.* (2005) has established that the areas with the highest poverty incidence (above 50.5%) are the depressed basins in Sunamgonj, Habigonj and Netrokona districts in the northeastern region; Jamalpur, Kurigram, Nilphamari and Nawabganj districts in the northwestern region; and Cox's Bazaar and the coastal islands of Bhola, Hatia and Sandeep districts in the southern part of Bangladesh. The possible determinants of poverty are assets (human, financial and physical capital); opportunities (natural resource endowment, accessibility, migration), and vulnerability or susceptibility to environmental stresses.

Using the Cost of Basic Needs (CBN)<sup>7</sup> approach, the Household Income Expenditure Survey (HIES) (2005) conducted by the Bangladesh Bureau of Statistics (BBS) reported three poverty indices (in %) for the lower and upper poverty line expenditures. For the lower poverty line, 25.1, 4.4 and 1.3 are the head count index, poverty gap and squared poverty gap respectively, while the corresponding figures are 40.0, 9.0 and 2.9, respectively for the upper poverty line. The headcount index posits that around 29% and 44% of the rural community are living below the lower and upper poverty lines, respectively. Using the Food Energy-Intake<sup>8</sup> (FEI) method, the BBS poverty monitoring

---

<sup>7</sup> This method takes a normative consumption basket of food items recommended for the average Bangladeshi population that gives a per capita daily intake of 2112 kilocalories and 58 gm of protein needed to maintain a healthy productive life. A lower threshold of 1800 kilocalories is used for setting the poverty line for the extreme poor.

<sup>8</sup> The basic needs approach requires information on prices of goods that the poor consume. When data about are unavailable, researchers use an alternative method to construct the poverty line which is 'Food Energy Intake method'. In this method, it is required to find the level of consumption expenditure (or income) that allows the household to obtain enough food to meet its energy requirements. Note that consumption will include non-food as well as food items, even underfed households typically consume some clothing and shelter, which means that the margin these 'basic needs' must be as valuable as additional food (World Bank , 2005).

survey in 2004 reported that the households below the poverty line had decreased from 44.7% in May 1999 to 42.1% in March 2004.

In rural Bangladesh, when livelihood strategies fail, seasonal migration elsewhere from the origin is selected as a diversification strategy and this is well documented in the northwestern region. Livelihoods in the rural remote areas of the northeastern<sup>9</sup> area are challenging as they are highly vulnerable to flashfloods and remain submerged during the whole monsoon lasting 5 – 6 months. This study is focused on poverty and the livelihood sustainability of the people in this remote area.

### 1.3 Floodplains in Bangladesh

Bangladesh comprises three distinct physiographical regions: floodplains, terraces and hill areas. A significant part of Bangladesh is covered by floodplains formed by different rivers (Chowdhury, 2006, as cited in Banglapedia, 2006)<sup>10</sup>. They are neither uniform nor absolutely flat and are normally flooded in the rainy season. Morphologically, there are 6 main types of floodplain areas: (i) piedmont plains, (ii) active river floodplains, (iii) meandering river floodplains, (iv) major floodplain basins, (v) estuarine floodplains, and (vi) tidal floodplains [for details, see, for example, Brammer (1990)].

Under normal flooding conditions, depth-of-flooding land types for the total flood plain area are presented proportionately in Table 1.2. Considerable differences exist between regions: at the extremes, the northwest region has 58% Highland and no Lowland

---

<sup>9</sup> In respect of economical, social, political and geographical context the *Haor* area (northeastern region) is distinctly different from northwestern region. Recurrence flood, single crop season (dry season), single slack season (wet season), unpredictable crop yield, usual submerging period prolongs five to six months with unpredictable weather condition, high endowment of natural resources but less controlled and accessible by the poor, high unequal distribution of land with high productivity, narrow scope to diversify employment into off-farm and non-farm activities, highly remote etc. are the identical characteristics of *Haor* area of Bangladesh. On the other hand, the northwestern region bears the attributes of river erosion, flood, double crop seasons, two lean periods in which one is extremely insurmountable to overcome called *monga*, predictable crop yield, high unequal distribution of land with less productivity, more scope to diversify employment into off-farm and non-farm activities, well connected to capital city- Dhaka which is the principal growth center, numerous NGOs renders micro-credit facilities etc.

<sup>10</sup> [http://www.banglapedia.org/httpdocs/HT/F\\_0106.HTM](http://www.banglapedia.org/httpdocs/HT/F_0106.HTM)(accessed August 22, 2009).



or Very Lowland areas, whereas the northeast *Haor* area has less than 1% Highland but 43% Lowland and 23% Very Lowland areas. Within the meandering floodplain region, the ridge and basin relief is such that most villages include all or most of these land types within their boundaries, and farmers' fragmented holdings generally are scattered over all or most of them (Brammer, 1990).

Table 1.2: Proportion of depth-of-flooding land types in Bangladesh's floodplain area

Land Type	Highland	Medium Highland	Medium Lowland	Lowland	Very Lowland	Settlements, Water
Characteristics	Above normal flood level	Up to 90cm flooding	90-180cm flooding	180-300cm flooding	>300 cm flooding	
%	17	40	15	9	2	17

Source: Brammer, 1990.

The focus of this research is the *Haor* region which falls under the 'major floodplain basins'.

#### 1.4 Background of the study area

The study area is located in the northeastern *Haor* basin of Bangladesh and geomorphologically under the 'major floodplain basin' which hints of the vulnerability of its inhabitants. This is one of the most poverty stricken areas in Bangladesh where people depend on income generated mainly from dry season agricultural activities as, during the 5-6 month wet season the study area looks like an inland sea – this is called the annual monsoonal deluge. Its remoteness, physical and climatic vulnerabilities together constrain the pace of sustainable livelihood, make it challenging and limits the search for income-generating opportunities by its inhabitants for both dry season agriculture and wet season work. Thus, the dynamics of poverty and the mechanisms of sustainable livelihood in this

ecologically vulnerable and sensitive area constitute the focal areas of this research for which some contextual information is needed.

## **1.5 Haor**

The *Haor* region is an ecological area which provides resources to sustain the people living in that ecosystem. In a broad sense, the *Haor* ecosystem supports hundreds of thousands of households who have settled here for hundreds of years.

### **1.5.1 Identifying the study area**

The study area is situated deep in the *Haor* basin and hence can be termed as a remote *Haor* area. *Haor* is a low lying, bowl-shaped flood plain shaped by tectonic forces criss-crossed by numerous rivers descending from the hills of India carrying a huge volume of runoff water which frequently causes flashfloods and extensive flooding during the monsoon season. The *Haor* ecology is found primarily in northeastern Bangladesh and comprises 25% of the entire region embracing 5 districts, namely, Mowlovibazaar, Habigonj, Sunamgonj, Kishoregonj and Netrokona. The *Haor* basin is a wetland ecosystem with an estimated area of 8000 sq.km (BWDB, 2005)<sup>11</sup> or 2,045,000<sup>12</sup> hectares (ha). It is surrounded by the mountain ranges of India- Meghalaya to the north, Tripura and Mizoram to the south and Manipur and Assam to the east.

During the rainy season, the *Haor* resembles a vast inland sea in which the villages appear as islands and hamlets look like islets. From July-September, occasional high winds

---

<sup>11</sup> BWDB-Bangladesh Water Development Board.

[http://www.bwdb.gov.bd/index.php?option=com\\_content&view=article&id=105&Itemid=95](http://www.bwdb.gov.bd/index.php?option=com_content&view=article&id=105&Itemid=95)(accessed August 23, 2009)

But by expert 25000 sq. km (banglapedia Bangladesh) the probable reason is that this amount may be included the total submerged area during deluge. This connotation may have supportive ration as Craig, Hall, Barr & Bean (2004) state from total 80,500 sq. km (55% of the country) floodplain 26,000 sq. km. , in an average, is submerged on a seasonal basis (June – October) in response to monsoon rains (March - September) and snow melt. 1 acre = 0.4047 hectare

<sup>12</sup> The International Union for Conservation of Nature (IUCN), Bangladesh, 2005.

generate large waves in the *Haor* which may erode the edges of homesteads which the inhabitants try to protect by building wattle and bulrush fences. During the dry season, most of the water drains out, leaving a layer of rich alluvial soil which enhances the production of *boro* paddy (dry season paddy). These natural calamities in the *Haor* area fall heavily on the agricultural labour whose traditional and indigenous methods of daily sustenance force upon them a seasonal migration strategy to other rural, sub-urban or urban centers to diversify their income sources.

### **1.5.2 Genesis of the *Haor* Basin**

The *Haor* basin is bounded by the Old Brahmaputra floodplain (Mymensingh district) in the west, the Shillong Plateau's foothills in the north and by the Sylhet high plain (Sylhet district) in the east (Chowdhury, 2006, as cited in Banglapedia, 2006)<sup>13</sup>. It is not a newly formed geo-morphological structure but rather reflects millions of years of evolution. It is stated that "the sinking of this large area into its present saucer-shape seems to be intimately connected with the upliftment of the 'Madhupur Tract' (Chowdury, 2006, as cited in Banglapedia, 2006)<sup>14</sup>. The Madhupur tract is considered as the Pleistocene Terraces in Bangladesh (Monsur, 2006 as cited in Banglapedia, 2006)<sup>15</sup> which represents a geological epoch 11,000 years to 1.8 million years ago (Rashid, Monsur & Suzuki, 2006).

The main *Haor* areas in Bangladesh lie within the Sylhet trough which is one of the major tectonic structures of Bangladesh. The basement of the trough slopes northwards at a great depth and continues thrusting northwardly beneath the Shillong Plateau; as a result the plateau is raising and the trough is subsiding. The great thicknesses of sediments have

---

<sup>13</sup> [http://www.banglapedia.org/httpdocs/HT/F\\_0106.HTM](http://www.banglapedia.org/httpdocs/HT/F_0106.HTM)(accessed August 22, 2009).

<sup>14</sup> [http://www.banglapedia.org/httpdocs/HT/F\\_0106.HTM](http://www.banglapedia.org/httpdocs/HT/F_0106.HTM)(accessed August 22, 2009).

<sup>15</sup> [http://www.banglapedia.org/httpdocs/HT/P\\_0195.HTM](http://www.banglapedia.org/httpdocs/HT/P_0195.HTM)(accessed August 22, 2009).

intensified the rate of subsidence which currently is estimated at 3 cm/century while the current total subsidence rate is thought to be 5 cm/century (Choudhury & Nishat, 2005).

### **1.5.3 Human settlement in the *Haor* area**

In the Netrokona district, human settlement started long before 300 BC. A Greek traveler Megasthenes visited the Mymensingh<sup>16</sup> area in 302 BC and the entire area is mapped in his book, *Indica*. The Chinese monk, Xuanzang (Hiuen Tsang) visited the area in 639-645 AD and found both Buddhism and Jainism flourishing in Bengal. The economic prosperity of the Bengal delta attracted Muslims from different parts of India during the 13<sup>th</sup> to the 18<sup>th</sup> centuries. During the rule of the Mughals<sup>17</sup>, people also migrated to the delta region from other countries.

At the early stage of human settlement, the villages in the *Haor* area were oriented along the levees (*kandas*) of the major rivers (*nodis*). Prior to the 12<sup>th</sup> century, there is almost no information available on the human settlement in the *Haor* basin (Soeftestad, 2000). It is believed that the early immigrants of the area were Hindus and other ethnic groups including Garo, Hajong, Khasi and Koch people descending from the hills to the north. They were drawn to the area partly because of its productivity and partly because of the favorable tenurial conditions (Ali, 1990, as cited in Soeftestad, 2000).

With the expansion of Muslim power in the south and the west, Hindu migration continued in the 13<sup>th</sup> century. The Muslim conquest of Sylhet in the early 14<sup>th</sup> century probably stopped migration to Sylhet from outside but Hindu migration increased to the *Haor* basin from the Sylhet region. Following the Afghan defeat by the Mughals in Orissa

---

<sup>16</sup> The border of Mymensingh district underwent constant change and internal administrative changes continued. In 1882 Netrokona was made a sub-division of Mymensingh district and in 1984 Netrokona were promoted as district administrative unit.

<sup>17</sup> Mughal Empire had been established in India at 1526.

in 1592, a large number of Afghans moved into the *Haor* area. After the Muslim conquest of Sylhet in 1612, the growth of the Muslim population continued and accelerated after the British conquest of Sylhet in 1765. A conflict gradually grew between the sedentary cultivators and the tribal shifting cultivators with the latter moving out over time. By the 1770s, all cultivable land was brought under plough cultivation as the migrants were given the opportunity to farm land for only nominal rents attracting even more migrants from neighboring districts (Islam, 1985, as cited in Soeftestad, 2000).

#### **1.5.4 Distinctive features of the *Haor* area**

Agriculture is the main source of livelihood in the study area and, directly or indirectly, all other income sources in this disadvantaged area are dependent on it. However, flashfloods often cause extensive damage to the crops.

Fishing is the best optional source of income for the *Haor* people (Alam, 2004), but, otherwise, there is little work during the non-crop season (Gardener & Ahmed, 2006). The area supports rich fisheries after the flood waters have receded and attracts professional fishermen (*jele*) and seasonal fishermen (Craig *et al.*, 2004) who are primarily landless and marginal farmers for whom fishing has become a critical component of their livelihood (Alam, 2004). Nowadays, however, fishing is not allowed freely even during the peak monsoon in the disadvantaged area of *Haor* and *beels*<sup>18</sup> since fishing areas are leased out by government. The incidence of poverty is very high at about 50% (Kam *et al.*, 2005), in some areas, it varies from 61% to 81% (Rahman & Razzaque, 2000) while the incidence of poverty fluctuates seasonally (Khan & Islam, 2005).

---

<sup>18</sup> These *Haors* and *beels* are khas or government owned property and perennial in nature. Commonly, the deepest part of a *Haor* is called *beel*. The ministry of Land usually leases out these properties for a period of 1 to 3 years to the public on open tender basis to realize some revenue and obviously because of holding control over institution and politics the auction goes to the people of non-fisher rural rich and thus the poor and *jele* are inhibited to claim their right of fishing.

The *Haor* livelihood is precarious owing to failures of governance (Islam, 2004). The flood control measures of BWDB (Bangladesh Water Development Board) are often faulty increasing the vulnerability of villages to flashfloods. Sometimes, dams were upgraded too late and left incomplete allowing water to inundate fields and the whole crop within a day. The recurrent nature of this natural devastation erodes the livelihood potential forcing marginal farmers to the edge of the poverty line and the adoption of the seasonal migration strategy (Rabby *et al.*, 2011b; Islam, 2004).

The political governance of Bangladesh has direct and indirect impacts on the livelihood of the *Haor* people as it constrains the poor (seasonal fishermen) and *jete* (professional fishermen) livelihoods by obstructing fishing in the *jalmahal*<sup>19</sup> (Alam, 2004). Because of strong institutional affiliation and influence, ownership and control of such common resources usually revert to the elites<sup>20</sup>.

### **1.5.5 Poverty in the *Haor* Area**

Few researchers have explored the poverty in the *Haor* area. The research by Rahman & Razzaque (2000) on poverty in 3 villages in the Kishorgonj *Haor* area found its incidence to vary between 60%-76%, with 30%-43% moderately poor households and 30%-33% extremely poor households. The highest and lowest incidence of poverty in a *Haor* village was almost 81% and 61%, respectively. The extremely poor cohorts are landless, illiterate, wage labours, disabled and female-headed households the last being the most vulnerable.

---

<sup>19</sup> Large water bodies, fish sanctuary, sometime comprises of large *beels* and *Haors*.

<sup>20</sup> The rural rich people who are political brokers and con-jointly have strong hold on district administration in a mutual give and take relation.

Khan & Islam's (2005) poverty study in the Hakaluki *Haor* area<sup>21</sup> focused on only one village<sup>22</sup> which had sufficient economic resources and was near to the divisional district –Sylhet - where employment opportunities were available. Using the cost of basic needs (CBN) method, 21% of all households fell below the poverty line in the lean season declining to 12% in the peak season indicating the seasonal impact on income variations. Variations in the incidence of poverty can be traced to land<sup>23</sup> ownership. In both the peak and lean seasons, the largest percentage of poverty (8% and 13% respectively) prevails among the absolutely landless households. None of the middle and large landholding households suffer poverty in the peak season. Based on the income poverty line, 40% and 17% of the households live below the poverty line in the lean and peak seasons, respectively. Other studies (for instance, Rana, Chowdhury, Sohel, Akhter & Koike, 2009) have also reported the prevalence of extreme poverty in the *Haor* area.

#### **1.5.6 Pre-monsoon floods in the *Haor* areas may cause food crisis by 2050**

Since the early flashfloods damage the important *boro* crop in the northeastern *Haor* areas, Bangladesh is likely to face a severe food crisis by 2050. As the rainy season shifts due to climate change, it is anticipated that in the near future, flashfloods will be more frequent causing water logging during April-June, the peak period for *boro* cultivation and production [United News of Bangladesh (UNB), 2009]<sup>24</sup>.

---

<sup>21</sup> Geographically it is located in a core *Haor* district – Moulovibazaar and in a divisional district – Sylhet in the northeastern Bangladesh.

<sup>22</sup> The sample size of this research is very small which is 181 households only.

<sup>23</sup> The study considers six categories of land classes. The respondent household are categorized as absolutely landless who do not have any cultivable land which means that this class of people do not have any assurance of own subsistence. Having land from 1 to 50 decimals are categorized as landless, such households are engaged in wage labor in Bangladesh. Having land from 51 to 150 decimals are categorized as marginal land holding households, they also depend heavily on selling out labor. The small owners are categorized who own 151 to 250 decimals of land. The classification follows to the middle category landowners who own land between 251 to 500 decimals. This types of landowners are called '*grihastha*' means that they are self-sufficient and do not borrow money unless face budget deficit. They employ labors when the work load is heavy in the field. The households own land more than 500 decimals are categorized as large landowners who are capable to produce surplus.

<sup>24</sup> UNB-United News of Bangladesh.<http://www.thedailystar.net/newDesign/news-details.php?nid=119318> (accessed December 26, 2009).

The rainfall is expected to increase by 10%-15% in the *Haor* area by 2050 and, at the same time, it will also intensify in Cherrapunji<sup>25</sup> in Meghalaya in India uplifting the supply of rainwater and inundate Bangladesh's *Haor* areas before the monsoon. Due to the heavy rainfall, the river water level will increase by 0.6 meter by 2050, threatening the *boro* crop which can only be protected by the re-building and raising the height of the protective polders by 1-1.5 meters. The five districts<sup>26</sup> have 367 kilometers of embankments to protect the *boro* crops from early flashfloods; they are insufficient currently and will be even more so in the future when climatic conditions worsen (UNB 2009)<sup>27</sup>. Due to climate change, the incidence of floods in Bangladesh has been raised by 20% negatively affecting the food grain production in the country's low-lying *Haor* areas (UNB 2009)<sup>28</sup>.

---

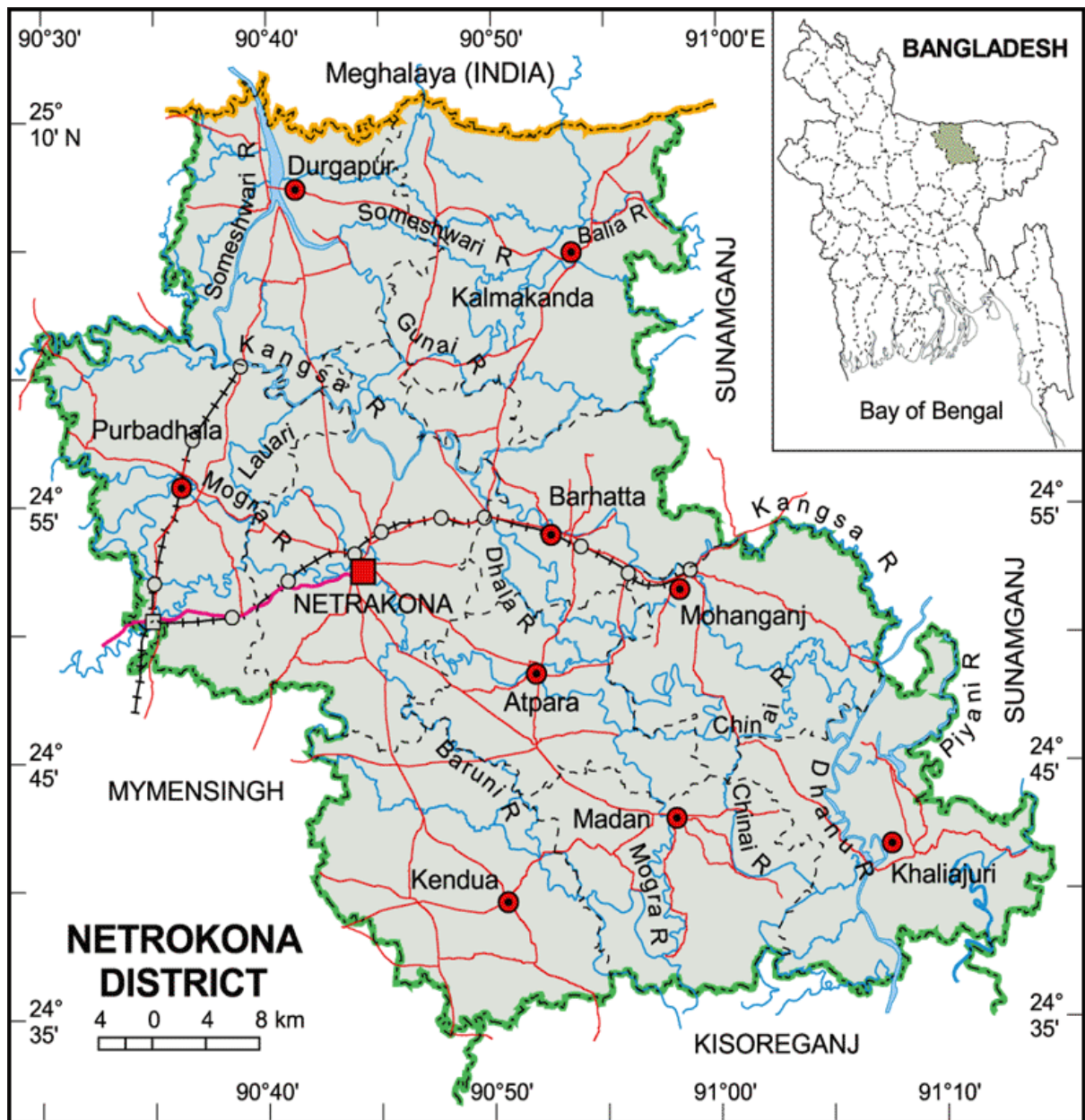
<sup>25</sup> At present 14,000 mm of rainfall are recorded at Cherrapunji in Meghalaya, India.

<sup>26</sup> There are approximately 57 *Haors* in Sylhet, Sunamganj, Moulivazar, Habiganj, Netrokona and Kishoreganj districts in the northeastern Bangladesh are known to *boro* cultivation. But flashflood damages huge crops of these districts during harvest every year.

<sup>27</sup> <http://www.thedailystar.net/newDesign/news-details.php?nid=119318> (accessed December 26, 2009).

<sup>28</sup> <http://www.thedailystar.net/newDesign/news-details.php?nid=119318> (accessed December 26, 2009).





Map1: The study area

(Source: <http://mapofbangladesh.blogspot.com/2011/09/netrokona-district.html>)(accessed April 9, 2010)

## 1.6 Study area: location and some statistics

The research area is located in the major floodplain basin of Bangladesh comprising extensive old swamp depressions whose centers stay wet throughout the dry season but are flooded to approximately 2 to 5 meters in the rainy season (Brammer, 1990). The area is highly ecologically vulnerable to flashfloods and normal (riverine and rainfall) floods.

Specifically, the study area (Map 1) is in northeastern Bangladesh *Haor* area of the Netrokona district<sup>29</sup>. Among its ten *upazila* (sub-district), one ecologically vulnerable *upazila* is Mohanjonj which covers 243.20 sq. km. or 0.1648% of Bangladesh's total area (BBS, 2001). The Mohanjonj *upazila* comprises of seven *unions* (sub-sub-districts) where the study area – *Gaglajore union*- is located.

The specific *union* comprises of 22 villages with 3283 households of which 1389 report agriculture<sup>30</sup> as their main income source. Agricultural labour is the main income source for 805 households while business, fishing and non-agriculture labour are the main income sources for 254, 236 and 195 households respectively. Only 4 households report remittances as a main income source. Other supplementary income sources are handlooms (4 households), industry (2 households), hawking (3 households), transportation (3 households), construction (14 households), religion (33 households), service (49 households), rental (2 households) and others (290 households) (see Table 1.3 for some comparative data).

---

<sup>29</sup> Bangladesh is divided into 64 districts and subsequently each district is also divided into *upazilas* (sub-district) which are subdivided into union (sub-sub-district which is the lowest administrative unit). Then the unions are subdivided into wards and wards into villages which are comprised of *para*- a cluster of households (hamlet).

<sup>30</sup> Which includes forestry and livestock as well (BBS, 2001).

Table 1.3: General information about households in the studied area in comparison to *Union*, *Upazila*, District, Division and Country

	Area (Sq. km.)	<i>Union</i>	Village	Household	Population			Literacy Rate (%)
					Both sex	male	female	
Study Area	7.1878	--	5	1050	5494	2880	2614	31.41
-Gaglajore								
-Mohabbotnogor								
-Chawarapara								
-Chandpur								
-Mandarbari								
Gaglajur <i>Union</i>	43.7769	1	22	3283	17266	9054	8212	28.62
Mohangonj <i>Upazila</i>	243.20	7	128	28835	143740	73702	70038	34.3
Netrokona District	2747.91	85	1612	409807	1988188	1016991	971197	34.9
Dhaka Division	30988.90	1236	16934	8236030	39044716	20362457	18682259	47.1
Bangladesh	147570.0	4466	59229	25490822	124355263	64091508	60263755	46.15

Source: BBS, 2001

In the study area comprising 1050 households, 312 households derive their main income from agriculture, forestry and livestock followed by 300 households engaged as agriculture labour, 114 households in non-agricultural activities, and 48 households involved in fishing. Only one household in *Gaglajore* village reported remittances as its main income source.

In the *Gaglajore union*, 45.17% of households do not have any agricultural land but in the five study villages taken together, this is 50%. The average household size of the study area is 5.25 persons which is higher than the national average of 4.88; the area is densely populated at 764.35 persons per sq. km which exceeds the *union* and national averages of 394.41 and 843 person per sq. km., respectively.

### **1.7 Livelihoods in the study area**

The livelihoods of the study area's inhabitants are directly dependent on the *Haor* and *beels* (permanent water bodies within the *Haor*) which support agricultural activities and commercial fisheries. The rich alluvial flood plains support major paddy growing activities while the aquatic vegetation provides rich grazing for domestic livestock and an alternative source of fuel and fertilizer for the local people.

Agriculture is the major means of livelihood in Bangladesh and likewise in the study area but under a precarious regime. The main dry season (crop season) income revolves around *boro* cultivation and, directly and indirectly, all other income sources of this remote area are dependent on it. It should be noted that early flashfloods often cause extensive crop damage and threaten livelihoods which Islam (2004) attributes to bureaucratic ineffectiveness in maintaining the protective dikes and embankments.

Fishing is another important livelihood source in the study area and until the 1980s, the indigenous fishermen were careful in their exploitation of the fisheries resources. However, with population pressure and demographic changes, others who adopted this activity as a livelihood strategy were less knowledgeable about resource conservation. Fishing was intensified with different techniques and gears leading to over-fishing and resource depletion.

Moreover, the elites<sup>31</sup> who took control of the *beels* by obtaining the government leases monopolized this resource. Neither the indigenous fishermen nor the ordinary people were allowed to fish in and around the *beels*, thus affecting their incomes and livelihoods.

### **1.8 Sources of income in the study area**

In their analysis of poverty trends during 1987-1994, Rahman (1996a) categorized rural household income into broad two groups - 'agricultural' and 'non-agricultural' income decomposing it by the sector of origin and economic activities. However, because of the inherent seasonal characteristics, the socio-economic conditions of the area could be better analyzed if income sources are classified under 'dry season income (DSI)' and 'wet season income (WSI)'.

Dry season income (DSI) includes income mainly from agricultural activities (crop production, crop stubble, livestock, fisheries, vegetable, fruits, etc.), non-agricultural activities (petty trading, earthwork, earthenware work, homestead construction, etc.) and wage labour.

---

<sup>31</sup> The rural rich people who are political brokers and con-jointly have strong hold on district administration in a mutual give and take relation.

Wet season income (WSI) refers to income mainly from fishing, remittances and non-agricultural activities [boating, grain husking, trading (grains, seasonal fruits, bamboo, plank of wood), petty trading, market intermediation, boat renting] and wages from homestead work. It is difficult for the poor to find alternative employment opportunities in their *Haor* villages during the wet season largely because of hydrological difficulties. Most of the landless farmers undertake seasonal domestic migration (SDM) elsewhere in Sylhet, Comilla, Chittagong and Dhaka.

### **1.9 Choice of the study area**

The study area differs from other poverty stricken regions (e.g., the northwestern region) of Bangladesh in several aspects. Recurrent flashfloods, paddy monocropping, the long slack and wet season, unpredictable crop yields, limited accessibility particularly to the *beels* for fishing by the poor, unequal distribution of land, narrow scope to diversify employment into off-farm and non-farm work and its remote location characterize the study area (Rabby *et al.*, 2011a). With the threat of climate change, its future livelihood can be expected to more challenging and the country as a whole will suffer extensive food crises by 2050 (UNB, 2009)<sup>32</sup>. In sum, the area is geographically isolated, politically disregarded, administratively neglected and economically impoverished making its development an almost insuperable challenge for policymakers.

### **1.10 Problem Statement**

The research area is poverty stricken (Kam *et al.*, 2005), highly flood prone (BWDB, 2005) provides less opportunities of livelihood diversification and forces its vulnerable population to migrate elsewhere in search of supplementary income sources (Gardener & Ahmed,

---

<sup>32</sup> <http://www.thedailystar.net/newDesign/news-details.php?nid=119318> (accessed December 26, 2009).

2006). This research is, thus, an attempt to study the poverty and its dynamics in the *Haor* area; its status can be gauged by data in the Regional Human Poverty Map 2000 (Sen & Ali, 2005) and the Poverty Map (Kam *et al.*, 2005). According to the former source, the Human Poverty Index in Netrokona district is above 37 while the latter source indicates that the prevailing headcount indices of poverty in Mohangonj *upazila* ranges from 50.2% to 72.7 % indicating severe and extreme poverty.

Household income in the *Haor* area is subject to a diversity of uncontrolled, semi-controlled and controlled (USC) factors (Rabby *et al.*, 2011a). Floods, remoteness, and inadequate infrastructure facilities affect rural household incomes (Kam *et al.*, 2005; Davis, 2007; Banerjee, 2007; Shahabuddin, 2004); population pressure has resulted in an increase in the number of landless households in the *Haor* area (Khan & Islam, 2005); while the primary income of the *Haor* households is derived from paddy monocropping cultivation (and related activities) subject to the ecological, geographical and environmental (EGE) attributes of the *Haor* ecosystem.

The ecological attributes constrains income sources forcing the inhabitants to maximize their incomes from the dry season agricultural activities which can be damaged by flashfloods, hail storms and dry weather cause crop damage affecting the household and community economic sustenance. The *Haor* people work strenuously during the crop season and try to save as much as possible to sustain livelihoods during the long monsoonal deluge which itself severely challenges their livelihood strategies in many ways; the labour market is virtually non-existent while access to infrastructures and resources to sustain them is curtailed (Rabby *et al.*, 2011 a, b).

The geographical remoteness of the area makes the dynamics of *Haor* livelihoods more problematic because, for example, in the area of 15-17 km of the sample villages, there are no public health services for the poor, government social protection programs are mostly absent and minimal local government activities are available in the dry season.

The recurrence of flashfloods affects the rhythm of life directly, reducing the agricultural income (crop income) and severely limits the sources of non-agricultural income in the dry season. In 2004 for instance, in Mohangonj and Khaliajuri *upazila*, 30,696 families (154,370 people) were affected by early flashfloods, 75% of the crops in 7 *unions* of two *upazilas* were damaged, to meet cash needs 25% -40% of the livestock were sold at 60% -70% of the actual price, the people could not obtain new credit as they had unpaid loans from the previous bad crop season, forcing migration elsewhere to meet household sustenance requirements (Disaster Emergency Response [DER] Secretariat, 2004).

During the long monsoonal deluge, there are few work opportunities besides fishing (Gardener & Ahmed, 2006); however, as the government has leased out *beels* to the elites in the community, the poor (who used to be seasonal fishermen) and the *jete* (professional fishermen) have no free access to the *Jalmahal*<sup>33</sup> (Alam, 2004). Inaccessibility to what were common resources prevents income diversification strategies and pushes the *Haor* people even deeper into the poverty nexus.

Under such burdensome social, economic and ecological circumstances, seasonal migration is a last alternative to sustain livelihoods; it itself is constrained by the situation

---

<sup>33</sup> Large water bodies, fish sanctuary, sometime comprises of large *beel* and *Haor*.



of each household, the seasonal migrant himself and the nature and availability of work opportunities elsewhere (Rabby *et al.*, 2011b; Gardener & Ahmed, 2006).

### **1.11 Scope of the study**

As the purpose of this study is to address poverty, the focus is on the income of the households of the *Haor* villages; this includes incomes from both the dry and wet seasons, in kind and in cash. The whole community, irrespective of poverty status, is considered in the study in order to generate meaningful comparisons.

### **1.12 Objectives**

The main objective of this study is to derive the baseline poverty conditions and the sustainable livelihood mechanisms to underpin antipoverty policies for the northeastern region of Bangladesh. The other objectives are:

- a) to examine the poor and explore their poverty profile<sup>34</sup> and examine the causes and consequences of poverty in the *Haor* area.
- b) to examine the sources of income of the *Haor* households during the crop and monsoonal seasons, demographic attributes of the households, livelihood assets and transforming factors (e.g., roads network).
- c) to examine the dynamics of poverty, livelihood diversification strategies and their impact on overcoming crises confronting the *Haor* households.
- d) to examine the causal links between poverty and seasonal domestic migration (SDM) and their relationship to the resource base of the migrant households.

---

<sup>34</sup> A description of how the extent of poverty varies across subgroups of population, characterized by, for example, their gender, region of residence, types of economic activities, or source of income (Dayton, Khan, Ribe & Schneider, 1993).

### **1.13 Research questions**

The aim of this research is to understand the primary factors affecting the socio-economic status of the *Haor* people who have settled in the area for hundreds of years. Despite having a population of twenty million covering one fifth of the country's land area and producing 20% of its staple food output, the area still remains relatively neglected by policy makers as a persistent spatial poverty trap for the last four decades since Bangladesh's independence. Arising from this, the questions underlying this research are:

Who are the poor and what are the causes and consequences of poverty among the *Haor* villages?

What are the determinants of the income of the poor households and how is it managed?

What factors interrupt household livelihood dynamics and what are the major livelihood diversification strategies adopted by them?

What is the relationship between access to assets and household poverty status?

How does the seasonal domestic migration (SDM) strategy affect household poverty status?

### **1.14 Thesis structure**

The thesis consists of 6 chapters including the introductory chapter that covers the background of the research, the research problem, objectives and questions.

Chapter 2 starts with a brief discussion of the concepts and definitions of poverty followed by a review of the various poverty theories and their relevance to the research context. Since none of the theories alone can fully explain the poverty phenomenon, an

attempt has been made to derive a theoretical framework of poverty based primarily on the relative deprivation approach. This leads then to the conceptual framework adopted for this study.

Chapter 3 reviews the relevant literature on poverty and livelihood sustainability. The first section comprises three parts: worldview of spatial poverty, country context, and poverty in the *Haor* area. In this review, the focus is the causes and consequences of poverty and the strategies applied to escape the poverty trap. The second section deals with the multifaceted characteristics of sustaining livelihoods, relationship between assets and livelihood sustainability, diverse coping strategies and the impact of seasonal domestic migration on household poverty status.

The methods of data collection and analysis form the core of Chapter 4. Data gathering procedures include the census survey, semi-structured interviews and focus group and key informant discussions. The mixed method approach to analyzing the data includes the two qualitative and two quantitative strategies elaborated in this chapter. All these approaches are inter-linked to provide a holistic analysis of the poverty dynamics in the *Haor* region.

Chapter 5 covers the study's findings in five sections: general information about the *Haor* villages, poverty and income flows in the *Haor* households, identification of major income determinants, dynamics of *Haor* poverty and the poverty-seasonal domestic migration nexus. The analysis generates an understanding of the various issues that are intertwined: characteristics of the poor, seasonal income variations and occupational diversification strategies of households, empirical analysis of income determinants for six types of households, causes and impact of poverty, trends and dynamics in the poverty and

livelihood situation in the *Haor* basin, local informal institutions that influence *in situ* livelihood approaches, strategies utilized to improve livelihoods, identifying who the seasonal domestic migrants are and the linkages with poverty. The analysis of these issues is instrumental in answering the research questions.

Chapter 6 comprises two sections. The first section is a discussion of the implications of the findings in Chapter 5 directed to the research questions and the derivation and formulation of effective policies and programs to overcome the poverty nexus in the *Haor* basin of Bangladesh. The second section deals with the study's conclusion, policy approaches and summarizes the anti-poverty policy interventions to attain livelihood sustainability in the *Haor* area in Bangladesh. It also addresses the contributions of the study and the potential directions for future research in this critical area.

## **2. POVERTY CONCEPT, THEORIES, THEORETICAL AND CONCEPTUAL FRAMEWORK**

### **2.1 Introduction**

Poverty issues have been thoroughly examined from several disciplinary perspectives including economics, political science, sociology, psychology, anthropology and others. The common perception of poverty encompasses visions of acute deprivation of the basic necessities of life such as food, shelter and clothing, famine and degradation of human dignity when individuals are forced to survive through begging (Jamilah Ariffin, 1994).

As poverty is contextual in nature, no single definition of poverty can be appropriate to all countries, societies or communities. The concept of poverty invariably refers to a lack or insufficiency of means, but it is devoid of substantive content unless approached within its income context. Income poverty is pervasive in low-income parts of the world but poverty and its depth, severity or intensity in any low-income country is significantly contextual in nature, ranging from abject rural poverty to severe income inequalities in the urban areas.

### **2.2 Concept and definition of poverty**

The meaning of poverty often depends on the particular approach taken by the researcher in studying the poor (Jamilah Ariffin, 1994); recently Laderchi, Saith & Stewart (2003) adopted four different approaches to investigating poverty – the monetary, capability, social exclusion and participatory approaches.

- a) The monetary approach views poverty as a shortfall in consumption (or income) from the poverty line.
- b) The capability approach represents it as a failure to achieve certain minimal or basic capabilities.
- c) The social exclusion approach to poverty is a relative one in which social exclusion is defined for such specific groups as the aged, handicapped, and racial or ethnic categories rather than pertaining to individuals.
- d) The participatory approach stresses people's self perceptions of well-being and ill-being.

Hagenaars & De Vos (1988) suggest that all poverty definitions can be reduced into one of the categories below:

- (a) Poverty is having less than an objectively defined, absolute minimum.
- (b) Poverty is having less than others in society.
- (c) Poverty is feeling you do not have enough to get along.

In the first category, poverty is absolute, in the second, poverty is relative while in the third, poverty may be absolute, relative, or in between. From a different view, the third category defines poverty subjectively, while the first and second categories define poverty objectively (Hagenaars & De Vos, 1988).

### **2.3 Poverty Measurement**

The methods of poverty measurement are subject to how the poverty line is determined and its selection depends on the purposes of measurement and data availability

(Ravallion & Sen, 1996). Different methods of poverty measurement are discussed and compared in the following section.

### 2.3.1 Direct Calorie Intake (DCI) method

This is the earliest method used by the Bangladesh Bureau of Statistics (BBS) to estimate poverty in the country (F. Ahmed, 2004). In this method, the household's nutrition requirement, in calories, is the vital issue with the household's per capita calorie intake as the unit of measurement. A household's per capita energy intake under the standard per capita requirement of energy defines the poor and is termed the Direct Calorie Intake (DCI) method of poverty measurement (Kakwani, 2003). A daily comprehensive food-basket with the corresponding calorie content is used to estimate the total calorie intake consumed per household. Table 2.1 shows the nutritional food-basket for Bangladesh; when the total calorie intake is divided by household size, the per capita household calorie intake is given.

Table 2.1: Nutritional basket of Bangladesh

Food items	Per capita normative daily requirements		Average rural consumer price (taka/kilogram)
	Calories	Quantity (grams)	
Rice	1,386	397	15.19
Wheat	139	40	12.81
Pulses	153	40	30.84
Milk (cow)	39	58	15.90
Oil (mustard)	180	20	58.24
Meat (beef)	14	12	66.39
Fish	51	48	46.02
Potatoes	26	27	8.18
Other vegetables	36	150	38.30
Sugar	82	20	30.49
Fruit	6	20	28.86
Total	2112	832	

Source: Wodon, 1997.

The poverty estimates based on the DCI approach are easy to understand because of its simplicity and transparency. For example, until 1991-1992, Bangladesh used a national threshold of 2,112 (Wodon, 1997) and 1805 (Kakwani, 2003) calories per capita per day energy intake to estimate absolute and hard core poverty respectively (Table 2.2).

Table 2.2: Poverty estimates in Bangladesh using DCI method

Year	Absolute Poverty (%)			Hard Core Poverty (%)		
	Rural	Urban	National	Rural	Urban	National
1985-1986	54.7	62.6	55.7	36.3	30.7	26.9
1988-1989	47.8	47.6	47.8	38.6	26.4	28.4
1991-1992	47.6	46.7	47.5	28.3	26.3	28.0
1995-1996	47.1	49.7	47.5	24.6	27.3	25.1
2000	42.3	52.5	44.3	18.7	25.0	20.0

*Source: Bangladesh Bureau of Statistics; Kakwani, 2003*

Although poverty is a rural phenomenon and higher in most rural areas in the world, the data in Table 2.2 are counterintuitive. Rural poverty (e.g., 42% in 2000) is much lower than urban poverty (e.g., 53 % in 2000) showing that the DCI method has serious inconsistency problems. In Bangladesh, this method overestimates urban poverty while underestimating rural poverty and may result in misleading policy prescriptions.

### 2.3.2 Food-Energy Intake (FEI) method

The Bangladesh Bureau of Statistics (BBS) has also applied the Food-Energy Intake (FEI) method of determining the poverty incidence which requires estimating the per capita total consumption expenditure (or income) level that allows the household to meet its caloric requirement (Ravillion & Sen, 1996) of 2112 calories. Consumption expenditure will automatically include non-food as well as food items thus avoiding the problem of identifying the basic household needs. Empirically considering 2112 calories as the poverty threshold, the poverty line expenditure is determined including both food and non-food



expenditure using the semi-log model:  $\ln Y = \alpha + \alpha_1 X$  where y represents per capita per month expenditure and X means per capita per day calorie intake (F. Ahmed, 2004).

### **2.3.3 Cost of Basic Needs (CBN) method**

The Cost of Basic Needs (CBN) method is founded on the concept of a person's 'physical efficiency' based upon the consumption of essential consumption items (Ravallion & Bidani, 1994; Kakwani, 2003). Setting the poverty line using this method involves a normative consumption of a basket of food recommended for the average population. It should be sufficient to provide a predetermined caloric requirement (e.g., such as those given in WHO, 1985) while the composition of food should be consistent with the consumption behavior of the average population. In this method, the total poverty line is derived from the sum of food and non-food costs of basic consumption bundle (Kakwani, 2003). In Bangladesh, a per capita daily intake of 2112 calories and 58 gm of protein is needed to maintain a healthy productive life and is considered the upper poverty line for the moderately poor. A lower threshold of 1800 kilocalories sets the lower poverty line for the extremely poor.

Determining the non-food component of the poverty line is difficult as there is no unanimous set of non-food components corresponding to the food-basket and it varies across sectors, regions, age, sex and occupation of an individual. In Bangladesh, different studies consider diverse types of assessment for non-food goods. For example, in rural poverty estimates, 30% of the food-basket is considered as the non-food allowance (Hossain & Sen, 1992, as cited in Hossain & Nargis, 2010) while a 40% allowance is considered to estimate urban poverty (Sen & Islam, 1993). Rahman & Haque (1988, as cited in Wodon, 1997) use a 25% allowance of the food poverty line to calculate poverty

for the both rural and urban sectors, while 35% of the food poverty line in 1983/84 is used by Ravallion & Sen (1996).

This method is being currently followed to calculate poverty in Bangladesh. Table 2.3 shows the various CBN poverty lines for 14 geographical areas of Bangladesh.

Table 2.3: CBN Poverty line in Bangladesh (per capita per month in Taka)

Geographic Area	1991-92		1995-96		2000	
	ZL	ZU	ZL	ZU	ZL	ZU
SMA Dhaka	480	660	574	791	649	893
Other Urban Area	399	482	480	580	521	629
Rural Dhaka	425	512	492	593	548	659
Rural Faridpur Tangail Jamalpur	432	472	484	529	540	591
SMA Chittagong	523	722	627	867	702	971
Other Urban Chittagong	517	609	619	730	694	818
Rural Sylhet Comilla	432	558	499	644	572	738
Rural Noakhali Chittagong	438	541	522	645	582	719
Urban Khulna	482	636	552	727	609	803
Rural Barisal Pathuakali	413	467	494	558	546	616
Rural Khulna Jessore Kushtia	420	497	499	592	527	624
Urban Rajshahi	446	582	496	647	557	726
Rural Rajshahi Pabna	459	540	535	630	586	690
Rural Bogra Rangpur Dinajpur	426	487	468	535	510	582

*Note: SMA-Statistical metropolitan area, ZL-Lower poverty line, ZU-Upper poverty line.*

*Source: BBS, Kakwani, 2003; F. Ahmed, 2004.*

### 2.3.4 Summary

To estimate poverty, three approaches have been applied in Bangladesh: DCI, FEI and CBN, each having both advantages and disadvantages covered in various studies (Ravallion & Sen, 1996; Kakwani, 2003; F. Ahmed, 2004). Though simple to understand, the DCI method measures not poverty but undernourishment. When calorie intake requires conversion to the expenditure level, the EFI method becomes inconsistent. Individual expenditure level varies with different market conditions and geographical locations. As prices are higher in the economically progressive areas, individual expenditures will rise

requiring the poverty line to move upwards. Thus, using the same calorie requirement benchmark for sectors and locations may be misleading (Ravallion & Sen, 1996; Kakwani, 2003). Although basic needs may mean food, clothing and housing, there is no general agreement on what basic needs are (Hagenaars & De Vos, 1988) and how the necessary caloric requirement should be determined for households. Against this debate, the CBN approach has been currently used to measure poverty in Bangladesh.

## 2.4 Theories of Poverty

Poverty mostly prevails in remote rural areas such as the *Haor* area<sup>35</sup> of Bangladesh (R.I. Rahman, 2002) where people survive in a subsistence economy and livelihoods are challenging by its ecological vulnerabilities.

Generally, theories of poverty can be subsumed into six major groups among which Bradshaw (2006, 2007) has discussed five: (a) theory of individual deficiencies, (b) culture of poverty theory, (c) social progressive theory, (d) theory of geographical disparities, (e) cumulative causation theory; the sixth theory is economic and social inequality theory discussed by Husin Ali, 1986, as cited in Lim, 1990.

**The first theory of poverty** is about individual deficiencies focusing on the individual who is responsible for his/her poverty and on whom the effort rests to escape poverty. It links poverty directly to individual abilities and motivation. Every individual's inherent characteristics like age, sex and asset endowment like education, skills, experience, land, health and also opportunities like access to infrastructure, resources,

---

<sup>35</sup> *Haor* is a fresh water wetland ecosystem which receives surface water runs off by rivers and canals, and consequently becomes a very extensive water body in the monsoon and dries up mostly in the post-monsoon period. In Bangladesh *Haors* are found mainly in northeastern regions.

credit market, labour market must be taken into account in assessing a person's deficiencies.

**In the second theory of poverty**, the root cause is the 'culture of poverty' which is sometimes has linked to the individual theory of poverty. It suggests that poverty is created by the transmission over generations of a set of beliefs, values and skills that are socially generated but individually held. Individuals are not necessarily to blame because they are victims of their dysfunctional sub-culture or culture (Bradshaw, 2006 & 2007).

The culture of poverty is a sub-culture of poor people in poor regions psychologically unable or unwilling to overcome their socio-economic conditions up by exploiting opportunities accruing in their life time. The psychological barriers to face new challenges like learning new language, adapting to new cultures, upgrading skills by adopting technology, acquiring experience in new jobs, loosening family ties, etc., involved in breaking out of their comfort zones make it problematical in accepting challenges and opportunities. The poor agricultural and wage labourers in the backward *Haor* area rarely move to urban centers as they fear urban modernity and competition, unfamiliar environments, learning new jobs, etc, which contrasts starkly to their cohesive rural society.

In the **third theory**, progressive social theory, it is not the individual but the economic, political and social system which causes people to have limited opportunities and resources to escape the poverty trap. Structural barriers (such as the lack of educational opportunities) limit poor households from getting better jobs because of the lack of economic growth in sectors supporting lower skilled jobs (Blank, 1997, as cited in Omideyi, 2008; Quigley, 2003). Historically, rural society of Bangladesh functions through an informal social system in which the poor households can depend on social networks to

sustain them during emergencies - such systems cannot be tapped in new environments such as urban centers where work opportunities are more available than in the rural areas. Another structural impediment is the gender bias in seasonal outmigration disallowing women or female headed households from exploring supplementary income sources elsewhere.

**The fourth theory of poverty** links poverty to geographical disparities such that people, institutions and cultures in certain areas lack the resources needed to generate well being and income, and the power to claim its redistribution. Poverty and physical geography is a theme in Sachs' (2005) poverty analysis. In Bangladesh, poverty is highly concentrated in areas, like the *Haor* basin, which are vulnerable to river erosion, drought, coastal erosion, brine water intrusion and floods. River bank erosion is probably the most important natural cause of landlessness and hence a contributory factor in the incidence of poverty.

**The fifth theory of poverty** views individuals and their communities caught in a spiral of opportunity and problems and once those problems dominate, they destroy those and create a cumulative set of problems that make any effective response nearly impossible (J. Bradshaw, 2000; Bradshaw, 2006; Omideyi, 2008). This cyclical explanation explicitly looks at individual situations and community resources as mutually dependent and can be labeled as the 'vicious circles of poverty'. Thus, for example, a poor individual may not have enough food to eat; being underfed, his health may be poor; being physically weak, his working capacity is low, which means that he is poor, which in turn means that he will not have enough food to eat; and so on. Thus, in this theory when flood causes crop failure, it decreases work opportunities, limits sources of income, peasants and share croppers fall

into debt which leads the petty traders and small retailers to lose their business ultimately creating a lack of income opportunities and employment leading to more extreme forms of poverty.

**The sixth theory** of poverty is ‘**the economic and social inequalities theory**’ which postulates that the prevalence of poverty is associated with the concentration of wealth and power in a particular class within a country (Parkin, 1979; Husin Ali, 1986, as cited in Lim, 1990). The poor have no assets to generate income and, moreover, have limited access to various economic opportunities to create income flows. Poverty is a product of social stratification resulting in differential access of various classes to economic resources and political power (Lim, 1990). In rural areas, economic inequalities exist between the elite upper class and the poor lower class within a socially stratified structure that supports exploitation and appropriation. Social inequalities (lack of a voice in community affairs, a biased judicial system, etc.) prevail when there is lack of equal social status - thus, both inequalities are mutually reinforcing and work to the detriment of the household’s poverty status.

## **2.5 Theoretical framework of the study**

Though none of the poverty theories alone can describe and explain poverty, they outline its diverse manifestations, attributes and antecedent factors. The complexity of poverty measurement mirrors the complexity of understanding of the phenomenon.

The individual deficiencies theory attributes the prevalence of poverty to (i) an individual’s time variant and invariant inherent characteristics (e.g., age, education, sex etc.) and (ii) his/her assets endowment (e.g., education, skills, experience) which open

windows of opportunity for self-improvement. Educational attainment, for instance, can contribute to income as it is an asset which can be capitalized in terms of ‘entitlements,’ for example, to labour, capital, and social welfare support (Oxaal, 1997).

As the culture of poverty underlines the sub-cultures of people as a major determinant of the existence and extent of poverty, it basically asserts that people are poor because of some personal or cultural attributes that constrain attempts to break out of the poverty trap. Thus, poverty transcends the mere lack of resources is grounded on individual traits of dependency, illegitimacy, instability, etc. (Corcoran *et al.*, 1985).

The social, economic and political contexts also impinge on the extent of poverty as its aggregate influence inhibits the ability to extend income sources in a strategy to escape mere subsistence. The spatial nature of poverty also exerts a strong influence on poverty because of geographical isolation and remoteness. Geographical disparity in the location of land leads to the speculation that remoteness of an area is a crucial determinant of poverty. When problems dominate opportunities then the poverty of households declines exponentially and lack of access and control over resources negatively impact the financial situation of households (Bradshaw, 2006; Omideyi, 2008; Kothari, 2002; Lim, 1990).

In this study, the relative deprivation approach (RDA) that states that people use other reference groups at a point in time to evaluate their social and economic circumstances (Yitzhaki, 1982; Stark & Yitzhaki, 1988; Pettigrew *et al.*, 2008; Silber & Verme, 2012) is adopted as the theoretical framework for poverty analysis. The rationale behind adopting RDA is that no one poverty theory can to explain poverty comprehensively. In this approach, diverse socio-economic conditions affecting individual/household disparities in income, household status (gender), education and

occupational activities are juxtaposed against the social and political structures governing accessibility to the resources existing in the *Haor* area. This approach to understanding the poverty phenomenon in the *Haor* area illuminates the existing socio-economic disparities and enable the categorization of households into the extremely poor, moderately poor and non-poor in the study villages. It facilitates the analysis of the extent of relative deprivation of the poor/non-poor in terms of economic opportunities such as the ownership of land, access to natural resources (for e.g., common fishing grounds), public services, credit and infrastructural facilities.

## **2.6 Conceptual framework of the study**

In this research, the main concepts considered are poverty, household and income (Figure 2.1). No generic poverty definition is given as a variety of poverty measurements correspond with different conceptualizations. Based upon the diverse approaches to the understanding of poverty, it can generically be re-classified into two measurements - objective and subjective poverty. The former is manifested in the concepts of absolute and relative poverty while the latter is self-perceived and rooted on the feelings and subjective understanding of poverty and relative poverty by the poor. The visualization of poverty through self perception generates important and revealing insights into its dynamics at variance with livelihood analysis (see Figure 2.1).

Poverty exists in households which lack the means to satisfy their basic needs which may be defined in absolute or relative terms.



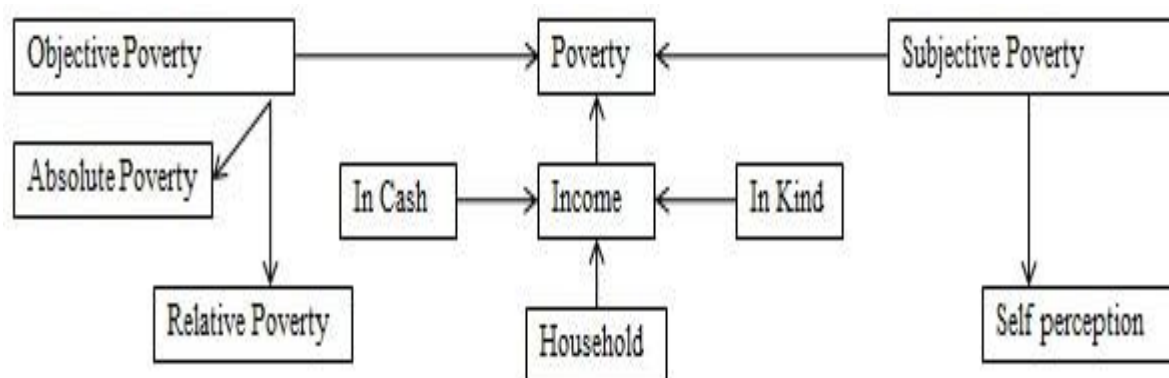


Figure 2.1: Conceptual framework

### 2.6.1 Absolute poverty

Absolute poverty refers to the inadequate amount and quality of food, shelter and other needs that are deemed necessary in order to survive. It is a basic human right to receive sufficient food, housing and clothing and anyone unable to access and enjoy these basic needs is in poverty. Viewed differently, poverty is said to exist when people suffer from starvation and severe malnutrition. The basic food and nutritional requirement to maintain physical efficiency are not satisfied. In some societies, basic needs may include only food, shelter and clothing while in others they cover social facilities such as education, health and durable household goods (such as televisions, bicycles, motor-cycles, etc.). The ability of a household to satisfy these needs depends upon its income level. A household is poor if it does not have enough money to fulfill the minimum basic needs, often associated with income below a certain level known as the poverty line.

Another common measure related to the absolute poverty concept is the incidence of poverty, which is defined as the number of poor households in a particular locality, either state or district, over the total number of resident households.

### **2.6.2 Relative poverty**

The relative poverty concept measures welfare or wealth inequality of certain groups in a society through an inequality parity approach. Relative poverty exists in a situation of comparative deprivation. By relative poverty, a group is defined as poor relative to others in society by comparing their incomes. The differences in the ownership of assets (such as land, houses, factories and shares) bring about differences in occupation and incomes.

One method of measuring relative poverty is through Engle's coefficient which shows the relationship between the level of income and expenditure on basic needs. The method requires calculating the percentage of real income spent on acquiring basic needs and is used as a comparative indicator of the economic status of households. Poverty is relative because a person is poor when his/her income is significantly less than the average income of a locality, region or country.

### **2.6.3 Self-perception of poverty**

The proliferation of concepts and indicators of poverty mirrors its multidimensionality in that there are as many types of poverty and as many experiences of poverty as there are individuals or categories of individuals (Levin, 2005). To bring to the surface its complexities, a participatory approach encourages the poor to define poverty within the context of their self-perception. Its advantage is that if the same individuals are identified by all or a majority of poverty measures, the phenomenon can be circumscribed by the locus of what is the reality for the poor. For this study, self-perceived poverty data rests on whether household financial sufficiency is insufficient, barely sufficient, sufficient and more than sufficient to buy all the basic needs. For estimation purposes, the four categories

are reduced into the poor (having insufficient and barely sufficient income) and not poor (with sufficient and more than sufficient income).

#### **2.6.4 Income estimation**

The most direct economic measure of poverty is based on income or expenditure (Kam *et al.*, 2005) which in Bangladesh is available from the Household Income and Expenditure Survey (HIES) conducted by the Bangladesh Bureau of Statistics (Hossain, 2009) or special purpose surveys by scholars (Kam *et al.*, 2005). Following Hossain (1996, 2009), this study is based on per capita income estimated from the data on household economic activities over the survey year.

The income variable includes incomes received in kind as well as in cash. A money value was imputed to receipts in kind at the prices prevailing in the survey village, and household consumption of self-produced crops and their by products, livestock, fisheries and forestry products. Income from crop production activities was estimated as the value of the main product and by products net of the costs of seeds, fertilizers, pesticides, irrigation charges, hired labour wages, and draft and machine power. This income thus includes the imputed value of resources owned and used by the household, including land, family labour and draft animals. For business enterprises and agro-processing activities, incomes were estimated as gross returns minus business-related expenses, as recollected by the respondents. Salaries and wages are recorded as earnings per month multiplied by the number of months family workers are employed in a specific activity.

### 2.6.5 Unit of analysis

The unit of observation and analysis is ‘the household’ which is often related to the concept of family although the distinction between households and families is important. This distinction widely accepted by anthropologists identifies households as places of residence while families are structured on blood and marriage links. According to Linton (1936, as cited in Lim, 1990) “while both households and families are culturally defined, the former are task-oriented residence units and the later are kinship groupings that need not be localized”. In other words, members of households share a common residence and certain domestic activities whereas family members may not cooperate in social and economic activities.

The ‘household’ in this study is defined as a group of people who share a common residence, eat from the same cooking pot and participate in income-pooling and decision-making<sup>36</sup>. The household thus constitutes ‘both a unit of production as well as a unit of consumption. The underlying assumption is that the household represents as a unit of entity and all the members share equally household resources, such as income and household-level public goods’ (Hossain & Nargis, 2010, pp. 216-217). Family members who have migrated elsewhere to work are not included as household member while visitors who reside with the household are not included as household members.

---

<sup>36</sup> Income pooling and decision-making may not be limited to members living together.

### 3. POVERTY AND LIVELIHOOD DISCOURSES

#### 3.1 Introduction

It is important to distinguish between poverty and livelihood. Poverty is closely associated with the flows of household income from various sources and has a crucial bearing on household livelihood strategies. The potential and links between livelihood-enhancing and poverty-reducing strategies are recognized in different studies (Ellis, 2004; Ellis & Freeman, 2004; Neely, Sutherland & Johnson, 2004; Orr *et al.*, 2009).

Livelihoods may improve by increasing a household's productivity through agricultural intensification; skill development, access to infrastructure and market (both labour and goods) and employment diversification from farm to non-farm sectors in the place of usual residence or elsewhere. These opportunities generate income to underpin sustainable livelihoods and improve the household's socio-economic status or ameliorate its poverty status. The poor generally develop strategies to provide for their needs and minimize the risks to their livelihoods. The significant link between poverty and livelihoods lies in the reduction of vulnerability to risks affecting livelihoods and attaining sustainable income flows to reduce and eventually escape the poverty trap.

The most of the extremely poor in the world live in the different agro-ecological regions (Ahmed, Hill, Smith, Wiesmann & Frankenberger, 2007) which are spatial poverty traps (Mosse *et al.*, 2002) characterized by geographical isolation and ecological vulnerabilities. Livelihoods in these agro-ecological regions mainly depend on agriculture and related activities; thus these factors together with the demographic and socio-economic attributes of individuals and households have an important bearing on the prevalence of

extreme poverty (Kam *et al.*, 2005; Minot, Baulch & Epprecht, 2003; Minot & Yamamura, 2003; Handley, Higgins, Sharma, Bird & Cammack, 2009; Mehta & Shah, 2001; Ali & Thorbecke, 2000). Figure 3.1 summarizes the flow of some of the major themes in the literature on the poverty discourse.

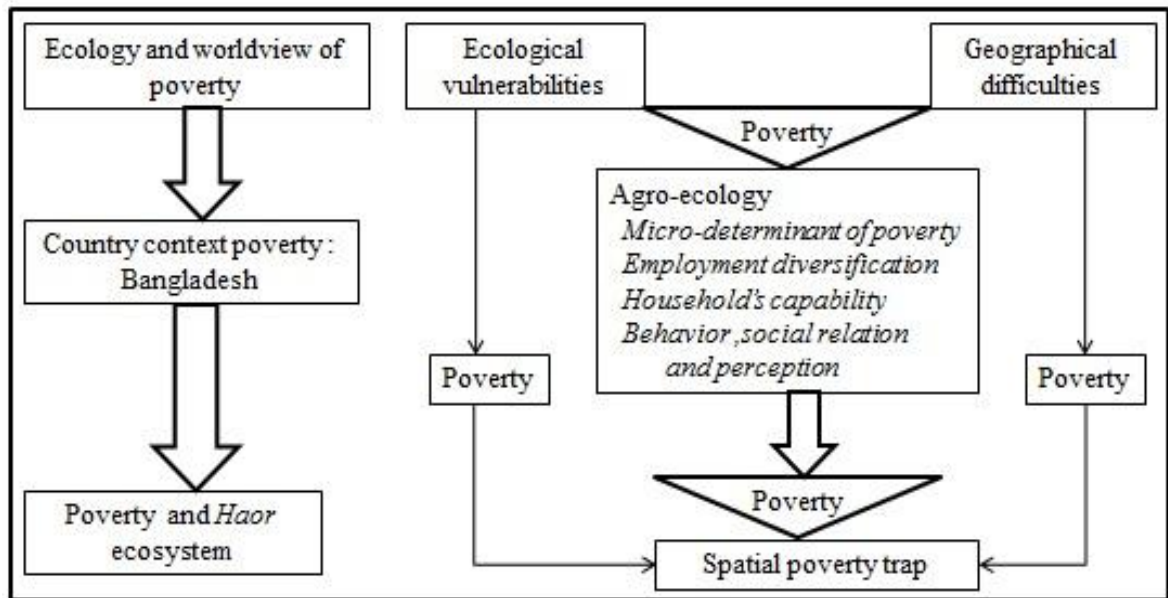


Figure 3.1: Major themes in the poverty discourse

### 3.2 Ecology and worldviews of spatial poverty

In 2004, about one billion people in the developing world were living in extreme poverty mainly in Sub-Saharan Africa (SSA) and the more remote and isolated parts of Asia. The poor are socially excluded, uneducated and primarily landless, have limited access to roads, markets, schools and health services. As poverty begets poverty, the poor are caught in a poverty trap whose common antecedents are (a) inability to invest in children's education, (b) inaccessibility to credit markets and (c) unproductive labour (Ahmed *et al.*, 2007; Swain, Van Sanh & Van Tuan, 2008). Natural and physical vulnerability and inaccessibility to common resources also contribute to the persistence of poverty (Mortimore *et al.*, 2008;

Enfors & Gordon, 2008; Castella, Manh, Kam, Villano & Tronche, 2005; Parker & Kozel, 2007). To increase the welfare of the poor, external public interventions are essential to build and upgrade roads, markets and basic services in the remote rural areas, provide health insurance and investment in education and physical capital (Hanjra, Ferede & Gutta, 2009; Ahmed *et al.*, 2007; Van de Walle & Gunewardena, 2001; Castella *et al.*, 2005).

There is however a limited understanding of the interplay of ecological fragility and geographic isolation on the dynamics of livelihood maintenance of the poor living in such spatial poverty traps. The agriculture dependent rural poor people live in ecologies where they encounter more vulnerabilities than others in sustaining their livelihoods (Handley *et al.*, 2009). This is true for the people living in SSA, highlands in Vietnam, uplands in Philippines, and the drought prone and hilly forest based regions in India. Along with inherent ecological risks, other factors like geographical isolation and remoteness contribute to the downward spiral of poverty (Handley *et al.*, 2009, Minot *et al.*, 2003; Epprecht, Müller & Minot, 2011; Albert & Collado, 2004; Mehta & Shah, 2003).

Holden & Sankhayan (1998) state that in many ways poverty causes inefficiency. It may increase debt, food crisis (less buffer stock) and other sorts of vulnerabilities. It forces households to adopt sub-optimal (below the optimal) strategies to obtain relief. This misery accounts for the high interest rate in the private credit system and its negative effects on human and social capital of the households. Therefore, the study argues that ‘local collective action’ could be a possible strategy as otherwise a vicious cycle will begin.

The summary of the literature on spatial and ecological poverty traps provided in Tables 3.1 and 3.2 postulates that (a) people inhabiting the spatial traps are extremely poor; (b) these spatial traps are located in geographically remote areas; (c) people depend on the

ecosystem which is invariably fragile and sensitive to earn livelihoods; (d) all resource rich households are not non-poor; (e) poverty and landlessness tend to show a positive association; (f) although demographic and household asset attributes contribute to poverty incidence, the ecological, geographical and environmental (EGE) factors also play a crucial role although their exact links have not been clearly examined. An understanding of poverty would thus require an investigation of the interplay of both phenomena.

Table 3.1: Attributes of the poor identified based on a sample of studies in different underprivileged regions in the world

Sinn (1988):	Minot <i>et al.</i> , 2003:	Jensen, 2003:	Mehta and Shah, 2003:
Landless, Agricultural labour, Displaced household, Nomad people	Landless, Agricultural labour,	Household (HH) with low social capital	Landless, HH with uneducated head, HH with inefficient head (less productive HHhead)
Shah & Guru, 2003:	Albert & Collado, 2004:	Minot & Baulch, 2005:	Parker & Kozel, 2007:
Landless, Displaced HH	Self employed agricultural labour, Household (HH) with uneducated head, HH with married head	Daily labour, Farm labour, HH with uneducated head and spouse	Asset poor HH, Unskilled HH head, Sexually (gender), politically and socially discriminated HH
Mortimore <i>et al.</i> , 2008:			Hanjra <i>et al.</i> , 2009:
HH with illiterate head, HH less accessible to the service and production of eco-system			HH with illiterate head, HH inaccessible to land



Table 3.2: Causes of spatial poverty identified by a sample of studies in different underprivileged regions in the world

Sinn, 1988:  Lack of property right, Draught, Inaccessibility to irrigation facilities, Difficulties of livestock rearing, Unavailability of firewood, Nomadism.	Mortimore <i>et al.</i> , 2008:  Low access to the service and production of ecosystem, inability to cope with the consequences of poverty, historical exploitation of ecosystem, asset divestment, capital deficiencies.	Minot & Baulch, 2005:  Large number of female, children and old members, Geographical location (remoteness), Low productivity occupation, Population pressure	Minot <i>et al.</i> , 2003:  Lack of road facilities, Inaccessibility to market and natural resources, Remoteness
Jensen, 2003; Hanjra <i>et al.</i> , 2009:  Deforestation, Remoteness, Illiteracy, Inaccessibility to land, Fragile land tenure contract, Corruption.	Albert & Collado, 2004:  Capital deficiencies, Single nuclear family, Large family size, High dependency ratio	Mehta & Shah, 2003; Shah & Guru, 2003:  Socio-political isolation, Remoteness, Exploitation of natural resources (deforestation), Low productivity of labour, Lack of cultivable land and infrastructure facilities (e.g., irrigation, roads), Female illiteracy, Household size.	Parker & Kozel, 2007:  Low endowment of private assets, Inaccessibility to public goods and services, Low social capital, Politically polarized informal social institution, Gender discrimination, Nuclear family, Family size

### **3.3 Understanding poverty in Bangladesh**

While poverty in Bangladesh has been prevalent since the colonial era, investigations into this phenomena only began after the famine of 1974 with a few ethnographic studies concentrating on its sociological aspects (Islam, 2004) and in the 1980s, and on its cultural traits and perpetuation in traditional Bangladesh society (Maloney, 1986). Between 1990-2009, poverty investigations were intensified although pre-occupied with counting the poor. With the availability of secondary panel data from different sources, much of the research efforts (Rahman, 1996 a; Sen, 2003; Rahman, 2009; Hossain 2009 to name a few) have explored the dynamics of poverty. However, poverty in the *Haor* region has not received as much attention; it is characterized by its spatial and ecological dimensions (Kam *et al.*, 2005) that require particular anti-poverty policy interventions.

To understand the diversity of poverty traps in Bangladesh, a review of some recent empirical studies is given below. Given the variety of approaches adopted by the scholars, the discussion categorizes them into three groups: quantitative studies, qualitative studies and hybrid (mixed method) studies.

#### **3.3.1 Exploring the quantitative studies**

The empirical poverty studies applying quantitative methods can be classified into three topical areas: (i) micro-determinants of poverty, (ii) occupational diversification and (iii) capability of households. Although differing in contexts, they focus on the common themes of identifying the poor, causes of poverty and methods of exiting poverty.

## **A. Micro-determinants of poverty**

The micro-determinants of poverty are the key variables defining the socio-economic status of an individual or household in a community and include household size, age, gender, occupation, etc. The relationship between household socio-economic status and micro-determinants, however, do not always coincide with theoretical expectations. Their effects, however, are confirmed by different studies (Wodon, 2000; Rahman, 2009; A.U. Ahmed, 2004) and affect the formulation of anti-poverty policies.

Wodon (2000) has investigated the micro-determinants of long-run income growth, consumption and poverty reduction in Bangladesh using household level data from 1983-1996. Poverty decreased from 1983-1985, then increased from 1985/86 to 1991/92 and again declined between 1991/92-1995/96. The study analyses the effects of different micro-determinants (e.g., demographics, education, landholding, occupation, geographic location-rural or urban) on household income. In a quantitative study on three ecological regions (Jamalpur, Jessore and Comilla districts), Rahman (2009) recognizes some household (e.g., land ownership, non-agricultural income, farm resources endowments) and regional characteristics (e.g., availability of infrastructure, land productivity) which influence rural poverty.

Along with the subsistence definition, Wodon's (2000) study identifies the multidimensional nature of poverty. The CBN (Cost of Basic Needs) method is followed to construct the poverty line and the estimated poverty headcount ratio is 0.59 which is lower than 0.62 (Nargis & Hossain, 2006) but higher than 0.49 (Sen, 2003). The study also reports that 14% of farmers are pure tenants, the average education is less than 4 years,

household average dependency ratio is 0.25 (with an average of 4 dependents), 78% of income is generated from farm activities and the rest from off-farm activities.

A. U. Ahmed (2004) identified the major factors contributing to poverty in the two northwestern districts of Gaibanda and Rajshahi, including location, household size, gender, age, marital status, land ownership, house ownership and occupation. Given the upper and lower poverty line based on the CBN method estimated by the BBS (2002), at least 36% of household heads have no income compared to 50% in the Gaibanda district which is more susceptible to monsoonal floods than the Rajshahi district while 25% of all households earn under US\$ 20 income per month. In the study area, 48% and 70% of the households in Rajshahi and Gaibanda districts, respectively, are income poor (A. U. Ahmed, 2004). Other studies (Wodon, 1999 a, b; BBS, 2002) report that such micro-determinants as education, household size, occupation, land ownership, age, gender, marital status, religion and geographic location affect poverty in rural Bangladesh.

#### *(i) Causes of poverty*

The primary causes of rural poverty are education, land ownership, occupation, household size, family structure and gender of household head (A. U. Ahmed, 2004; Wodon, 2000). Subsistence pressures (farming, grazing, uncontrolled usage of common water bodies), and declining man-resource ratios significantly contribute to the prevalence of poverty aggravated by high household dependency ratios and the low educational attainment of the household head. Land ownership, farm assets and income from non-farm activities conversely are associated with escaping the poverty trap (Rahman, 2009). Unemployment, underemployment, landlessness, single female household heads (unmarried, divorced or widowed), young adult household heads and illiteracy contribute to the prevalence of

poverty. Geography is an important determinant as the remote areas are relatively poorer than areas close to towns (A.U. Ahmed, 2004).

### ***(ii) Ways out of poverty***

Wodon (2000) has reported that over time the number of large landowners has decreased while the number of landless has risen slightly pushing rural-urban migration and lessening poverty reduction marginally. Land and education contribute to income earning capacity while female-headed households consume less than those male-headed. Geographical location and regional characteristics affect poor households significantly. The poverty situation is significantly lower in areas with developed infrastructure as it facilitates off-farm and non-farm income opportunities. While modern agricultural technology adoption is not significant in combating poverty, overall, non-farm activities followed by land ownership, significantly work against poverty (Rahman, 2009).

### ***(iii) Research gap***

Wodon's (2000) investigation is useful in explaining the basic variables affecting poverty incidence but does not explicitly take into account the study area's ecological characteristics. In many areas of rural Bangladesh, apart from the micro-determinants of poverty, ecological attributes, geography, infrastructure facilities, culture and social norms are important issues confronting livelihood strategies. Seasonality and ecological calamities induce vulnerability of the community as they damage crops, squeeze labour markets, and affect wages, employment and market mediation (e.g., petty trading). In spite of examining three agro-ecological regions, Rahman (2009) also failed to consider the significance of ecological factors in sustaining community livelihoods.

## **B. Occupational diversification**

Rural people's livelihoods in the developing countries depend on more than one occupation as incomes tend to be unstable (Ellis, 2004; Saleth, 1997) because of ecological conditions, lower rural wages and lack of education. Thus occupational or employment diversification requires investigation as it may explain an individual's socio-economic status in a community.

Nargis & Hossain (2006) state that occupational shiftment from farming to non-farming activities is connected to the dynamics of rural poverty in Bangladesh. In their study of the short run poverty dynamics (2000-2004) and the longer run scenario (1988-2004), they found that household income of the poor increased by 2.3% annually during 1988-2000 and by 1.8% annually during 2000-2004. Against this rising income trend, however, farm income share declined from 58% to 44% while non-farm income share rose from 42% to 56% in 1988-2004. The head count index (the percentage of households falling below the estimated poverty line) declined from 62% in 1988 to 48% in 2000 and 44% in 2004 or an average 18% poverty reduction in 16 years or a 1.1% annual decline. However, it is significant to note that over the survey period, 28% of households remained poor although it marginally declined to 27% in 2000-2004.

Along a different perspective, Malek & Usami (2010) found that the contribution of non-farm income (NFI) in rural Bangladesh was mostly diverted to non-food consumption (purchasing furniture; buying new clothes, building houses) rather than household production. However, there was a highly significant influence of NFI on rural income poverty reduction.

### ***(i) Causes of poverty***

The primary causes of persistent rural poverty are lack of education, land and infrastructure facilities to build household capacity. The current education curriculum does not increase rural labour quality, occupational immobility retains the poor in poverty (Nargis & Hossain, 2006; Rabby *et al.*, 2011a) while the ecological situation binds farmers to monocropping in the depressed basin area in Bangladesh (Nargis & Hossain, 2006; FAO, 2001).

Family size, landlessness and the incidence of tenant farmers are associated with persistent poverty (Nargis & Hossain, 2006). Research by Otsuka & Estudillo (2007) relate poverty to the traditional cultivation system, limited scope for occupational diversification especially in the rural non-farm sector, population pressure and the subsequent low rural wages.

### ***(ii) Ways out of poverty***

The studies reviewed above reveal that rural households in Bangladesh can escape poverty through (a) increasing the capital stocks (b) improving human capital (c) migrating to the more productive non-farm occupations, (d) international migration and (e) adopting modern technology either singly or in synergy (Nargis & Hossain, 2006). Income from the agricultural labour market alone cannot provide an escape route from poverty and although migrant labour remittances to households contribute to poverty reduction, self employment income plays the most significant role (Otsuka & Estudillo, 2007).

### ***(iii) Research gap***

The Nargis & Hossain (2006) study does not consider the potential of access to natural resources (such as common water grounds) in enhancing household incomes or the role of roads and the service sectors. In a broader setting, it does not evaluate the potential of ecological factors, common resources, seasonal shocks and politics which affect market size and the institutional rights of poor households.

Despite some useful insights, Otsuka & Estudillo's (2007) study similarly fails to delineate the effects of ecological and geographical barriers on agricultural intensification and the need for financial and capital inputs to diversify employment into non-farm sectors. Natural calamities, seasonal shocks and its aftermath are interlinked to landlessness and agricultural activities in rural Bangladesh. For example, *monga*<sup>37</sup> (a seasonal shock) increases landlessness in rural poor households (Zug, 2006) and monsoonal floods (a natural calamity) obstruct *in situ* income diversification and force poor households to search employment elsewhere (Rayhan & Grote, 2007). These factors are not considered in exploring the linkage between employment diversification and rural poverty in Bangladesh.

### **C. Capability of household**

The capability of an individual or household refers to the ability to earn income, claim rights of access to resources either private or public. Every individual has some inherent capability which together with other acquired abilities or qualities creates variations in individuals' capabilities. The resulting competitive advantage generates additional income opportunities affecting the poverty status of different individuals or households.

---

<sup>37</sup> It is seasonal food insecurity in ecologically vulnerable and economically weak parts of northwestern Bangladesh, primarily caused by unemployment and income deficit before monsoon crop is harvested. It mainly affects those rural poor, who have an undiversified income that is directly or indirectly based on agriculture (Zug, 2006).



Sen (2003) studied the capability of households moving in or out of poverty in rural Bangladesh using panel data on 379 rural households from 21 villages collected in 1987/88-2000. Using the CBN based objective poverty line, he reported a decline in the headcount poverty from 57%-49%. Four household categories were identified- always poor (remained in poverty in both periods), never poor (remained out of poverty in both periods), ascending (escaped from poverty) and descending (non-poor who slipped into poverty). Of the sample, 31% and 25% were found to be always poor and never poor, respectively; the ascending households comprised 26% and the balance (18%) the descending households. Overall, there was an 8% net poverty reduction facilitated by multiple strategies of crop intensification, agricultural diversification, off-farm activities and migration. These strategies facilitate household asset accumulation and enhance its capability.

The consistently poor households had the lowest mean value of assets, followed by descending, ascending and never poor households; the asset categories included the number of bread winners, earner's average years of schooling, access to credit markets, average land owned and cultivated and ownership of non-land fixed assets. The quality of human capital and non-agricultural asset holdings influence the motivation for occupational or employment mobility from agriculture to the non-agricultural sector.

The size of the labour force mainly engaged in agriculture reduced from 69% to 51% during the study period; the corresponding figures were 38%-56% and 36%-61% in the ascending and never poor households, respectively, in the non-agriculture sector. The capacity of household influences the process of switching occupations, particularly in the non-agricultural sector.

To Kam *et al.* (2005), the geographical or spatial distribution of poverty in Bangladesh is linked to household capability to escape the food crisis which itself is associated with its livelihood assets. Household income strongly correlates with such variables as education, access to assets and services; appropriate policy interventions oriented to enhancing household capability would decrease the incidence and prevalence of poverty.

***(i) Causes of poverty***

To Sen (2003), household and individual factors transcend agro-ecological conditions of the rural villages in affecting poverty. But, it has been argued that geographical remoteness exerts a predominant influence on extreme poverty in rural Bangladesh (Kam *et al.*, 2005) while the paucity of assets impedes the income diversification strategy of the poor households.

The employment mobility of the always poor households is limited to low productive, non-farm activities (e.g., construction labour, rikshaw pulling and wage work in agro-processing). More specifically, lack of human and physical capital (e.g., education and road communication, respectively) constrains income diversification potentials of this group (Sen, 2003). Along with these capital deficiencies, land-related factors (landlessness, low lying land) increase the incidence of extreme poverty (Kam *et al.*, 2005).

Although the number of bread winners increase, household size is inversely related to descending households (Table 3.4) who are also less successful in diversifying their income into more productive non-agricultural work. After the household's demographic characteristics, the most important factors causing the incidence of the descending poor

group are ill-health shocks, loss of natural assets (e.g., cultivable land), natural disaster (village-level factor) (Sen, 2003).

### ***(ii) Ways out of poverty***

The non-agricultural activities that provide avenues for households to escape from poverty include salaried and self employment, non-agricultural labour in transport, construction and agro-processing and commercial activities such as petty trading, shop keeping and business. Enhancing human and physical capital stocks contributes to upgrading household income of all groups. The ascending and never poor households are more efficient in accumulating and maintaining human, natural, financial and physical capital assets than the descending and always poor households. But overall, asset advantages consolidate the income earning potential of the ascending and never poor households compared to the always poor group (Sen, 2003).

Engaging in different income generating activities, access to education, health and the employment market can ameliorate the prevalence of poverty. Opportunities of renting more arable land and livestock rearing can expand the capacity of household's food production and income (Kam *et al.*, 2005).

### ***(iii) Research gap***

An individual's way of life together with life expectations are critical in examining poverty. Thus, in the research reviewed above it is clear that how individuals strategize their exit out of poverty (as, for example, through entrepreneurial ventures, and migration), their struggles and limitations, the role of formal and informal village institutions and others have not been explored. Neither have ecological factors been assessed and linked to

household income earning capabilities together with the barriers arising from geographical remoteness in rural Bangladesh.

#### **D. Summary**

Though the three broad categories of studies deal with different issues associated with poverty, their locus is poverty reduction strategies. They elucidate the characteristics of the poor (Table 3.3), causes of poverty (Table 3.4), and ways to exit the poverty trap. The poor are primarily the uneducated and female-headed households living in the remote rural areas. Occupationally, the poor are limited to daily labour, agricultural work and marginal farming and they possess minimal assets while the extremely poor are also landless. The incidence of poverty in Bangladesh has not steadily declined but has shown irregular fluctuations (World Bank, 2008; Nargis & Hossain, 2006; Sen, 2003; Orr *et al.*, 2009) perhaps traceable to methodological limitations in the research.

The primary determinants of variations in poverty incidence in rural Bangladesh are education, land ownership, occupation, household size, family structure and gender of household head which are similar to those associated with spatial poverty factors discussed earlier. Geographical location also affects poverty (Rahman, 2009) although it is argued (A. U. Ahmed, 2004) that it is less significant than land ownership and occupation. Apart from these determinants, occupational immobility and landlessness also contribute to poverty incidence in rural Bangladesh and are themselves subject to ecological factors.

Table 3.3: Characteristics of poor identified in different quantitative studies in Bangladesh

Wodon, 2000:	A.U.Ahmed, 2004	Sen, 2003	Kam <i>et al.</i> , 2005
Landless, Agricultural workers, HH with Illiterate headed, Married headed HH, Female headed HH, HH with younger head, The people live in remote area	Landless, Marginal farmer, Unemployed and under employed rural wage labour, Female headed HH, People from backward regions	Agricultural labour, HH with lowest mean of asset, HH with uneducated head, HH with female head, People live in remote rural areas	Landless, HH located in remote areas, HH inaccessible to infrastructure
Rahman, 2009			
Landless			

Table 3.4: Causes of poverty identified by quantitative studies in Bangladesh

Wodon, 2000 and A. U. Ahmed, 2004:	Nargis & Hossain, 2006; Otsuka & Eztudillo, 2007:	Sen, 2003; Kam <i>et al.</i> , 2005:
Landlessness, Illiteracy, Unemployment, Underemployment, Household size, Family structure, Gender of HH head, Age of HH head, Marital status of HH head, Subsistence pressure, remoteness.	Landlessness, Illiteracy, Lack of infrastructure facilities, Incapability of occupational diversification, Family size, Traditional cultivation system, Single crop cultivation.	Landlessness, Low lying land, Lack of assets, Geographical factor, Low productive occupation, Lack of physical and human capital, Households size, Dependency ratio, Ill-health shocks, Loss of natural assets (e.g., cultivable land), natural disaster.

### 3.3.2 Exploring the qualitative studies

Qualitative literature usually attempts to provide an in-depth and contextual understanding of a study phenomenon. There are few such studies (Maloney, 1986; Hossain, 2005; Amin and Mierre, 2002; Davis, 2007) in Bangladesh exploring the subject of poverty; two (Maloney, 1986; Davis, 2007) of them are reviewed since other studies are predominantly focused on political approaches to the study of poverty which is outside the scope of this research.

## A. Behavior of people

Maloney's (1986) study investigates the poverty phenomenon in rural Bangladesh from the perspectives of culture, social cohesion and capital accumulation. The poor are mostly landless and the poorest daily labourers subsisting on their daily wages. Where previously, the poor could expect some assistance from informal institutions oriented to wealth re-distribution embedded in traditional Bengali society, nowadays, such entitlements are rarely available.

Maloney (1986) points out that Bangladesh's poverty reduction strategies have not accorded importance to human relational qualities or social capital. Such social capital is embedded in society's texture (social norms) and human behavior (culture) which are unique. Maloney (1986) identified 8 primary causes categorized into general and behavioral factors given in Table 3.5.

Table 3.5: Causes of rural poverty in Bangladesh

General causes		Behavioral causes	
Natural and external causes	Floods Draught Lack of natural resources Calamities Poor demand for Bangladesh export Low international prices for its commodities	Hierarchy and patronage	Hierarchy and exploitation Entitlement to patronage Indulgence Personalization of authority
		Individualism	Kinship  Cooperative group Entrepreneurship
Population Historical explanation Illiteracy Idleness		Trust, guilt and duty	

Source: Maloney, 1986.

Despite blaming natural and external causes, the inability of utilizing the resource advantages (fertile soil, irrigation potential, fisheries and human labour) causes poverty and

retards poverty eradication. The large population is also relevant but its growth cannot be regulated because of the pro-fertility belief in the local culture, lack of old age security, religious constraints (*porda*) and social restrictions on women's mobility. Historically, agricultural productivity has primarily depended on land only; the paucity of professional skills, weak social capital and physical infrastructure, lack of entrepreneurial culture, weak institutions and low urbanization also contribute to rural poverty.

Education has both vertical and horizontal effects in an individual's social position; its benefits need to be disseminated to the rural community while the State should provide universal education.

Idleness appears to also contribute to the persistence of rural poverty but rural communities have to work hard in activities linked to farming and agriculture implying that idleness is not a characteristic of rural society.

Maloney (1986) does not discuss the broader factors affecting poverty beyond human behavior and culture of society. The arrogant behavior of public servants and exploitation by the local elite can also contribute to the persistence of rural poverty in Bangladesh.

## **B. People's perception of poverty**

Davis (2007) conducted a qualitative study of poverty dynamics in rural Bangladesh based on focus group discussions exploring the perception of the poor regarding the fluctuations in their well-being.

***(i) Causes of poverty***

Table 3.7 pinpoints dowry, illness and adverse dependency ratios in a family as the prime determinants of poverty while the other causes are flooding, lack of work and idleness, debt, increased price of necessities, lack of land, business loss, migration, lack of education, court cases and cheating, all of which are related to life-cycle related pressures on poor households. The poorest and those without social capital endowment are the most vulnerable to the above as are the poor female-headed households, while households having more daughters are more likely to slip into chronic poverty because of dowry payments.

***(ii) Ways out of poverty***

Mitigation of impoverishment is associated with different business activities, improved agriculture, micro-finance, salaried work, labour migration, and households with working children. These activities require risk taking and a capability for hard work. The poor generally lack economic and social assets in their livelihood cycle and thus are vulnerable to these risks. Policy interventions should take into account the life-cycle-related drivers of impoverishment and aim to mitigate risks involved in potentially profitable, yet risky, undertakings.

***(iii) Research gap***

Both studies while focused on poverty dynamics do not provide the environmental conditions of the area from which the research samples are drawn. Thus, geographical location and remoteness, ecological properties, natural resource endowment and other factors affecting the income potential and the diversification of livelihoods of the rural poor are not identified or examined.



### **C. Summary**

Although the findings of quantitative and qualitative studies differ to some extent, there is agreement on the characteristics of the poor (Table 3.6). The qualitative studies stress the significance of human relations (based on social norms and culture) and poverty in rural communities. The persistence of poverty in a large part of the population in Bangladesh is caused by the qualities of social behavior which cannot be explored just with quantitative approach. The causes of poverty (Table 3.5) illustrate the inherent strengths and advantages of Bengali society, hand-in-hand with its failure to build up poverty amelioration-friendly institutions. The authoritarian behavior of bureaucrats reflects in leasing out public resources to the local elites add to the incidence of poverty in rural Bangladesh. The well-to-do farmers assume the role of patron and wield power that work against the interests of the less well-off groups. Individualism impedes cooperative activities and increases helplessness in the poor community in rural Bangladesh.

Understanding of life-cycle related pressures are important to reveal the risks facing the rural poor in Bangladesh. The dowry system, health shocks and adverse dependency ratios are the most important factors (Table 3.7) that contribute to the persistence of poverty. Escaping poverty is usually the outcome of hard work but involves a degree of risk taking. It is very challenging for the poor to exit poverty as they have scarce economic and social assets. In such a context, identification of risks and opportunities which have positive implications on poverty eradication is essential.

Table 3.6: Characteristics of poor identified by qualitative studies in Bangladesh

Maloney, 1986	Davis, 2007 ;
Landless, Daily labour, HH with uneducated head, HH with female head	Landless, Female headed HH, HH with more daughter

Table 3.7: Causes of poverty identified by qualitative studies in Bangladesh

Maloney, 1986:	Davis, 2007:
Floods, Draught, Lack of natural resources, Historical exploitation, Calamities, Population, Historical explanation, Illiteracy, Idleness, Hierarchy and exploitation, Entitlement to patronage, Indulgence, Personalization of authority, Kinship, In-cooperation, Entrepreneurship	Dowry, Illness and injury, Family size and adverse dependency ratio, Flooding, Lack of work and idleness, Debt, Increase price of essentials, Lack of land, Business loss, Migration

### 3.3.3 Exploring the mixed method studies

Using a mixed research method, Orr *et al.* (2009) outlined the economic, social, human and historical dimensions of rural poverty in three different agro-ecological villages in Bangladesh: Bhabanipur village (Comilla district), Darikamari village (Bogra district) and Dariabad village (Barisal district). The study focused specifically on fluctuations in the poverty incidence, changes in traditional rural society and people's life style.

Between 1987-2002, changes in income poverty influenced the livelihood quality of the poor. Using Participatory Poverty Assessments (PPA), fluctuations in household poverty were noted: poverty declined from 40% to 33% in Bhabanipur village, from 73% to 66% in Darikamari village, but increased from 60% to 64% in Dariabad village. In 2002, the newly poor households rose from 12%-23% while the extremely poor households fell from 45%-28% in Darikamari village but remain unchanged for other two villages.

The rural spaces are occupied by small enterprises like repair shops (mechanical and electrical); more land was brought under cultivation after the Green Revolution Technology was adopted and new asphalted roads were constructed. With the emergence of new financial organizations (e.g., NGOs), village life changed through the impact of credit accessibility without collateral.

Electricity, television and mobile phones are common in all the villages permitting the inflow of news and easy communication facilities transforming village life and society. Such facilities create new livelihood strategies, increase family cohesion and, to some extent, close the amenity gap between villages and cities.

#### **A. Causes of poverty**

The fluctuations in and persistence of poverty is mainly related to urban proximity or geographical isolation of the villages. Additionally, security, bribery of local influential persons (weak local informal institutions), illiteracy, culture of early marriage, dowry and high interest rates charged by the local moneylenders contribute to the incidence of poverty (Orr *et al.*, 2009).

#### **B. The ways out of poverty**

The study suggests various strategies for poor households to escape the poverty trap including the provision of infrastructure and communication, technology, media, education, microfinance, migration, social capital (social relationships, neighbors, village community), etc., which broadly link to physical, financial and human capital interventions. Capital accumulation enhances a household's capability to opt for diverse livelihood strategies and income sources to support and enhance livelihoods.

### C. Research gap

The ecological and environmental attributes of the study villages have not been given consideration in the appraisal of the poor households. Additionally, particularly in the qualitative approach, a critical evaluation is required of the pathways out of poverty founded upon community and government structures and systems and the corresponding governance frameworks. This implies that individual efforts to lift households out of poverty must be complemented by appropriate government interventions and efforts to promote the rule of law, civil society, social norms, trust, social network and common property rights (Palivos, 2001; Birdsall, 1993).

### D. Summary

The study by Orr *et al.* (2009), although neglecting the impact of ecological and environmental attributes of the sample villages, confirms that poverty as a social phenomenon cannot be wholly understood by resorting only to measurable determinants. This requires the application of a mixed methods approach in such studies to broaden and deepen the understanding of the dynamics of ecologically-driven poverty.

Table 3.8: Causes of poverty identified by a hybrid study

---

Orr *et al.*, 2009:

Remoteness, Security, Bribery of local influential person, Illiteracy, Culture of early marriage, Dowry, Lack of financial capital, High interest rate of informal local financial system

---

### **3.4 Understanding poverty in the *Haor* area**

For a more insightful understanding of poverty in the *Haor* area, more research must be conducted (UNB, 2009)<sup>38</sup>. This section focuses on the literature specifically dealing with *Haor* ecological and environmental characteristics, individual and household characteristics and other transforming factors (e.g., infrastructure facilities) before relevant anti-poverty interventions can be evaluated.

#### **3.4.1 The poor in the *Haor* villages**

Probably Rahman & Razzaque (2000) were the first researchers to study poverty by sampling 3 *Haor* villages in the Kishorgonj district applying a mixed methods approach generating a one-off gathering of primary data. The extremely poor, moderately poor and non-poor groups were delineated using the income poverty line approach.

##### **A. The condition and causes of poverty**

The number of poor households varies from 60%-76% in the study villages of which 30%-43% and 30%-33% were moderately poor and extremely poor households, respectively while the total poor households varied between 61%-81%. In one village was found both the highest proportion of households who were extremely poor (33%) and moderately poor (43%). Among the extremely poor households, the average income had not changed significantly while their average landholding was the lowest among all households. Female-headed households reflected a higher incidence of poverty compared to their male-headed counterparts.

---

<sup>38</sup> UNB-United News of Bangladesh.<http://www.thedailystar.net/newDesign/news-details.php?nid=119318> (accessed December 26, 2009).

A critical finding was that the extremely poor households appeared unwilling to obtain credit because of the debt burden and this prevented them from being involved in NGO-coordinated social programs. A micro-credit policy to facilitate the sustainable development of the extremely poor households was proposed.

***(i) Research gap***

Despite its pioneering and valuable insights, the study failed to critically examine the socio-demographic characteristics of the poor households and the causes, consequences and exit strategies out of poverty. Also, although Hossain (1996, 2009) has studied the impact of flood, natural disaster, geographical remoteness and natural resource endowments on household income, such issues have not been analyzed by Rahman & Razzaque (2000). Neither is any suggestion given about the justifiability of some form of regulatory control over NGO program activities which affect the freedom of choice of the poor.

**3.4.2 Poverty status of the local community**

Khan & Islam's (2005) research into poverty in the Hakaluki *Haor* area in Moulovibazar district aimed at assessing the potential of creating sustainable employment and income opportunities. It applied quantitative techniques to poverty data gathered through a primary survey of the sample community.

**A. The condition and causes of poverty**

Using the CBN method, 21% of all households fell below the poverty line in the off season compared to 12% during the peak season confirming strong seasonal income variation. Using TK. 600 as the poverty income line, by headcount nearly 39% of households lived in

poverty during the non-crop season improving to 17% in the crop season. The poverty gap and square of the poverty gap in the off season were 0.08 and 0.02 respectively and declined during the crop season.

The study traced the poverty incidence to the lack of cultivable land, low consumption capacity and nutritional levels, and unproductive human capital (labour). Household consumption expenditure varied with land ownership and availability of different food items. All landless households were poor and comprised the largest such group in both seasons; of this group, 9% and 13% were extremely poor in the crop and non-crop seasons, respectively. In comparison, none of the households with middle and large landholdings experience poverty during the crop season, indicating that land affects household income positively. Employment opportunities and the scope of using arable land affect the variations in poverty incidence seasonally.

However, the poverty incidence is very high in the *Haor* villages (Kam *et al.*, 2005), it is relatively low in the sample village probably due to the continuous flow of remittances, improved roads and accessibility to larger towns in the Sylhet district offering employment and trading opportunities. In the villages, most if not all economic activities and employment opportunities are based on crop cultivation affecting the seasonal poverty fluctuations.

***(i) Research gap***

As the study is concentrated only on one village, its findings cannot be generalized to the whole community or villages. Importantly, the impact of flashfloods and the monsoonal deluge are insufficiently considered as are the ecological attributes of the area, extension of

the labour market, absence of a comprehensive poverty profile and an analysis of household demographic factors.

### **3.4.3 Food security and poverty**

The food security strategies of the *Haor* villages and its implications on prevailing poverty have been investigated by Kazal, Villinueva, Hossain & Das (2010) concentrating on the physical, economic and social accessibility to food by the *Haor* community.

#### **A. The condition and causes of poverty**

Using the CBN measure of poverty, 43% of the households are moderately poor while 29.6% are extremely poor. Based on the DCI method, 40.2% and 18.1% of households were absolutely poor and hardcore poor<sup>39</sup>, respectively; the gap between these two groups may be linked to access to more rice with its higher calorie value. According to the self-assessment method, 71% and 29% of households are poor and non-poor, respectively. Moreover, the study contends that in case of other indicators (e.g. district, landholding, occupation and education of household head, possession of durable assets, housing condition, sanitation facilities and NGO membership), the incidence of poverty in the region is most probably worse than the estimates of poverty been found in this study.

The study found that the absolutely landless households comprise the hard-core poor as are the labourer-headed households compare to the households whose heads were engaged in agriculture and job/services. The educational attainment of household heads, family size and housing conditions affect inter-household poverty variations.

---

<sup>39</sup> A household is considered as 'hardcore poor' with per capita calorie intake is less than 1,805 K.cal per day, and 'absolute poor' with less than 2,122 K.cal per day (Kazal *et al.*, 2010).



### ***(i) Research gap***

Though the study explores a broad poverty scenario, some significant omissions are a poverty profile of the population, time variant (age) and time invariant (gender) characteristics of individuals and households, ecological attributes of the study area, livelihood strategies, exogenous (e.g., public credit) and endogenous (e.g., land ownership) factors that elucidate the strategies to cope with crop and non-crop season crises, and labour capability and labour market dynamics. Such data will deepen the understanding of the factors that interrupt livelihood efforts in the region and approaches to overcome them.

### ***Summary***

The characteristics of poor (Table 3.9) and the causes of poverty (Table 3.10) in the region have similarities with the worldview of poverty of regions and countries with common ecological and geographical and country-context poverty. Individual attributes (labour-headed household, occupation and education of household head), and household characteristics (e.g., household size) are associated with poverty. The poverty of the *Haor* households fluctuates with the season; land ownership, consumption capacity and physical capital can adversely impact poverty.

Table 3.9: Characteristics of poor identified by different studies in the *Haor* area

Rahman & Razzaque, 2000:	Khan & Islam, 2005:	Kazal <i>et al.</i> , 2010:
Landless, Female headed HH	Landless, Daily labour	Landless

Table 3.10: Causes of poverty identified by different studies in the *Haor* area

Rahman & Razzaque, 2000:	Khan & Islam, 2005:	Kazal <i>et al.</i> , 2010:
Low landholding, Gender of HH head, Lack of social and financial capitals	Lack of land, Lack of consumption capacity, Unproductive physical capital (e.g., labour), Single crop cultivation, Lack of labour market in non-crop season	Landlessness, Occupation of HH head, Illiteracy, Family size

### 3.5 Synthesis of poverty literature

Studies of vulnerable regions all over the world project them as poverty stricken, geographically isolated and whose communities confront precarious livelihoods. Such areas and countries are labeled poverty traps which have, in the main, remained relatively neglected and marginalized from mainstream development. This does not, however, indicate that poor people are lazy or without motivation to improve their livelihoods; their lives reflect heavy labour inputs throughout the year applying various strategies to diversify their sources of income and attempt to attain sustainable livelihoods.

Poverty is multidimensional, encompasses spatial attributes while the poor are heterogeneous in character. The poor are generally asset poor and specifically landless, illiterate or semi-literate and displaced people (Sinn, 1988; Mehta and Shah, 2003; Parker and Kozel, 2007; Sen, 2003; Kam *et al.*, 2005; Khan & Islam, 2005; Kazal *et al.*, 2010). The social, political and gender discriminated households belong to that group (Parker & Kozel, 2007; Sen, 2003). Female-headed households, households with many daughters and old members are extremely poor (Maloney, 1986; Rahman & Razzaque, 2000; Sen 2003) while older-headed households are comparatively less poor than those with younger household heads (Wodon, 2000).

Rural wage labour is unemployed and underemployed in the rural farm sector (Rahman, 2009), do not have command over own labour resources (Mehta & Shah, 2003) and are predominantly extremely poor (Maloney, 1986; Davis, 2007). They survive in remote, low-lying and hilly regions and while their household income is driven by ecological factors, often access to the ecosystem's services and products are limited.

From the worldview of poverty traps, while their poverty incidence is high, the density of population is low in these traps; poverty is ecology-driven and invariably the poor assign income diversification strategies to cope with ecological and other crises. The causes of household poverty are manifold and often interrelated and increasing their income potential appears vital to overcome the constraints reflected by the other factors.

In a majority of cases, poverty research identifies landlessness as a significant cause (Sinn, 1988) because of its intimate links with agriculture which is the mainstay of rural poverty (Parker & Kozel, 2007). Natural and physical capital assets can ameliorate poverty incidence (Minot *et al.*, 2003) but accessibility by the poor and underprivileged can constitute an insurmountable barrier

Although education level and occupation of household head are individual attributes that affect poverty, they cannot be seen in isolation as spatial poverty embraces ecological and geographical factors which may exacerbate livelihood vulnerabilities and accentuate poverty by increasing its incidence while diluting its density.

In the literature on poverty in Bangladesh, three striking patterns of poverty distribution have been recognized: poverty stricken areas which are geographically remote and located in low-lying and hilly regions, poverty incidence varies across the remote areas,

and the disproportionately high incidence and persistence of poverty in the *Haor* region. These patterns of poverty distribution mirror the demographic, immediate, intermediate, and underlying causes of poverty. While the first cause is self-explanatory, the second covers ecological and environmental factors, the third refers to the various forms of capital and assets, and last underpins the third and includes geographical isolation, unequal access to resources and services; gender discrimination, etc. (Green & Hulme, 2005; McCaston, Rewald & CARE's Integration Team, 2005; Turner, 2005; Moore, Chodhary & Singh, 1998).

From the quantitative studies, it is learnt that because of individual and household characteristics the incidence of poverty varies between places in rural Bangladesh. The micro-determinants and occupational diversification literature explore how individual and household characteristics affect income of rural households. In this relationship, the household capabilities literature argues that individual and household characteristics are more significant than the geographical factor in affecting poverty in rural Bangladesh. None of the qualitative and mixed method studies attempt to discover this relationship.

Literature on household capabilities concentrates on how resource endowment affects household position on the poverty ladder based on measurable attributes and determinants. However, other non-quantifiable variables influence household income and include accessibility to roads, common water, and hospital services which must also be taken into account.

In the case of regional poverty, the geographical location of the villages is an important factor but while is recognized in the quantitative poverty literature, this appears

to have been neglected or under-estimated in the qualitative studies and mixed method studies.

The occupational diversification literature provides corroborating evidence that ecology has some effect on crop cultivation. However, the strength of the association between ecological factors and household income is not sufficiently weighed in the quantitative studies on poverty.

In the qualitative studies, Maloney (1986) found that floods and droughts are natural causes of poverty but they are not found all over Bangladesh. While Davis (2007) argues that flooding is a main cause of poverty, its link to household income is not specified in any poverty study although in the migration literature, it is noted that livelihoods have failed or deteriorated during the monsoonal deluge in the *Haor* area (Gardener & Ahmed, 2005). In fact, the situation of poverty and the income of households are strongly associated with the ecological and environmental factors which have not been explored in any of the studies reviewed.

It is understood that livelihood is very onerous in the *Haor* region. Individual and household characteristics affect household income (Rahman & Razzaque, 2000; Kazal *et al.*, 2010; Khan & Islam, 2005) and have to be investigated in greater depth.

The literature reviewed above indicates that while insights have been given on the persistence of poverty in the *Haor* region, the influence of floods, geographical remoteness, scarcity of infrastructure facilities, etc., affect rural household income while recognized have not been specified (Banerjee, 2007; Shahabuddin, 2004). A lacuna in the poverty literature in Bangladesh is that there is an inadequate comprehension about the

association between the ecological, geographical, environmental and transforming factors, and the existence and persistence of spatial poverty in Bangladesh.

### **3.6 Livelihoods and Rural Livelihoods in Bangladesh**

While poverty is a multifaceted social phenomenon, a central concern is sustaining livelihoods by generating sufficient income from a diversity of sources (Scoones, 1998; Ellis, 2003). Sustainable livelihood involves exploiting the means whereby life is maintained if not at higher levels at least at similar past levels; for the poor, livelihood diversification strategies are required to cope with the crises, stresses and shocks of living with thin margins of flexibility. Poverty eradication refers to those strategies to enhance livelihoods by engaging in more productive activities than those currently undertaken.

Livelihoods, not just of the poverty stricken, are always in a dynamic state and their fluctuations are investigated by researchers using panel data over a period of time or gathering primary data from sample villages on a one-off basis. The latter has certain methodological limitations that can be compensated by analyzing poverty applying the concept of sustainable livelihoods in the literature.

#### **3.6.1 Concept of sustainable livelihood**

The integrating concept of sustainable livelihood emphasizes enhancing capability, improving equity and increasing social sustainability (Solesbury, 2003). The first definition of livelihood was proposed by the World Commission on Environment and Development (WCED) in 1987 (Chamber and Conway, 1991) as follows:

*“Livelihood is defined as adequate stocks and flows of food and cash to meet needs. Security refers to secure ownership of, or access to, resources and income-earning activities, including reserves and assets to offset risk, ease shocks and meet contingences. Sustainable refers to the maintenance or enhancement of resource productivity on a long term basis. A household may be enabled to gain sustainable livelihood security in many ways- through ownership of land, livestock or trees; rights to grazing, fishing, hunting or gathering; through stable employment with adequate remuneration; or through varied repertoires of activities”.*

Chambers and Conway (1991) proposed a new definition which is the most well known and commonly accepted (Cahn, 2002):

*“A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term” (Chambers and Conway, 1991, p 6).*

Scoones (1998, p 5) has modified the above definition as follows:

*“A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks; maintain or enhance its capabilities and assets while not undermining the natural resource base”.*

From the above definitions, five key elements can be extracted: (i) creation of working days, (ii) poverty reduction, (iii) well-being and capabilities, (iv) livelihood adaptation, vulnerability and resilience, and (v) natural base sustainability. These components establish approaches or methods of assessing outcomes with the first three concentrating on livelihoods and the rest on the sustainability dimension.

### **A. Employment diversification**

This refers to a combination or diversification of strategies where ability is a tool to create higher income employment opportunities during the main or off season. Such strategies may be associated with employment on farm, off-farm and non-farm; be in the subsistence or any other sector; *in situ* or elsewhere. Such employment has three aspects (Sen, 1983): income (a wage for the employment), production (employment provides a consumable output), and recognition (employment provides recognition). A minimum level of 200 days a year is widely used to create a livelihood to produce an income (Lipton, 1991&1993, as cited in Scoones, 1998).

### **B. Poverty amelioration**

The incidence of poverty is a main criterion in the assessment of livelihoods. The poverty line can be calculated by measuring income or consumption levels. Various indices can be used to measure the gap and severity of poverty. The inequality and relative poverty can be accessed through Gini coefficient measures (Ravallion & Sen, 1996; Jalan & Ravillion, 2002). Although all these measures have merits and demerits, the quantitative assessments of poverty would be more understandable when used in combination with qualitative indicators of livelihood (Scoones, 1998).



### **C. Well-being and capabilities**

The relationship of well-being and capabilities to the livelihood concept is well identified in literature (Sen, 1983, 1987&1993; Chambers, 1995 &1997; Basu, 2003). According to Sen (1983) the realization of human capabilities enlarges human choice, represent more than human capital, ultimately increasing a person's economic well-being. The measurement of well-being depends on different dimensions of socio-economic characteristics which foster livelihood development. Basu (2003) considers educational attainment, health facilities, infrastructure services and technological progress to explain well-being. This approach to poverty and livelihood analysis may allow people to choose the criteria which may result in a range of sustainable livelihood outcomes (Scoones, 1998; Chambers 1997& 2006).

### **D. Livelihood adaptation, vulnerability and resilience**

The focus of the definition of sustainable livelihood is to explore the ability of a livelihood to cope with and recover from stresses and shocks. The resilience mechanism includes both livelihood adaptation and coping depends on the kind of stress and shocks (Azam & Imai, 2009). The people who are vulnerable are those unable to cope (temporary adjustments in the face of change) or adopt (longer term shifts in livelihood strategies) and they are unlikely to achieve sustainable livelihoods. An evaluation of historical experiences of responses to different stresses and shocks are important to assess resilience, coping and adopting ability (Scoones, 1998; Azam & Imai, 2009).

## **E. Natural resource base sustainability**

The rural livelihood in the developing countries depends on the natural resources bases. When livelihoods are subject to stress (a small, regular, predictable disturbance with a cumulative effect) or shock (a large infrequent, unpredictable disturbance with immediate impact), the natural resources help to maintain the productivity of a system. Thus, the sustainability of natural resources is vital to maintaining sustainable livelihoods and implies that resource exploitation should be avoided. The quantification of natural resource sustainability is difficult but, a qualitative assessment can be drawn by linking indicators of resource depletion or accumulation (reductions in fish catches in a river, re-forestation or de-forestation, etc.) and livelihood needs (changing the need for useful products or services) (Scoones, 1998).

It is clear that although quantitative measures are important, a large range of qualitative indicators are required to assess sustainable livelihood. As the concept of sustainable livelihood is a product of many ideas and interests, its operationalization is subject to negotiation and the possible outcomes recognized (Scoones, 1998).

### **3.6.2 Livelihood diversification**

Diversification is a strategy designed or adopted to reduce exposure to risk by spreading investments. Livelihood diversification is a survival strategy for the poor households (Rafique, Massey & Rogaly, 2006; Ellis, 2003; Konsiega, 2005) and results in the new opportunities afforded by improved infrastructure and communication (Toufique & Turton, 2002).

A livelihood strategy is not individually independent and requires the mediation of resource factors. Thus, Ellis (2003) states that livelihood covers people's available sources of wealth, wealth management, institutional activities and policies that promote or hinder livelihoods. The term 'wealth' refers as assets or capital (Kothari, 2002; Ellis, 2003; Waddington & Sabates-Wheeler, 2003) including human capital (skills, education and health), physical capital (labour and investment goods), financial capital (money, savings and credit accessibility), natural capital (land, water and forest) and social capital (networks, kinship and association). The household's ability to adopt single or combined livelihood strategies ultimately depends on resource accessibility (Toufique & Turton, 2002).

### **3.6.3 Poverty and livelihood diversification**

Poverty is concentrated in the rural remote areas (Jalan & Ravallion, 2002) where the poor are socially and politically excluded (Mehta and Shah, 2003) and having less income diversification opportunities. Non-remoteness and relative urban proximity encourage change and diversification of livelihoods in an area (Bird & Shepherd, 2003).

Remote areas are characterized by challenging climatic regimes, ecological barriers or vulnerabilities and physically distant from locations with strong economic activities, urban agglomerations, coasts, communication links and political centers (Bird & Shepherd, 2003). Encountering risks and vulnerabilities exacerbate the conditions of poverty pressuring people to diversify livelihoods to exit poverty (Ellis, 2003).

Livelihood strategies arise from insecurity and uncertainty which both induce risk adverse behaviors (Wood, 2003) requiring resource endowment analysis of poor

households. Resources mean assets or capital (Ellis, 2003; Ellis & Allison, 2004) which permit self-improvement (Wood, 2003) and broadly geographical capital (Bird & Shepherd, 2003).

The resource profile of households is founded on the quality and capability of material, human, social, cultural and political resources to support a particular livelihood strategy. The risk of adopting new strategies is associated with some covariant as, for instance, seasonality of income, food crisis, morbidity, illness and loss of employment, which causes poverty (Wood, 2003); this covariance of risk influences livelihood strategy or changes to it.

### **3.6.4 Resource endowment and livelihood diversification**

#### **A. Natural capital**

Exploitation of natural resources degrades the environment and negatively impacts livelihood. De-forestation limits firewood and thatch grass collection, overgrazing limits livestock rearing, silting rivers and drying up dams affect income sources; population pressure sub-divides landholdings into uneconomic plots initiating land sales or leaving arable land as fallow land; these factors collectively exert pressure on sustaining the livelihoods of the poor and their ability to diversify them. However, agricultural intensification or extensification can upgrade the potential for rural livelihood diversification (Nargis & Hossain, 2006; Otsuka & Estudillo, 2007; Asaduzzaman, 2002; Hossain, 2009).

## **B. Social capital**

In developing countries, social protection is virtually absent or provides thin coverage of the poor household's survival chances; social capital is critical to its livelihood diversification. Social networks (e.g., farmer's groups, women's clubs) mediate to improve access to information, credit, input and output markets in the poor communities. Social capital enables households to diversify their livelihood activities, links to rich relatives provide a means to overcome seasonal cash deficits (Maloney, 1986), while networks involving urban migrants bring urban employment opportunities. In a barter economy, neighborly assistance helps survival when the household head migrates elsewhere to find work (Rafique *et al.*, 2006).

## **C. Human capital**

As human capital promotes economic and social well-being (Sen, 2003), households invest in human capital (Malek & Usami, 2010) to increase productivity and wages particularly in the non-agricultural sector (Sen, 2003; Nargis & Hossain, 2006; Rahman & Islam, 2003, among others). In rural areas, the never poor and ascending households show the highest endowments of human capital while the poor group has the least (Sen, 2003).

Livelihood and livelihood diversification are also associated with the household's human capital stock. Bird & Shepherd (2003) have shown that skills and education enable households to diversify their employment opportunities away from subsistence agricultural production. Households with educated heads can become formal wage earners rather than rely on agricultural production while those who are less educated or illiterate face a

limited scope of work which are primarily agriculture-related and labour-intensive (Bird & Shepherd, 2003).

#### **D. Physical capital**

Physical capital like roads, transportation, flood protection infrastructure, irrigation canals, sewing machines, fishing gear, ploughs, and water pumps are crucial capacity determinants of rural non-farm employment (Reardon, Berdegé, Barrett & Stamoulis, 2006) and enhances household income (Ashley, Kar, Hossain & Nandi, 2000; Mukherjee *et al.*, 2002; Alam, 2005). Such capital permits technology adaptation (e.g., power pumps, deep tube wells) and facilitates efficient management of irrigation, land and labour which improve household productivity and increase income helping farmers to diversify employment (Adato & Meinzen-Dick, 2002). Ownership of a deep tube well increases farmer's income through selling irrigation services (Rafique *et al.*, 2006), while a sewing machine furnishes income to the poor rural household (Ellis, 1999). Accumulation and utilization of physical capital increase the price of the output of the poor (Shaffer, 2008) and thus work in reducing chronic poverty in rural area (Sen, 2003; Ellis, 2000; Jalan & Ravallion, 2000). But poor households lag behind the non-poor households in accumulating such capital.

The quality and quantity of physical capital furnish a remarkable difference to the viability of rural livelihoods (Mukherjee *et al.*, 2002; Ellis, 2000). Poor quality of housing and open sanitation affect poor households through infection and disease (Mukherjee *et al.*, 2002; Ahmed, Troell, Allison & Muri, 2010; Alam, 2005). Degraded irrigation and drainage infrastructure reduce crop yield and animal husbandry (Mukherjee *et al.*, 2002) and the poor condition of flood protection infrastructure increases the vulnerability of the poor in the ecologically underprivileged and geographically remote areas (Ashley *et al.*,

2000). Also, limited access to roads, markets, boat and net making facilities constrain the income generating activities of the poor rural households in Bangladesh (Ahmed *et al.*, 2010).

### **E. Financial capital**

Access to financial capital provides insurance to manage risks and cope with vulnerability. Generally, the rural poor need loans to overcome unpredictable shocks or meet emergency consumption crisis. However, they have less scope and determination to save and thus cannot depend on the formal financial system (Parker & Kozel, 2007). In rural areas, the poor are forced to borrow from informal and exploitative moneylenders as they have little collateral; micro-finance institutions can play a crucial role in this regard.

The ascending households have greater access to formal institutional credit than the poor households who are deprived of a significant means to escape poverty (Sen, 2003; Rahman & Islam, 2003). The patron-client relationships in rural communities are also informal credit sources for the poor but which can involve bonded labour arrangements. Such a vertical relationship is a form of social capital and safety net but will not lead to poverty reduction (Parker & Kozel, 2007).

### **3.6.5 Livelihoods in rural Bangladesh**

Livelihoods in rural Bangladesh directly or indirectly depend primarily on agriculture, forestry and fishing. In the *Haor* region, the vulnerabilities of the ecosystem can create additional pressures on livelihoods governed by agricultural crop cycles.

Where opportunities present themselves, the rural poor engage in non-agricultural livelihoods in a strategy to diversify their income sources. The service sector has the greatest potential for off-farm work in small village shops, tailoring and other craft enterprises, rickshaw pulling and petty trading (Toufique and Turton, 2002). Agriculture's share of rural household incomes has declined from 63%-54% during 1987-1994 corresponding to the 37%-48% upsurge in non-agricultural activities for the same period (Hossain, 1996; Saha, 2002). One probable reason for such work diversification is that income from non-farm activities exceeds farm-related income (Afsar, 2002; Toufique & Turton, 2002).

This trend is becoming more prominent (Varma & Kumar, 1996; Toufique & Turton, 2002; Saha, 2002; Toufique, 2002; Asaduzzaman, 2002; R. I. Rahman, 2002; Afsar, 2002 and H. Z. Rahman, 2002). Secondary data analysis by Saha (2002) indicates that rural poor households are increasingly diversifying their livelihood to non-agricultural activities particularly by the landless farmers.

Toufique (2002) differentiates non-agricultural activities from agricultural activities where crop, livestock, forests and fisheries are subsumed as agricultural activities and other rural sectors including manufacturing, processing, repairing of manufacturing goods, trading activities, transportation and construction are considered as non-agricultural activities. But this differentiation varies with the geographic location of the villages. With human capital, natural capital endowment relates to livelihood diversification. Being uneducated and unskilled, the poor are commonly involved in low wage residual employment which provides mere survival means. Thus the process of livelihood



diversification as a contextual issue requires investigation. The poor with better capacity to diversify are the winners while those without this capacity are the losers (the poorest).

The poorest people exploit natural resources most (Jensen, 2003; Hanjra *et al.*, 2009). Exploitation of natural resources inhibits rural livelihood diversification. Subsistence economy and rural livelihood in Bangladesh depend on the management and exploitation of natural resources through crop production, fisheries, livestock and forestry (Asaduzzaman, 2002). Agricultural growth alone cannot reduce rural poverty as the growth in the rural non-farm sector (RNF) is also critically important (R. I. Rahman, 2002) which means the displacement of labour from agriculture to the RNF sector.

With the constraint of ‘resource pauperization’ (Asaduzzaman, 2002) rural livelihood diversification is impeded by other barriers including individual deficiencies (inability to take risk, illiteracy, lack of skill, lack of skill management), inaccessibility to capital market, lack of market centers (which create storage, communication and other facilities), lack of infrastructure (especially all-season roads and easy links to market centers), lack of power supply, incidence of natural calamities (floods which induce crop failure, river erosion), dysfunctional institutions (lack of law and order, rent-seeking nature of local government), and lack of growth centers in the rural area (Thornton, 2002; Rahman, 2002). These variables are directly related to poverty (R. I. Rahman, 2002). Empirical evidence (Mahmood, 1996) suggests that a shift from agriculture to non-farm occupations entails a significant income gain for the household within each land ownership group and who share similar characteristics.

With the changing of rural livelihoods, rural poor interact with the transformation of rural labour market where (R. I. Rahman, 2002) casual daily labour is the least preferred

employment. The trend in non-farm employment opportunities goes down from rural construction activities, transport operation to the lower end of trade and service activities. In this context, shifting the capacity of individual households becomes a key livelihood concern for the poor dependent on the endowment of financial, social and human capital factors of individual households (H. Z. Rahman, 2002). To take advantage of the various livelihood opportunities, natural resource endowment (access to land and water) is also crucial (Asaduzzaman, 2002) because access to these resources increases the capacity of household to shift from one livelihood to another or to combine livelihood strategies (Toufique & Turton, 2002).

### **3.7 Seasonal migration: A livelihood strategy**

The poor always run short of capital to overcome vulnerabilities and crises. Additionally, for the seasonal migrants, livelihoods are vulnerable to different latent factors (e.g., exploitation, health hazards. etc.) at the destination. Therefore, migrants may fail to become income generating but rather resource exploiting corresponding to their intrinsic capability at the destination. Along with this, some ecological factors (flashfloods, monsoonal deluge) hinder household income at the origin. This issue demands attention as seasonal domestic <sup>40</sup> migration in the flood-prone developing countries is an extreme strategy to sustain the livelihood of the extremely poor.

#### **3.7.1 Understanding flood-induced seasonal migration**

Two ecological attributes, both inextricably intertwined, underpin the seasonal diaspora in the *Haor* region - flooding and crop seasonality. The seasonal deluge which lasts 5-6 months negates a second cropping cycle with all the subsidiary work opportunities for the

---

<sup>40</sup> Domestic means the incident occurs within the geographical frontier of a nation (Rabby, *et al.*, 2010).

community. For the marginal households, seasonal migration is a grounded coping strategy (Mishra, 2007) to deal with an inevitable environmental and ecological disaster or vulnerability (Rhyhan & Grote, 2007; Kabir, Lipi, Afrin & Seeley, 2008). Since seasonal floods disrupt the traditional means of livelihood, the seasonal migration strategy works as an adjustment mechanism<sup>41</sup> for the poor households. Figure 3.2 illustrates the phenomenon of flood induced seasonal migration.

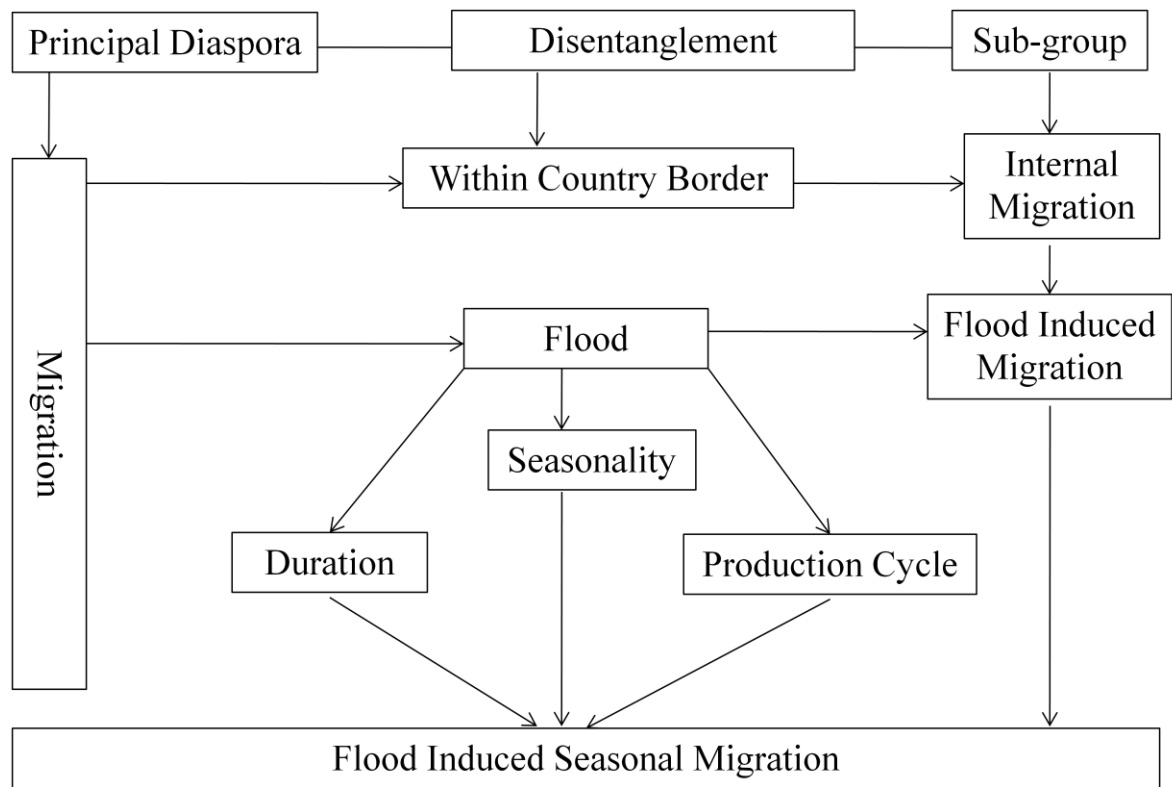


Figure 3.2: An illustration of flood induced seasonal migration (Rabby *et al.*, 2011b).

The attribute ‘duration of flood’ induces poor people to seasonally migrate as the duration of flooding intensifies their suffering. Another attribute ‘production cycle and flood’ relates to the disruption of production and services of the agricultural ecosystem. As theory posits that ecology can be instrumental in enhancing livelihoods, ecological

<sup>41</sup> Adjustment mechanism includes strategies of reducing household current food consumption during crisis, shifting to less preferred foods with lower cash cost and reallocating household labor to increase current income (Rashid, Langworthy & Aradhyula, 2008).

management becomes a critical component of poverty alleviation strategies (DeClerk, Ingram & Rio, 2006). However, poor ecological management<sup>42</sup> (particularly in resource-deficient countries like Bangladesh) severely diminishes the income diversification alternatives forcing the poor and marginal inhabitants to adopt seasonal migration as their coping mechanism.

### **3.7.2 Linkage between poverty and seasonal migration**

The poverty-migration nexus can best be understood through its multidimensional attributes (Kothari, 2002). Studies by Stark, Micevska & Mycielski(2009); Skeldon (2003), De Haan &Yaqub (2008) and Afsar (2005) attribute it to the predominance of economic factors (e.g., unemployment, wage determinants) as migration can move people out of poverty or into poverty or greater impoverishment. Based on this hypothesis, identifying migrants and the causes and consequences of migration can unravel the complexity of this nexus (De Haan & Yaqub, 2008; Kothari, 2002).

### **3.7.3 Identifying the migrant**

Seasonal migrants generally comprise the young able-bodied males and a select group rich in human and social capital (De Brauw & Harigaya, 2007). Asset endowment provides a comparative advantage to diversify livelihoods elsewhere than the point of origin. As the poor are also asset deficient, they are highly cost sensitive in adopting any livelihood diversification strategies. In geographically vulnerable areas, the very poor undertake seasonal migration (Mosse *et al.*, 2002). In Bangladesh, Afsar (2000, 2005) reports that migrants belong largely to two groups – the landless and the resource-rich households while De Haan, Brock, Carswell, Coulibaly, Seba & Toufique (2000) observe that internal

---

<sup>42</sup> It causes over exploitation and degrades the natural growth processes of the ecosystem.

migrants are less likely to belong to landless households. The poorest people prefer temporary and short duration migration while landless households rarely migrate unless survival becomes difficult in rural Bangladesh (Rayhan & Gorte, 2007). Such inconclusive findings necessitate further exploration of the seasonal migrant's identity particularly in the *Haor* region.

#### **3.7.4 Causes of migration**

Migration is an *ex ante* risk management strategy or *ex post* coping strategy (Barrett, Reardon & Webb, 2001). It is a flight from poverty when there are no locally available opportunities for survival (Skeldon, 2003). People often migrate responding to diminishing returns to labour or land and non-existent land, labour, credit or insurance markets (Barrett *et al.*, 2001). Migration theories imply that migration is induced by wage differentials between the origin and destination, underemployment of agricultural labour, and unemployment. The poor household head migrates to cope with a lean season (Sjaasted, 1962) and to service debt (Mosse *et al.*, 2002). The level of access to and control over human, social, cultural, political, economic and environmental capital causes migration (Kothari, 2002). These causes connect to poverty as the poverty-migration link is inconclusive (Afsar, 2005).

In rural Bangladesh, poverty can induce migration in diverse ways: chronic unemployment shortage and limited land ownership (Afsar, 2005; Shamsuddin, 1981; Kabir *et al.*, 2008; Shonchoy, 2008), gender disparities (Afsar, 2005), ecological vulnerabilities (Afsar 2005; Kabir *et al.*, 2008; Shahariar, Zeba, Shonchoy & Parveen, 2006; Shonchoy, 2008) and household and individual characteristics (Shahariar *et al.*, 2006; Shonchoy, 2008). Lack of social networks (Gardener & Ahmed, 2006; Kabir *et al.*,

2008; Rayhan & Grote, 2007), inaccessibility to resources (Chowhury, Rashid and Afrad, 2004; Alam, 2004), infrastructure and credit markets and natural calamities (Rayhan and Grote, 2007) may also induce seasonal migration in rural Bangladesh. But specifically in the *Haor* region, despite the above mentioned reasons, frequent flashfloods (DER Secretariat, 2004) and the annual monsoonal deluge<sup>43</sup> (Gardener & Ahmed, 2006) impel seasonal migration.

### **3.7.5 Consequences of migration**

The inconclusive findings on the poverty-migration nexus and flood-induced seasonal migration require investigation. In general, when people are forced to relocate, migration can lead to an increase in the number of absolute poor. Also, when migrants have limited human and social capital, migration leads to an extension of poverty in a community or region (Skeldon, 2003) through capital (knowledge, skill, experiences, financial investment) relocation. Migration, as a last resort, leads to further exploitation and impoverishment and accentuates the vulnerability rooted on such comparative disadvantages as capital deficiencies and inaccessibility to credit markets. Migrants borrow at high interest rates to fund seasonal moving costs and living expenses exacerbating individual and household poverty and vulnerability as families left behind depend on remittance transfers (Wood, 2003).

Flood-induced seasonal migration exacerbates poverty when migration itself is a source of vulnerability. Seasonal migrants dependent on manual labour are vulnerable to health hazards (Deshingkar & Start, 2003; Rafique & Rogaly, 2003; Rafique *et al.*, 2006),

---

<sup>43</sup> This typical climatic character of the *Haor* area differs from the usual understanding of annual flood. Deluge is not an unusual and unexpected ecological incidence in the *Haor* area. But its inherent attributes of consistent annual reoccurrences, seasonality and long duration make differential from annual flood.

insecurity on the journey and employers' malpractices (Rafique & Rogaly, 2003; Rafique *et al.*, 2006). Flood-induced migration acts as a form of credit and recovers values of damage caused by flood. Recurrent seasonal floods like those inundating the *Haor* area, can over time, significantly increase the number of homeless, landless and temporary migrants while pushing them deeper into the poverty trap (Rayhan and Grote, 2007).

### **3.7.6 *Haor* people's livelihood in Bangladesh: Socio-economic issues**

Seasonal flood-induced migration is not a viable solution for the poor to achieve sustainable livelihood (Shonchoy, 2008; Shahriar *et al.*, 2006; Kabir *et al.*, 2008) when they are also subject to environmental crises, *monga*<sup>44</sup> and poor social protection. But several studies (Shonchoy, 2008; Kabir *et al.*, 2008) have not considered poverty or ecological parameters in examining seasonal domestic migration. While Shahriar's (2006) study incorporated economic factors, ecological vulnerability and migrants' personal attributes in affecting the seasonal migration decision, it overlooked the impact of remittances in providing capital to diversify livelihoods.

Seasonal migrants are neither uniquely distributed nor inherently homogenous in character. Gender-specific constraints, unequal employment access, low educational attainment rates, natural resource constraints and the unremitting struggle to escape poverty are fundamentally and directly or indirectly associated with the *Haor* households' livelihood diversification strategies (Rabby *et al.*, 2011a; Alam, 2004). The seasonal migration consequences of both time variant (e.g., household size) and invariant characteristics (e.g., gender of migrant) of households together with crop seasonality

---

<sup>44</sup> It is seasonal food insecurity in ecologically vulnerable and economically weak parts of northwestern Bangladesh, primarily caused by unemployment and income deficit before monsoon crop is harvested. It mainly affects those rural poor, who have an undiversified income that is directly or indirectly based on agriculture (Zug, 2006).

patterns based on the *Haor* ecological conditions influence the decision to seasonally migrate. Crop seasonality and migration are together subsequently related to household income in rural Bangladesh (Shamsuddin, 1981; Rashid, Langworthy and Aradhyula, 2006).

Despite cultivating a single crop and the recurrence of flashfloods, the region produces about 20% of country's total staple food, covers almost one fifth of its total land area and provides livelihood for twenty million people. Along with rice and land taxes, the area provides millions of tons of sweet water fish for local and international markets. Yet, ironically, the region is still underdeveloped and during the annual deluge, neither public nor private interventions have been made to extend employment opportunities let alone social investments.

The flood-induced seasonal migration and poverty interface remains a poorly researched and often misunderstood area in Bangladesh. A viable framework is required incorporating the primary determinants of seasonal domestic migration in the poor and flood prone areas to generate sustainable livelihood diversification policies and strategies for the socio-economic development of the *Haor* households.

### **3.8 Poverty and vulnerability**

Vulnerability is a situation which explains the likelihood of household of sliding into poverty or of deteriorating poverty status in the future which is often linked to shocks such as drought, floods, etc. It is directly related to household assets because it influences individual behavior in investment, production pattern and coping strategies and at the same time self perception of poverty (World Bank, 2005).



The poorest households, lack of private assets (land, animals, farming equipment and even a homestead plot), are vulnerable to particular shocks which undermine their human and physical capital. The most vulnerable are female-headed households who are economically insecure, have low income, are always in debt, vulnerable to natural calamity and live a life with few or no social ties (Parker & Kozel, 2007).

Household composition also causes vulnerability. When a family has many girls then dowry-induced impoverishment evolves which leads long term financial sliding (Davis, 2007). To cope with vulnerability, many people resort to borrowing from different sources, consume less food, sell assets and undertake migration (Davis, 2007; Azam & Imai, 2009).

### **3.9 Summary**

Livelihood diversification is an inevitable strategy to diversify the livelihoods of the poor communities and becomes particularly acute in regions which are ecologically vulnerable and remote. When agriculture and related activities can no longer provide employment opportunities because of over population and resource scarcity, depletion or deterioration together with social and governance structures that do not favor the poor, then the extremely poor in particular have to resort to temporary or permanent migration to search for livelihoods. In many cases, work is agriculture-related and labour intensive in nature reflecting the limited skill base of the migrants. In other cases, access to urban or semi-urban centers allow a diversification into non-agricultural occupations often requiring hard labour but sometimes permitting an upgrading of skills as in work in RMG (Ready Made Garment) factories, for instance.

It is also apparent that the extremely poor households lack the capacity and capability to escape the poverty trap because of weaknesses in human or physical capital (skills that are associated with education and training), financial capital (access to credit markets especially where asset security is not a condition) and even social capital (the capacity to tap networks to identify new opportunities). This implies that seasonal or permanent migration need not be an unavoidable livelihood diversification strategy if the human, financial, social and even the natural capital base of the communities in which the poor reside can be enhanced as a deliberate policy intervention.

In the *Haor* region of Bangladesh, the literature reviewed above emphasizes that rural poverty cannot be studied without reference to the impact of the ecological sensitivity and remoteness especially on the extremely poor and the landless labourers. The studies undertaken have not sufficiently investigated the links among ecological factors (flashfloods), environmental factors (the annual monsoonal deluge which determines the monocropping cycle and virtually eliminates the labour market) and the natural resources (common water resources most of which are leased to the elites) and their collective impact on household livelihoods, particularly of the poor who suffer the most. Additionally, the alternative of seasonal domestic migration as a livelihood diversifying strategy of poor households and its consequences have not been studied and elaborated. In sum, the dynamics of rural poverty in the *Haor* communities necessitate an in-depth investigation applying diverse models of poverty (including self-perception of poverty) and the mixed methodologies of the quantitative and qualitative approaches. This becomes the orientation of the current study.

## **4. METHODOLOGY**

### **4.1 Introduction**

This study was conducted for about four months (April-July, 2010) applying both qualitative and quantitative approaches (the mixed method approach). While the survey addresses the demographic characteristics of the household head, the focus groups reveal insights into the non-monetary exchange of goods among households which are conducive to creating and maintaining social networks thus reducing vulnerability.

### **4.2 Method and methodological implications**

Method is a set of procedures and techniques for collecting and analyzing data while methodology is a way of thinking about and studying and viewing any social reality (Strauss & Corbin, 1990). The mixed method (both quantitative and qualitative) approach applied in this study is considered purposively<sup>45</sup>; its justification is found in different studies (Orr, *et al.*, 2009; White, 2002; Place, Adato and Henbinck, 2007). The quantification (or hard) (Guba & Lincoln, 2000) approach alone cannot explain the process of development where the nature of reality (ontology) requires philosophical interpretation (Obermeyer, 1997). This approach can overcome the limitation of quantification in terms of both analytical tactics and interpretation. The mixed method of analyzing the livelihoods of the poor *Haor* households will allow the consideration of perspectives associated with the macro aspects of development constraints with the thinking of individuals about their everyday life, opportunities and constraints in livelihood processes, desire for livelihood sustainability and perception of poverty reduction and livelihood enhancement policies.

---

<sup>45</sup> The details of the process of answering the research questions have been drawn where the domain of appropriate methods are mentioned (Table 4.3).

### 4.3 Significance of mixed method

The combination of both quantitative and qualitative methods will provide more insights (White, 2002) which range from general description to in-depth understanding of the process of poverty reduction and development (Orr *et al.*, 2009). The qualitative approach complements the quantitative approach by surveying households, groups, informants and local institutions about such issues as perceptions of poverty, livelihood strategies, and common resource rights.

### 4.4 Sample selection

#### 4.4.1 Selection of the study area

The selection of study area is based on the lower poverty incidence map at the sub-district level (*Upazila*)<sup>46</sup> and high level extreme poverty incidence map in the sub-sub-district level (*Union*). To understand the geographical variation of poverty between sub-districts, BBS and WFP (World Food Programme) jointly produce poverty maps for Bangladesh based on Household Income Expenditure Survey (HIES) 2005. The ‘Small Area Estimation’ technique developed by Elbers, Lanjouw & Lanjouw (2003) is used to produce these poverty maps. To explore the probability that the sub-sub-district has a high incidence (> 30%) of extreme poverty, *Union*-level poverty maps are also prepared by BBS and WFP.

Population census data (BBS, 2001) reveals that more than 50% of the study village households do not have any cultivable land compared to 45% for the rest of the villages in the *Union* indicating the prevalence of poverty in the survey area.

---

<sup>46</sup> *Upazila* level lower poverty incidence map (2005) was prepared by Bangladesh Bureau of Statistics (BBS) in collaboration with the United Nations World Food Programme (WFP).

#### **4.4.2 Data collection**

Data were gathered by a door-to-door household survey with the help of 6 field workers (2 female and 4 males and with a minimum secondary school education) working 12-14 hours per day including holidays. This team was given a one -week extensive training by the researcher although all members had the experience of working in the BBS Population Census Survey, 2001. For this study, the households were selected in a three stage sampling process to increase data reliability and accuracy.

##### **A. Stage 1**

To identify the poor and migrant households, household income (including remittances), expenditure, family size and household head's occupation of all 1265 (though the number was 1050 in 2001 census in Table 1.3) households in the 5 villages were gathered in the initial survey stage in April 2010. The upper income poverty line for 2008 was calculated to categorize poor and non-poor households while a lower poverty line was computed for the extremely poor households (Table 4.1). The sample covers all migrant households including seasonal and year round migrants and those receiving non-crop seasonal remittances.

##### ***(i) Poverty line calculation***

In calculating the 2008 poverty line, the ratio of the 2008 rural consumer price index (RCPI) to that of 1998 was estimated –2008 RCPI of 195.14 was divided by the 1998 RCPI of 113.31 giving a ratio of 1.722. This is then multiplied by the income poverty line of 1998 to get the updated figure for 2008 given in Table4.1.

The estimated 1265 households in the study villages were then categorized into 3 groups according to poverty status (non-poor, moderately and extremely poor households); their distribution in the five villages is given in Table 4.2.

Table 4.1: Poverty line of 2008 for the households in the 5Haor villages

Calculated By	Group*	Poverty line (per capita in Bangladeshi - Taka)	Year
Based on Rahman (1996a)	2	6287	1994
	3	3757	1994
Based on Rahman & Razzaque (2000)	2	6879	1998
	3	4111	1998
Computed for this study	2	11846	2008
	3	7079	2008

\* Upper poverty line (2) and Lower poverty line (3).

Table 4.2: Distribution of population in the 5 Haor villages

Poverty status	Village name					Total
	V1	V2	V3	V4	V5	
Non poor	31	60	126	18	113	348
Moderately poor	46	47	117	27	115	352
Extremely poor	70	47	207	20	221	565
Total	147	154	450	65	449	1265

Note: V1- Chawrapara, V2-Chandpur, V3-Gaglajur, V4- Mohabbotnagar and V5-Manderbari village.

## ***(ii) Significance of samples and design of tools***

Structured and semi-structured interviews were conducted along with the census survey of the study villages. Questionnaires, focus group discussions and key informant interviews were the main components of the tools which are summarized in Table 4.3.

Table 4.3: Checklists of the research questions and tools of analysis

Research Questions	Method/s	Tools	Sample
Who are the poor and what are the causes and consequences of poverty among the <i>Haor</i> villages?	Quantitative and Quantitative	Census survey, interviews, focus group discussion and key informant interviews	Yes
What are the determinants of income of the poor households and how is it managed?	Quantitative and Qualitative	Census survey, interviews and focus group discussions	Yes
What factors interrupt household livelihood dynamics and what are the major livelihood diversification strategies adopted by them?	Qualitative	Interviews, focus group discussions and key informant interviews	Yes
What is the relationship between access to assets and household poverty status?	Qualitative	Interview, focus group discussion and key informant interview	Yes
How does seasonal domestic migration strategy affect household poverty status?	Quantitative and qualitative	Census survey, interview and focus group discussion	Yes

## B. Stage 2

In selecting a representative sample of the population, Krejcie & Morgan's (1970) suggestion<sup>47</sup> was followed in this study. After categorizing the households into non-poor, moderately poor and extremely poor, a random sample of 292 households was selected (Table 4.4), the share in each category corresponding to their proportion in the whole population. Then, the households in each group were picked randomly. In this process, every household was coded during census survey and recorded on a piece of paper of identical size and folded by one person. All the folded papers were thoroughly mixed up to assure the same probability of selection of each household and to overcome systematic sampling errors. One folded paper was picked up each time by the field workers and sometimes by villagers who happened to be around at that time. After each selection, the

<sup>47</sup> Using an efficient method they construct a table which gives the sample size requires be representative of a given population size. According to the table, if the population size is 1600 then the representative sample size is 310. The relationship between sample size and total population is that as the population increases the sample size increases at a diminishing rate and remains relatively constant at slightly more than 380 cases (Krejcie & Morgan, 1970).

pile of folded papers was mixed up again and another person was chosen to pick up another folded paper and the process continued until the sample household total was attained. Then the interviews of selected households were administered with structured and semi-structured questionnaires.

Table 4.4: Population and sample of households of the study area

Population and sample		Village name					
		V1	V2	V3	V4	V5	Total
Population		147	154	450	65	449	1265
Sample	Non-poor	7	14	29	4	25	79
	Moderately poor	11	11	30	6	26	84
	Extremely poor	16	11	45	5	52	129
	Total	34	36	104	15	103	292

Note: V1- Chawrapara, V2-Chandpur, V3-Gaglajur, V4- Mohabbotnagar and V5-Manderbari village.

### C. Stage 3

In this stage, focus group discussions and key informant interviews were carried out to obtain insights into the village society and such social activities as culture, norms and institutions; economic conditions including income diversification, vulnerabilities, coping strategies, effects and implications of the *Haor* attributes on local livelihoods. Based on household characteristics like gender, education and household head's occupation, 11 focus groups of 5 members each and 5 key informants were selected.

#### (i) *Focus group discussions*

Among the 11 focus groups, as female-headed households are the most vulnerable in rural Bangladesh (Davis, 2007; Nargis & Hossain, 2006; Hossain & Nargis, 2010), an attempt was made to schedule a special group discussion of such (female) household heads



irrespective of their poverty status; unfortunately, this proved difficult to bring them together. It was possible in only *Gaglajur* village to gather 5 female heads<sup>48</sup> (1 from the non-poor and 2 each from the moderately and extremely poor households) in such a grouping. The balance of 10 focus groups comprised of 5 each of the moderately and extremely poor<sup>49</sup> male-headed households.

While some discussions were arranged in tea stalls in two market places where the participants were provided baked foods, fruits, tea and bottled juice, others were arranged in the homesteads of focus group members. Though all the discussions were open, the researcher as moderator intervened occasionally by raising some issues not properly described or answered in previous interviews to obtain clarification and deeper contemplation on issues.

#### ***(ii) Key informant interviews***

The key informants were the older members of the village communities and school teachers. The interviews provides information on settlement history; social culture, norms, networks and understanding social informal institutions; economics of the area, communal perception and history of poverty; and overall survival strategies together with other related information.

---

<sup>48</sup> They live in the same village with close distance and agreed to allocate sometime for the discussion.

<sup>49</sup> Since the objective of the study is to explore the causes, consequences and dynamics of poverty, therefore poor households are given preference in focus group participation and discussion.

#### **4.4.3 Methodological limitations**

In this study, limitations related to data and survey are recognized and discussed as follows:

##### **A. Data limitations**

The data do not account for regional level factors (such as unemployment rate, wage difference, price of goods) to explain poverty which in this study is limited to an analysis of individual and household levels. Since the study villages are located deep in the *Haor* area, the data are not representative for all the villages in the *Haor* area and thus the findings are not generalisable.

The data limitations on households' vulnerability to flashfloods, accessibility to road networks and public health services impel inclusion of these variables for the multivariate regression analysis. This happens since flashfloods affect all households irrespective of their financial status and availability or non-availability of public services or facilities in and around the studied villages.

Furthermore, the data have intrinsic limitation to one-off collected cross-sectional data which does not take into account lagged data (e.g., poverty, seasonal domestic migration) essential to clarify reciprocal relationships (non-recursive linkages) between poverty and migration. Such data constrains the development of the non-recursive simultaneous equation model; therefore, for the clarification of the poverty-migration nexus, a recursive (uni-directional) simultaneous equation model has been purposively considered.

## **B. Limitations of the survey**

The main physical predicament faced in the survey was a sudden flashflood which made the research work very difficult and when all the villagers were actively engaged in harvesting as much of the crop as possible.

The rich and educated villagers pressured the local people not to co-operate with the researcher as they claimed that the study would not benefit the community rather the researcher. As the villagers felt betrayed by different organizations (e.g., NGOs) who collected data but did not help them in the past, this impeded the survey.

There was a collapse of communication during the flashflood and it became very difficult to travel from one village to another or from one cluster to another.

There was another constraint in the research track to collect data. The village people thought the people who are collecting data will achieve their personal ends at the cost of the victimized people. Secondly, the relief amount that was given was negligible and embarrassing for some of the households.

The researcher took some measures to overcome these limitations. He conducted meetings with the influential people at different points to make his purpose clear. He met the local people, teachers and influential *imams* to convince them about the value of this study.

## **4.5 Method**

In this section, the qualitative and quantitative approaches are discussed to provide an in-depth analysis of the dynamics of poverty in the *Haor* study villages.

### **4.5.1 Qualitative approach**

The qualitative orientation in studying poverty dynamics in the *Haor* encompasses the Income Flow Approach (IFA) and the Sustainable Livelihood Approach (SLA). The former comprises different sources of income impacting upon household financial situation and is linked to the second established framework (DFID, 1999).

#### **A. Income flow approach**

Although income is a significant determinant of poverty, some economists (e.g., Sen, 1983, 1999; Sachs, 2005) are also concerned about the social, political, geographical, physiological and psychological perceptions of poverty. Also, recently, a trend (in, for example, Rahman, 1996b; Rahman & Davis, 2005; Ashley *et al.*, 2000) in poverty investigations has emerged directing attention on the livelihood assets of the poor. Thus, the poverty phenomenon can be studied by money metric models, vulnerability models, models concerned with capability and functioning, among others (Maxwell, 1999).

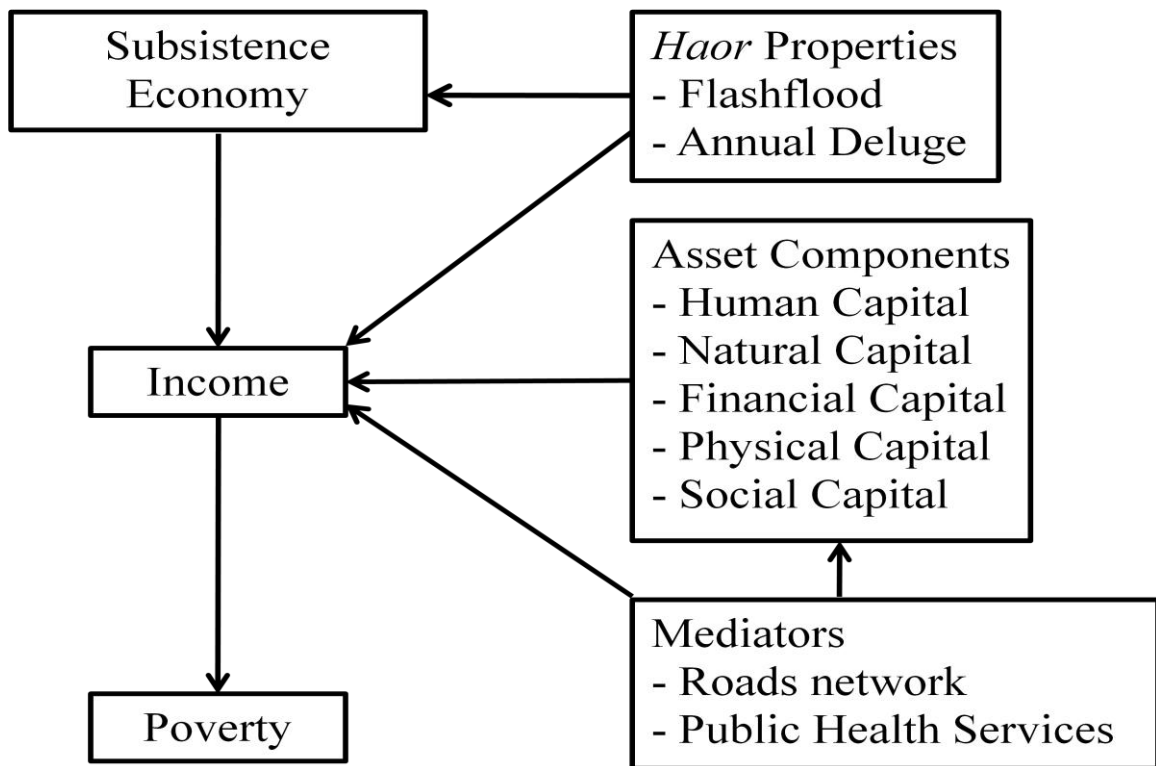


Figure 4.1: Income flow approach (IFA) (adapted from Rahman, 1996b; Reardon & Vosti, 1995, Ashley *et al.*, 2000; Rana *et al.*, 2009; Islam, Chowdhury & Haque, 2005)

The locus of the income flow approach adopted in this study is the generation of household incomes of the survey sample measured by the total flow method. Additions to income and its erosion are triggered explicitly or implicitly, with positive and negative attributes. The effect of negative attributes can be offset through some livelihood mechanism which is subject to the inherent capabilities of households which involve good health and asset accessibility. If a household is incapable, it is unable to replenish the eroded income resulting in more suffering or sinking further into the depths of poverty. The positive effects illustrate conditions favorable to enhancing income which subsequently is amplified, directly or indirectly, and contributes to poverty amelioration.

The sources of income flows which support the household's financial situation in the *Haor* area can be codified as an approach to the '*Haor* Household Income Flow'.

## **B. The sustainable livelihoods approach**

The geographical, economic, political, social and ecological framework of the *Haor* region directly and indirectly affects the livelihoods of its inhabitants which can be profitably examined by adopting the Sustainable Livelihood Approach (Chambers & Conway, 1991; Solesbury, 2003; Krantz, 2001, Farrington, Carney, Ashley & Turton, 1999). In Bangladesh, several studies have applied the SLA instrument in the agricultural sector (Hallman, Lewis & Begum, 2003; Adato & Meinzen-Dick, 2002), fisheries (Adato & Meinzen-Dick, 2002; Ahmed, 2009) and in the *char*<sup>50</sup> area (Ashley *et al.*, 2000) to explore the livelihood sustainability strategies and mechanisms adopted by the rural poor.

### ***(i) Origin and development of SLA***

The concept of sustainable livelihoods was first introduced in the report of an advisory panel of the World Commission on Environment and Development (WCED) in 1987 (Chambers & Conway, 1991; Cahn 2002). It recommended sustainable livelihood security as an integrating concept of basic human needs, food security, sustainable agricultural practices and poverty. The most popular SLA has been formulated by the Department for International Development (DFID) (Figure 4.2) (DFID, 1999). The normative and descriptive applicability of this approach is highly acknowledged by several government, non-government and multilateral organizations (Carney *et al.*, 1999; Cahn, 2002).

---

<sup>50</sup> *Chars* are very new landmass and island located inside river/s, created by continual shifting of these rivers. In Bangladesh, *chars* are found along all the major river systems, both lining the banks of rivers and as mid-river island (Ashley *et al.* 2000).

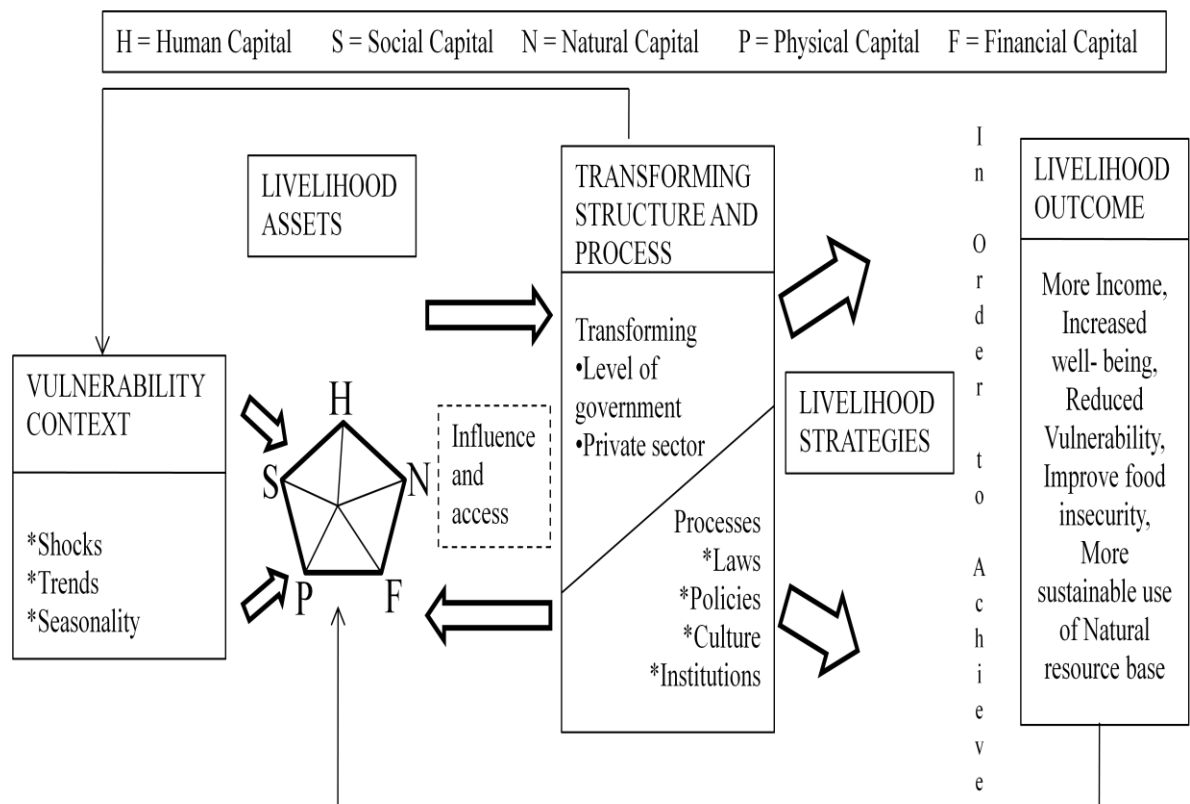


Figure 4.2: Sustainable livelihood approach (SLA)

Source: Sustainable Livelihood Guidance Sheet, DFID, 1999.

The definitions (proposed by WCED, 1987; Chambers and Conway, 1991; Scoones, 1998) of sustainable livelihood incorporate several common elements applied in the SLA used by different scholars and organizations: the vulnerability context, asset profile, transforming structure and processes, livelihood strategies and outcomes. An individual or household or community is living within a context of risk (vulnerability context) and to cope with this vulnerability, the entity concerned has the potential to initiate diverse efforts (livelihood strategies) and use its potential capabilities (asset profile) to sustain livelihoods. In this approach, the contribution of assets can be understood in two ways: as ‘the engine’ for livelihood strategies and ‘a buffer’ for reducing vulnerability (Sanderson, 2000). With appropriate asset deployment, a certain livelihood can be pursued to enhance the probability of attaining livelihood outcomes. Thus, in this study, the SLA will be

instrumental in exploring how the livelihoods of the sample villagers are affected by its ecological attributes, seasonal cropping regime, strategies to cope with vulnerabilities and geographical difficulties and what *in situ* improvements can be employed as an alternative to seasonal domestic migration by the poor.

**(ii) Asset Pentagon: An in-built analytical method of SLA**

The shape of pentagon represents the variability of access to different assets. In its optimal shape (Figure 4.3), the pentagon is based on a central and starting point where the value of accessibility is zero. The radial lines moving outwards from the central point represents the maximum access to five different assets; equal lengths of those radial lines shows optimal state of assets endowment.

On this basis, variously shaped pentagons can be drawn as the poor in any community, as in the *Haor* area, are not homogenous in endowed assets and which varies over time and which can be captured by a three dimensional rendering of the pentagon.

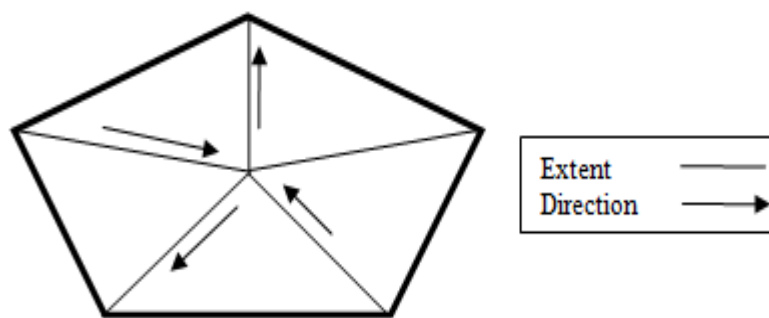


Figure 4.3: Extent and direction of assets accessibility

Figure 4.3 conveys qualitative information provided by the studied community. Though the poor are asset poor, they own some capitals upon which to build livelihoods. Thus, owning and lacking assets are given positive and negative signs, respectively in the discussion of



pentagon. Following the suggestion of Mukherjee *et al.* (2002), the comparative extent of access to each type of asset is demarcated by the length of the radial lines from the starting point to the perimeter of the pentagon. The outward and inward arrows inside the pentagon imply a trend of the household's accessibility or inaccessibility to the assets, respectively. Unbalanced pentagons indicate resource vulnerability in need of attention (Shivakoti & Shrestha, 2005 a, b; Mukherjee *et al.*, 2002).

***(iii) Strengths and weaknesses of the SLA***

Table 4.5: Summary of the strengths and weaknesses of the SLA as an analytical framework to study the dynamics of poverty

Strengths	Weaknesses
Assist to ameliorate poverty since acts as an operational tool (Carney, 2003)	Does not offer any clear indication of how to identify poor (Krantz, 2001)
Corroborates ‘asset-vulnerability approach’ and practiced with a set of principles compactly known as ‘analytical framework’ which facilitates analyzing vulnerability issue and interventions (Brocklesby and Fisher, 2003)	Assumes that capital assets can be expanded in generalized and incremental fashion (Serrat, 2008)
Seeks to understand changing combinations of modes of livelihood in a dynamic and historic context (Serrat, 2008)	Underplays elements of the vulnerability context, such as macro economic trends and conflict (Serrat, 2008)
Explicitly advocates a creative tension between different levels of analysis and emphasize the importance of micro-macro linkage (Serrat, 2008)	Methodologically, the amalgamation of micro and macro levels does not guided by SLA. In this regard, separate test(s), probably complicated, are required to understand the capability of SLA in exploring the process of differentiation, accumulation and improvement ( <a href="http://core.kmi.open.ac.uk/download/pdf/5669/10">core.kmi.open.ac.uk/download/pdf/5669/10</a> ).
Acknowledges the need to move beyond narrow sectoral perspectives and emphasizes seeing the linkage between sectors (Serrat, 2008)	Does not pay enough attention to inequalities of power (Serrat, 2008)
Calls for intervention of the relationships between different activities that constitute livelihoods and draws attention to social relation (Serrat, 2008)	Underplays the fact that enhancing the livelihoods of one group can undermine those of another (Serrat, 2008)

**4.5.2 Quantitative approach**

Only adopting the various strategies of the qualitative methodology is insufficient to investigate the dynamics of poverty. Thus, researchers such as Nargis & Hossain (2006) and Kam *et al.*, (2005) have justified the application of quantitative approaches to study rural poverty in Bangladesh. To meet the objectives of this study, two quantitative models are used: multivariate analysis and simultaneous equation model (SEM).

## **A. Multivariate analysis**

It is assumed that households belonging to different income categories in the five study villages would be influenced by diverse factors and to different extents. Neoclassical income theory postulates that aggregate income is dependent on consumption expenditures and investments (savings)<sup>51</sup>. At the household level, consumption (to satisfy household needs) depends on savings which are influenced by household size, number of income earners and the age of the household head (Crockett, 1964). Although large households can generate higher aggregate incomes through wage labour, it ultimately decreases per capita income (Jenkins, 2000). Savings facilitates asset creation and enhances income generating capabilities; thus, household asset accumulation and consumption expenditures tend to be significant at certain stages of the life cycle. These needs may vary with the geographical characteristics of a household's location (Crockett, 1964). Households located in a poor area with a low consumption growth are more vulnerable to external shocks (Jalan and Ravallion, 1998 a, b; Ravallion, 1996). Thus, household size, age of household head and geographical location are all relevant to household consumption. The desire for a standard of living can partly be understood by some factors like level of education, occupation, race and availability of consumption opportunities and consumption level which varies with household's accessibility to credit (Crockett, 1964). With a poor institutional set-up, poor local infrastructure has adverse effects on income since it affects the productivity of private investment (Ravallion, 1996).

This theoretical perspective is termed 'the structural approach' that establishes a relationship between poverty and income and argues that increasing economic opportunities

---

<sup>51</sup> In his 'Theory of Income Determination' Somers (1950) discusses three different concepts of income determination- Keynesian, Robertsonian and Swedish concept. Keynesian equation of income determination reveals that income is equal to consumption and investment where investment is equal to saving.

promote income growth for sustainable poverty reduction. Economic opportunities are associated with such factors as household size, education, land and ecological conditions of the rural area, among others (Aikaeli, 2010). Empirically, this structural approach has been used by different scholars (Kam *et al.*, 2005; Kabeer, 2004; Hossain, 2009, to name a few) in poverty analysis in Bangladesh and has been adopted in this study.

In Bangladesh, rural household incomes depend on household asset components, among others (Rahman, 1996b). Together with limited resource accessibility, livelihood in geographically-challenged regions of Bangladesh is onerous as infrastructure and public health facilities are limited and even absent (Ashley *et al.*, 2000; Rahman & Davis, 2005). Empirically, it is found that infrastructure facilities (e.g., accessibility to roads, electricity) increase household income (Kam *et al.*, 2005) and public health facilities decrease household vulnerability in protecting income erosion (Rahman, 1996b; Ashley *et al.*, 2000).

The income determinants in the 5 study villages include: (1) characteristics of households and household heads, (2) asset endowment of households, and (3) the vulnerability factors facing households. In this study, multivariate analysis is used to assess the relative contribution made by the factors affecting household incomes. Estimation of signs and significance of the determinants will allow inferences about which of a range of possible determinants help to explain the size and variation of household income of different categories of sample respondents.

*(i) Structural approach*

A regression analysis is an econometric technique of analyzing variables to explore the association/relationship existing between dependent and independent variable. This analytical method has been widely used in forecasting and prediction in economics.

The theoretical discussion above postulates that household income depends on diverse factors; formally the following function can be written:

$$Y = f(X, \alpha) \text{ --- (4.1)}$$

Here, Y = income of household

X is a set of exogenous variables which represent the determinants of income and  $\alpha$  is parameter of the exogenous variable

To confirm uniform variance and data normality (Bland & Altman, 1996), the income data have been transformed into logarithm for analytical purposes rather using raw or untransformed data. Thus, the familiar form of regression would be,

$$\ln Y = \alpha + \alpha X + u \text{ --- (4.2)}$$

Note that  $\ln Y$  is nothing but the transformed log form of Y which may be called a normalized indicator and  $u$  is the random error term.

Alternatively, this equation (4.2) can be re-written as

$$\ln Y = \alpha_0 + \sum \alpha_k X_{k_i} + u_i$$

Here,  $\ln Y$  = Natural log of income

$X_{k_i}$  = A set of exogenous variables characteristics

$u_i$  = A random error term

To operationalize the above income regression model, a list of variables is required. Following the literature reviewed, the income determinants in the 5 *Haor* villages fall into 5 main groups as follows:

(a) individual characteristics of household (i.e., household head's characteristics)

(b) household characteristics

(c) *Haor* properties (ecological and environmental characteristics)

(d) asset component of the household

(e) transforming factors

Each and every group comprises of numerous variables. However, to obtain effective outcomes, the most important variables referred in the literature are considered for the analysis. After identification of the variables (Table 4.6), the model would look like:

$$\begin{aligned} \ln Y = & \alpha + \alpha_1 AGE_{hh} + \alpha_2 EDE_{hh} + \alpha_3 EMPS_{hh} + \alpha_4 HH_{size} + \alpha_5 GEN_{hh} + \alpha_6 \ln D_i \\ & + \alpha_7 \ln REMT + \alpha_8 FF + \alpha_9 ND + \alpha_{10} LAND_{hh} + \alpha_{11} ACC_{hh} \\ & + \alpha_{12} ACCFG_{hh} + \alpha_{13} ACCR_{hh} + \alpha_{14} ACCPH_{hh} + \epsilon_i - - - - - (4.3) \end{aligned}$$

Here,  $\epsilon_i$  is the error term.

(ii) *Variable specification*

The explanation of variables in the regression is explained in Table 4.6.

Table 4.6: Specification of variables for multivariate analysis, Equation 4.3

Regression Equation	Group of Variables	Name of Variables	Identification
	<b>Dependent Variable</b>		
	Household (HH) Income	Income (average) (InY)	Natural log of average income, numeric (Taka)
	<b>Independent Variables</b>		
	Individual Characteristics	Age of HH head ( $AGE_{hh}$ )	Numeric (year)
		Education of HH head ( $EDE_{hh}$ )	Numeric (level of education)
		Employment Status of HH head ( $EMPS_{hh}$ )	Working as a labour in agriculture 1, otherwise 0.
	Household Characteristics	Household size( $HH_{size}$ )	Numeric (amount)
		Household status ( $GEN_{hh}$ )	Male headed 1, otherwise 0
		Dry season income ( $InD_i$ )	Natural log of dry season income, numeric (Taka)
		Remittance ( $In REMT$ )	Natural log of remittance, numeric (Taka)
	Haor Properties	Flashflood (FF),	If affected 1, otherwise 0.
		Annual deluge (ND)	If affected 1, otherwise 0.
	Household Asset Component	Household amount of land ( $LAND_{hh}$ ).	Amount of land (decimal)
		Household's accessibility to credit market ( $ACC_{hh}$ ).	If accessible 1, otherwise 0.
		Household's accessibility to fishing ground ( $ACCFG_{hh}$ ).	If accessible 1, otherwise 0.
	Transforming Factors	Household's accessibility to infrastructure (road) ( $ACCR_{hh}$ )	If accessible 1, otherwise 0.
		Household's accessibility to public health service ( $ACCPH_{hh}$ ).	If accessible 1, otherwise 0.

Since the *Haor* community is heterogeneous in terms of financial status, the magnitude of income determinants must vary between different categories of households. To identify the important income determinants, all the variables from the survey data have been included in Equation 4.3. But, it is also essential to clarify whether the variables are capable to generate the maximum precision of the model. Since the model has not been

tested by any previous studies, clarification of the best fit model criteria need to be imposed.

Although the variables are logically included in the model, all the exogenous variables may not be statistically significant. A range of variations in statistical non-significance may be observed for some variables. Some variables would be required to be deleted; if so, the highest non-significant variable will be removed first and the process repeated until the best model fitness is attained.

In this connection, the model building procedure has been conducted in such a way that the highest degree of model robustness incorporates the largest number of explanatory variables. Then, the established model would be considered in the data analysis. This ‘model building’ procedure has been discussed in the analytical part relevant to multivariate analysis (Chapter 5, Section 5.4).

## **B. Simultaneous equation model (SEM)**

One of the study’s objectives is to explore the effects of flood-induced seasonal domestic migration ( $M_n$ ) on household poverty status ( $P_{ns}$ ). Given the *Haor* area’s agricultural, ecological and geographical attributes, it is assumed that farmers work in the area during the dry crop season and migrate during the wet monsoonal season. Thus, the effect of migration on poverty is explored by (a) dry season income and household resources, (b) mediating factors, and (c) selected time variant and invariant factors.

The dry season income ( $D_i$ ) and household natural resource factors ( $H_r$ ) affect both poverty status and motivation to migrate. Similarly, the mediating factors affect new



livelihood strategies and household poverty status. This migration and poverty linkage can be stochastically determined in the following function as:

$$P_{hs} = f(D_i, M_h, H_r, X_{vh}) \dots \dots \dots (4.4)$$

Where  $H_r$  and  $X_{vh}$  mean natural capital ( $Land_{mh}$ ) of the migrant household and human capital such as education level of the migrant household head ( $EDE_{hh}$ ), respectively.

As the *Haor* people migrate to other agricultural regions when livelihoods fail during the flood season (Gardener & Ahmed, 2006), the probability of migration is inversely related to the income at origin (Hay, 1980) while the decision linked to seasonal domestic migration depends on the household's financial capital, investment attitude and return of investment (Rabby, Azam, Yeasmin & Hoque, 2010). Livelihood diversification opportunities are purely marginal and largely unavailable during the monsoonal flooding in the *Haor* area. The financial capital to invest is subject to high risk because of ecological vulnerability, fluctuating commodity prices, exploitation and some institutional constraints (e.g., lack of market and other infrastructure, weak law and order). Further, some poverty and livelihood studies (Kothari, 2002; Ellis 2003; Rabby *et al.*, 2011a) reveal that the poor are financially poor as well. Thus, livelihood diversification in the *Haor* area is highly dependent on the size of dry season income. Therefore, the household's migration probability function is:

$$M_h = f(D_i, H_r, X_{vh}, X_{im}, X_{vm}, I_f) \dots \dots \dots (4.5)$$

Here  $X_{vh}$  is household size ( $HH_{size}$ ),  $X_{im}$  gender ( $GEN_m$ ),  $X_{vm}$  age of migrant ( $AGE_m$ ) and  $I_f$  represents a mediating factor between natural capital (household's amount of land) and dry season income ( $Land_{mh\_Di}$ ).

The household size and age are time variant while gender is a time invariant factor. In function 4.5, neither the migration cost nor the discount rate is included as it is assumed that both are the same for all potential migrants since they originate from a homogenous geographical area and migrate to the same set of alternative destinations. After separating group variables into individual attributes to the functions 4.4 and 4.5, they can be written linearly in structural equations.

$$P_{hs} = \alpha + \alpha_1 D_i + \alpha_2 M_h + \alpha_3 Land_{mh} + \alpha_4 EDE_{hh} + \mu_p \dots \dots \dots (4.6)$$

$$M_h = \beta + \beta_1 D_i + \beta_2 Land_{mh} + \beta_3 HH_{size} + \beta_4 GEN_m + \beta_5 AGE_m + \beta_6 Land_{mh\_Di} + \mu_m \dots \dots (4.7)$$

Here  $\mu_p$  and  $\mu_m$  are the error terms in the Equations 4.6 and 4.7, respectively. The specification of all other variables has been characterized in the corresponding Tables 4.6 and 4.7.

As Equation 4.6 estimates directly through a linearly reduced form of poverty status function, the reduced form equation is:

$$P_{hs} = \delta + \delta_1 D_i + \delta_2 Land_{mh} + \delta_3 EDE_{hh} + \delta_4 HH_{size} + \delta_5 GEN_m + \delta_6 AGE_m + \delta_7 Land_{mh\_Di} + \varepsilon_p \dots \dots \dots (4.8)$$

Where the coefficients represent a combination of coefficients likely:

$$\partial = \alpha_1 + \alpha_2 \beta; \partial_1 = \alpha_1 + \alpha_2 \beta_1; \quad \partial_2 = \alpha_3 + \alpha_2 \beta_2; \partial_3 = \alpha_4; \partial_4 = \alpha_2 \beta_3; \\ \partial_5 = \alpha_2 \beta_4; \quad \partial_6 = \alpha_2 \beta_5 \quad \text{and} \quad \partial_7 = \alpha_2 \beta_6 .$$

Where, the coefficient of dry season income  $\partial_1$  represents a combination of parallel (analogous/corresponding) effect of  $D_i$  on the probability of migration  $\beta_1$  along with the parallel effect of the expectation of migration on the poverty status  $\alpha_2$  plus the parallel effect of  $D_i$  on poverty status  $\alpha_1$ . Another coefficient  $\partial_2$  also reveals a complex relationship of the corresponding variables. Except these two, all other coefficients in Equation 4.8 represent partial relationships.

**(i) Test of endogeneity**

Nevertheless, it is logical to assume that Equation 4.8 may produce a biased estimation, since  $\varepsilon_p = \mu_p + \alpha_2 \mu_m$ . Therefore, there is a probability of omitting unobserved variable/s which causes endogeneity. To resolve the endogeneity problem, a Hausman error test was performed as below (Gujarati, 2003):

To test the probability of endogeneity, two subsequent stages of the reduced form of equation have been considered in the regression procedure. Therefore, for the first stage, the equation is:

$$M_h = \pi + \pi_1 D_i + \pi_2 Land_{mh} + \pi_3 EDE_{hh} + \pi_4 HH_{size} + \pi_5 GEN_m + \pi_6 AGE_m \\ + \pi_7 Land_{mh\_Di} + \epsilon_m \dots \dots \dots (4.9)$$

And for the second stage, the equation is:

$$P_{hs} = \gamma + \gamma_1 D_i + \gamma_2 M_h + \gamma_3 Land_{mh} + \gamma_4 EDE_{hh} + \gamma_5 \pi_m + v_p \dots \dots \dots (4.10)$$

Here  $P_{hs}$  is poverty, seasonal domestic migration is  $M_h$  and  $\pi_m$  is the calculated residual retrieved from equation 4.9 while  $v_p$  is the error term.

**(ii) Instrumental variable technique**

Most of the real world economic behaviors are inherently interdependent or simultaneous in nature and the best approach is to estimate simultaneous equations system instead of looking at just one equation at a time (Studenmund & Cassidy, 1992) even though estimating simultaneous equation system with OLS causes a number of difficulties that are not encountered with single equations. The rule of thumb in a simultaneous equation system states that ‘all explanatory variables should be uncorrelated with the error term’ and for which, the OLS coefficient estimates are biased in simultaneous model. Overcoming this problem requires a variable called an ‘instrumental variable’ which must retain the following two characteristics:

- Not correlated with the error term in the question of interest, but
- Highly correlated with the endogenous variable which is considered as exogenous variable in the question of interest.

In this regard, applying OLS to the poverty Equation 4.8 would be inconsistent since the explanatory variable  $M_h$  and  $\mu_p$  are likely be correlated. To resolve this problem, a ‘proxy’ variable or instrumental variable for  $M_h$  is essential to find out which is highly correlated with  $M_h$  and uncorrelated with  $\mu_p$ . For this purpose, the two stage least squares (2SLS) method is considered as follows:

At stage 1,  $M_h$  is regressed on all the predetermined variables in the whole system.

Therefore the equation is:

$$M_h = \pi + \pi_1 D_i + \pi_2 Land_{mh} + \pi_3 EDE_{hh} + \pi_4 HH_{size} + \pi_5 GEN_m + \pi_6 AGE_m + \pi_7 Land_{mh\_Di} + \pi_m \dots \dots \dots (4.11)$$

From Equation 4.11,  $\hat{M}_h$  would be estimated to consider at the second stage of 2SLS.  $\hat{M}_h$  is the mean value of  $M_h$ .

At stage 2, the poverty Equation 4.6 can be re-written as

$$P_{hs} = \gamma + \gamma_1 D_i + \gamma_2 \hat{M}_h + \gamma_3 Land_{mh} + \gamma_4 EDE_{hh} + v_p \dots \dots \dots (4.12)$$

Here  $\hat{M}_h$  is the estimated  $M_h$  and  $v_p$  is the error term.

### (iii) Variable Specification

The specification tables for the different group of variables with identification characteristics to be used are as follows:

Table 4.7: Explanation of variables for Equation 4.6

For Equation 4.6	Group of Variables	Name of Variables	Identification
	Dependent Variables		
	Poverty	Household's poverty status ( $P_{hs}$ )	Poor =1, Not poor = 0
	Independent Variables		
	Migration	Seasonal Domestic Migration ( $M_h$ )	1 if household has at least one migrant
	Income	Dry Season Income ( $D_i$ )	Numeric Value (Taka)
	Household Resource Endowment ( $H_r$ )	Household amount of Land ( $Land_{mh}$ )	Amount of land in decimal
	Time Variant Characteristics of Household ( $X_{vh}$ )	Education of Household Head ( $EDE_{hh}$ )	Level of education

Table 4.8: Explanation of variables for Equation 4.7

For Equation 4.7	<b>Group of Variables</b>	<b>Name of Variables</b>	<b>Identification</b>
	<b>Dependent Variables</b>		
	Migration	Seasonal Domestic Migration ( $M_h$ )	1 if household has at least one migrant
	<b>Independent Variables</b>		
	Income	Dry Season Income ( $D_i$ )	Numeric Value (Taka)
	Household Resource Endowment ( $H_r$ )	Household amount of Land ( $Land_{mh}$ )	Amount of land (decimal)
	Time Variant Characteristics of Migrant Household ( $X_{vh}$ )	Household Size ( $HH_{size}$ )	Numeric Value
	Time Variant Characteristics of Migrant ( $X_{vm}$ )	Age of Migrants ( $AGE_m$ )	Numeric Value (Year)
	Time Invariant Characteristics of Migrant ( $X_{im}$ )	Gender of Migrant ( $GEN_m$ )	Male = 1, Female = 0
	Mediating Factor ( $I_f$ )	Interaction between Landholding and Dry Season Income ( $Land_{mh}D_i$ )	Numeric Value (Taka)

*(iv) Significance of using simultaneous equation model (SEM)*

In quantitative research, the use of SEM is increasing more rapidly than the other models like multiple regression, multilevel models, general equilibrium models, etc. Although, like other models, SEM is based on regression analysis principles, it is more advanced in solving both substantive and statistical problems that other traditional models cannot handle (Muijs, 2004). In explaining the causal relationships among the dependent variables and predictors, multiple regression and multilevel models are less advanced in revealing the direct and indirect effects.

Another reason for using SEM is the inherent measurement error issue especially when using questionnaires to gather data. In other regression procedures, this error is overlooked by assuming that the data are accurate. But as SEM takes this measurement

error into the analysis, relationships among variables that cannot be directly observed (constructs) are not biased by measurement error. Thus, the actual relationships between variables are highly reliable (Wener & Schermelleh-Engle, 2009; Muijs, 2004).

Social science theories postulate that variables (irrespective of dimension, conditions and group) have complex relationships. Modeling and testing complex patterns of relationships can be facilitated by SEM which, in other regression procedures, would necessitate several separate analyses (Wener & Schermelleh-Engle, 2009).

#### **4.5.3 Conclusion**

The IFA (Income Flow Approach) is an instrument to recognize the flow of household income through identifying the sources of and predicaments or shocks affecting income. Since households have different levels of income, the magnitude of the income generating factors necessitates special techniques such as the multivariate econometric technique. However, these analytical methods are limited to a snapshot or static view of poverty caused by one-off cross-sectional data. Thus, the SLA is invaluable to overcome the static problem of poverty and explore its dynamics in the *Haor* area in which the poor villagers are pressured to search for livelihoods elsewhere; this requires a technique to assess the impact of such a livelihood strategy on the poverty of household.

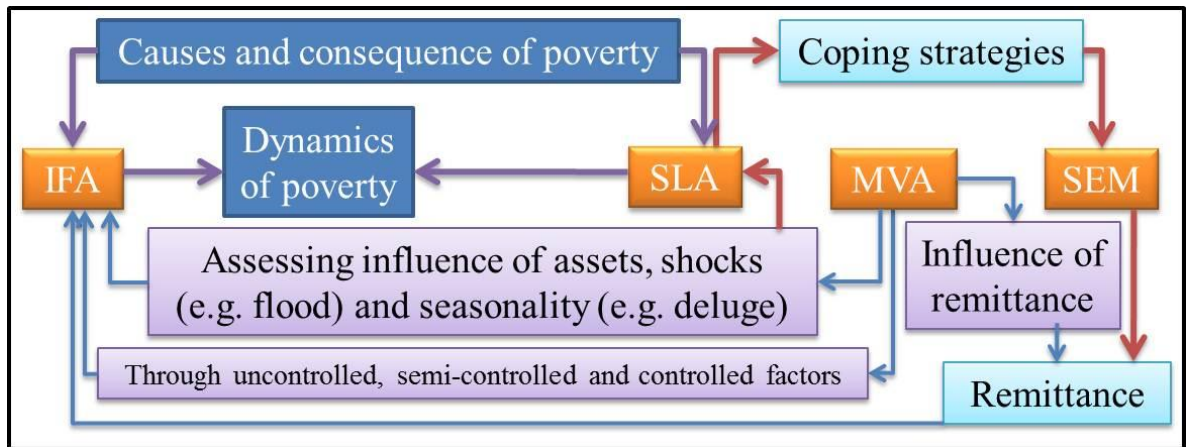


Figure 4.4: Linkage between four analytical approaches: An integrated approach

Fig. 4.4 shows the relationship between the IFA and SLA grounded on the dynamics of poverty and the causes and consequences of poverty in the sample households covered in this study. The multivariate econometric technique (MVA-Multivariate Analysis) assesses the impact of USC (uncontrolled, semi-controlled and controlled) in the ‘Income Flow Approach’ and EGE (ecological, geographical and environmental) factors in the SLA and thus established their linkage. The SLA provides information on seasonal domestic migration that the poor households use as a coping strategy while the impact of remittances on household income is examined in the multivariate econometric technique. Thus, these two approaches are linked through the SEM technique. By assessing the impact of this livelihood diversification strategy a link is established between SEM and the ‘Income Flow Approach’. Thus, these four approaches logically established an integrated approach to analyze the dynamics of poverty in the *Haor* region.



## 5. FINDINGS

### 5.1 Introduction

This chapter reviews the findings of the 4 different research models used in this study: qualitative (IFA and SLA) and quantitative (MVA and SEM) and comprises 5 sections. The first section covers the general information about the 5 *Haor* sample villages while the second analyses the poverty profile, income structure and major income activities that significantly contribute to the *Haor* household income. As household incomes differ, their determinants will have diverse effects on household income explored in the third section, while to investigate the poverty dynamics in the *Haor* community, data based on the SLA approach is analyzed in the next section. In the last section, an attempt is made to unveil the nexus of seasonal domestic migration (SDM) and poverty in the *Haor* households.

### 5.2 General information of the *Haor* households

Table 5.1 shows the general characteristics of the *Haor* households. The household heads are mostly male in the middle age (age range 31-40 years). The average household size (size range 4.85- 5.64) is larger than the national average of 4.7. Divorced household heads are rare in the villages which may indicate the strong social cohesion of the *Haor* society. A vulnerable group of household heads who are widows is found in all 5 villages. Illiteracy rates are very high among the households who mainly subsist on wage labour. The farmer household heads with secondary and degree level education are generally not poor compared to household heads with a primary level of education who are mostly farmers, sharecroppers and wage labour.

Table 5.1: Characteristics of *Haor* households (HH), 2010

Village Name*		V1	V2	V3	V4	V5
Number of HH	Total 292	34	36	104	15	103
Average age of HH head		41.32	43.53	41.64	40.33	42.31
Average size of HH		4.79	5.22	5.16	5.73	5.04
Gender of HH head (%)	Male	97.1	91.7	93.3	93.3	93.2
	Female	2.9	8.3	5.8	6.7	6.8
Marital status of HH head (%)	Married	10.6	10.6	32.2	4.8	32.2
	Unmarried	0.7	1.0	1.4	--	4.5
	Divorce	--	--	0.7	--	--
	Widow	0.3	0.3	1.4	0.3	1.7
	Others	--	0.3	--	--	--
Education of HH head (%)	Primary level	38.2	36.1	32.7	6.7	37.9
	Secondary level	11.8	13.9	20.2		8.7
	Higher secondary level	--	--	3.8	--	1.9
	Degree level	2.9	--	1.9	1.0	--
	Uneducated	47.1	50.0	41.3	93.3	50.5
Crop cultivation land (average in decimal <sup>52</sup> )		64.38	272.77	149.87	170.13	96.45
Vegetable cultivation land (average in decimal)		1.11	7.55	3.26	0.66	2.66
Poverty status of HH (money metrics) (%)	Non-poor	20.6	38.9	27.9	26.7	24.3
	Moderately poor	32.4	30.6	28.8	40.0	25.2
	Extremely poor	47.1	30.6	43.3	33.3	50.5
Poverty status of HH (self perception) (%)	Poor	97.1	94.4	80.8	93.3	99.0
	Not poor	2.9	5.6	19.2	6.7	1.0
Number of earners per HH		1.18	1.53	1.44	1.27	1.20
Number of seasonal migrant per HH		0.24	0.39	0.27	0.20	0.36

\*V1- Chawrapara, V2-Chandpur, V3-Gaglajur, V4- Mohabbotnagar and V5-Manderbari village.

Source: Survey data, 2010

Village 2 has the highest 272.77 decimals (2.7277 acres) and 7.55 decimals (0.0755 acres) of average crop and vegetable cultivation land, respectively among the 5 villages and the highest number of earners (1.53). Such assets help households to increase their incomes which is indicated by their income poverty status; among the 5 villages, V2 has highest number of non-poor households (38.9%) and lowest number of total poor households (both moderately and extremely poor individually constitute 30.6% of households in *Chandpur* village). *Gaglajur* village has the second lowest position for both aggregate poverty

<sup>52</sup> 100 decimal = 1 acre

(moderately and extremely poor households are 28.8% and 43.3% respectively) and non-poor households (27.9%) (Table 5.1). But for the sociological dimension of poverty (self perception<sup>53</sup>), 80.8 % and 19.2% households are reported as poor and not poor respectively in *Gaglajur* village (V3). This contrast in the case of *Gaglajur* village exposes the multidimensionality of poverty which cannot be fully understood by quantitative research alone. The average earner per household is more than one and all villages have seasonal migrants which shows the prevalence of this strategy (migration) to diversify livelihoods.

### **5.2.1 Income structure of the *Haor* villages**

Household incomes in the *Haor* area (Table 5.2) include incomes received in cash, in kind and self-produced consumption. In this study, a money value was given to income in kind at the prices prevailing in the survey villages as was household consumption of self-produced vegetable, livestock, forestry, fisheries and fruits.

The income from crop production activities are estimated as the value of the main product and by-products net of the costs of seeds, fertilizers, pesticides, irrigation charges and wages for hired labour, and draft and machine power charges. The income thus includes the value of utilization of resources owned by the household, such as land, family workers and draft animals. For business enterprises and agro-processing activities, incomes are estimated as gross returns minus business-related expenses, as recollected by the respondents. Salaries and wages are recorded as earnings per month which are multiplied by the number of months family workers are employed in the occupation.

---

<sup>53</sup> With reference to Sabates-Wheeler, Sabates & Castaldo (2008), the question of the out-come of the self-perception of poverty has been asked. Is the financial situation of the household insufficient, barely sufficient, sufficient and more than sufficient to buy all the basic needs? Information obtained from these four categories have to be re-categorized into two groups for estimation purposes: poor (using insufficient and barely sufficient income) and not poor (using sufficient and more than sufficient income).

Table 5.2: Average household income of 1265 households in 5 *Haor* villages, 2010

	V1	V2	V3	V4	V5
<b>A. Dry season net income (%)</b>					
a. Cash income (after deduction of production costs)	50.57	58.42	60.47	35.99	59.72
b. Kind income	2.44	1.54	2.42	0.48	3.00
c. Self consumption	10.26	13.23	8.88	17.01	5.54
<b>B. Wet season net income (%)</b>					
a. Cash income	24.40	17.55	19.40	32.14	29.16
b. Kind income	2.35	0.49	1.19	0.02	0.41
c. Self consumption	9.98	8.77	7.43	14.37	2.16
Total income of HH (A+B) (%)	100	100	100	100	100
Total income of villages (in Taka)	6,149,708	9,897,671	23,668,976	3,340,530	20,147,073
HH's average income in the V's (in Taka)	41,835	64,271	52,598	51,393	44,871
Per capita average income of V's (in Taka)	9,474	12,816	10,289	10,072	9,643

Source: Survey data, 2010

Given the vulnerable agricultural environment, all income components are grouped into dry season and wet season incomes. The major components of dry season income comprise both farm and non-farm income while wet season components comprise only non-farm income (Table 5.3).

Table 5.2 shows that dry season (crop season) incomes contributes more to total household income than the wet season (non-crop season) income. More than 52%<sup>54</sup> to 73%<sup>55</sup> incomes of household are generated from dry season activities. The amount of income provided by self-produced consumption is greater than income in kind. The households produce more and consequently consume more during the dry season. The *Haor* villages' average per capita income is much lower than the national per capita income of TK.43,433.80 (Table A-1 in Appendix A).

<sup>54</sup> (35.99 + 0.48 + 17.01)

<sup>55</sup> (58.42 + 1.54 + 13.23)

Table 5.3: Occupational structure of 1265 *Haor* households during dry and wet season, 2010

Crop Sources	Season	HH (amount)	HH (%)	Non-crop Sources	Season	HH (amount)	HH (%)
Rice cultivation		808	63.87	Boat renting		107	8.46
Livestock rearing		433	34.23	Livestock rearing		305	24.11
Forestry		54	4.27	Forestry		18	1.42
Fisheries		258	20.40	Fisheries		317	25.06
Vegetable cultivation		140	11.07	Market mediation		50	3.95
Homestead vegetable gardening		258	20.40	Homestead vegetable gardening		178	14.07
Agriculture labour		84	6.64	Boating		18	1.42
Wage labour		423	33.44	Wage labour		96	7.59
Artisan activities		40	3.16	Artisan activities		40	3.16
Hawking		2	0.16	Hawking		0	0.00
Construction		10	0.79	Construction		7	0.55
Transport		13	1.03	Transport		28	2.21
Hotel & restaurant		8	0.63	Hotel & restaurant		9	0.71
Business		222	17.55	Business		212	16.76
Services		59	4.66	Service		60	4.74
Religious activities		9	0.71	Religious activities		4	0.32
Village doctor		10	0.79	Village doctor		6	0.47
Cash from rent out land		27	2.13	Remittance		368	29.09
Remittance		37	2.92	Other activities		54	4.27
Other activities		77	6.09				
Total		2972*	234.94	Total		1877*	148.36

*Note: \*Since the many Haor households simultaneously engage in more than one income generating activities, therefore the total number of households (e.g. 2972 and 1877) exceed the total 1265 households of the five Haor villages.*

*Source: Survey data, 2010*

To sustain livelihoods, Table 5.3 shows that the sample households are simultaneously involved in diverse income activities in both dry and wet seasons. Many households are simultaneously engaged in rice cultivation (63.87%); livestock rearing (34.23%) and wage labour (33.44%) activities in their villages. It is primarily the non-poor families who earn extra income from tending in-house livestock. The dry season income primarily depends on rice cultivation which is affected by flashfloods. Hence, the number of agricultural labourer (seasonal contract labour) households is very low (6.64%) as

compared to wage labour households. This may be due to the fact that agricultural labour wage levels are subject to whether the harvest is good as it is often vulnerable to flashfloods. Information on homestead vegetable gardening and wet season livestock rearing reveals the contributions of female member/s in contributing to household income flows.

Lack of employment opportunities constrain wage labour activities and consequently increase seasonal migration. The 33.44% of dry season wage labour households decreases to 7.59% during the wet season in the sample villages; household members migrate for 2-4 months to other locations where agricultural work is available. The study indicates that 29.09% of households receive remittances during the wet season compared to only 2.92% for the dry season. Normally the monsoonal (wet season) deluge provides fishing opportunities to the villagers; the data indicate its insignificance in diversifying local livelihoods probably because the majorities are not allowed to access common fishery resources. Table 5.3 shows that 20.40% and 25.06% households in the dry and wet seasons respectively, derive income from fishing. Many of the non-poor households engage in fishing during the dry season similar to many of the moderately and extremely poor households to overcome the inevitable unemployment crises that temporarily occur in agriculture sector during the dry season. After returning home, many of the poor seasonal domestic migrants also engage in fishing until the dry season cultivation begins and they resume wage labouring.

These data confirm that the nature of the economic problems confronting the villagers necessitates an investigation of their poverty and livelihood strategies.

### 5.3 Poverty and income flow of the *Haor* households

This section analyzes the socio-demographic attributes of *Haor* households, characteristics of moderately and extremely poor and their sources of and constraints on income. Occupational mobility between seasons is very common among villagers and can be both a cause and consequence of household income flows and poverty status.

#### 5.3.1 Poverty profile

This section analyses the survey data on the poverty profile at the individual and household levels in the 5 study villages. At the individual level, the variables considered include the earning status, gender, marital status, age and education level of household (HH) head while the household characteristics refer to the size and natural resource endowment (landownership) of households.

Table 5.4: Incidence of poverty in 5 *Haor* villages, 2010

Village name	HH poverty						Total	
	Non poor		Moderately poor		Extremely poor			
	Count	%	Count	%	Count	%	Count	%
Chawrapara	7	20.6	11	32.4	16	47.1	34	11.6
Chandpur	14	38.9	11	30.6	11	30.6	36	12.3
Gaglajur	29	27.9	30	28.8	45	43.3	104	35.6
Mohabbotnagar	4	26.7	6	40.0	5	33.3	15	5.1
Manderbari	25	24.3	26	25.2	52	50.5	103	35.3
Total	79	27.1	84	28.8	129	44.2	292	100

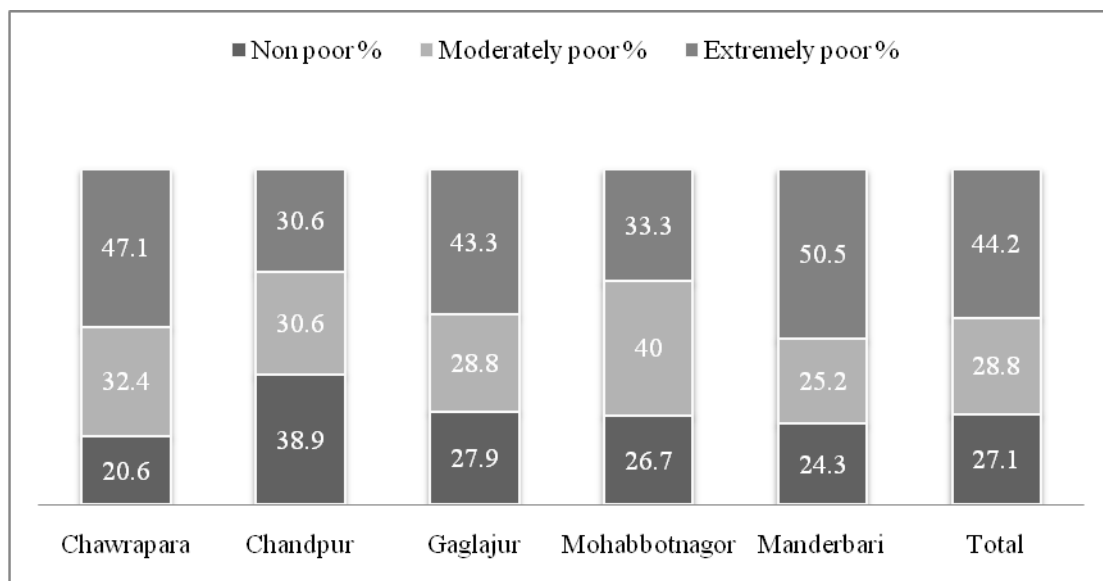


Figure 5.1: Poverty in the 5 *Haor* villages

The percentage estimates of the households living below the income poverty line are reported in Table 5.4 and Figure 5.1. Of all households in the 5 villages, about 27% are non-poor and 73% are poor in aggregate. Among the poor, 44% are in extreme poverty which is higher than the national average of 25% (BBS, 2006). While the BBS (2006) has reported a sharp reduction of extreme poverty in rural Bangladesh, the findings of this study indicate otherwise where the northeastern *Haor* areas are concerned.

The percentage of extremely poor is higher in *Manderbari* (50.5%), *Chawrapara* (47.1%) and *Gaglajore* (43.3%) than the other 2 villages. The percentages of the moderately poor are 40%, 32.4% and 30.6% for the *Mohabbotnagar*, *Chawrapara* and *Chandpur* villages, respectively. This may imply that the moderately and extremely poor can be associated with geographical location of the villages (e.g., proximity to the perennial river, bazaar, location of cultivable land in the different *Haors*, etc.).



The *Mohabbotnagar* and *Manderbari* villages lie near a perennial river (locally called ‘*Dhonu nodi*’ (Map 1)). As the local bazaar is located in *Manderbari* and a part of *Chandpur* villages, *Chandpur* village has both the lowest aggregate poverty (61.2%) and extreme poverty (30.6%) among the 5 villages. However, the poverty statistics of *Manderbari* village does not confirm the advantage of having a bazaar and *Dhonu nodi*. *Manderbari* has the second highest, after *Chawrapara*, aggregate poverty (77.7%) and extreme poverty (50.5%) among the studied villages. The reasons for this situation can be traced to the persisting jurisdiction dilemma between the place of usual residence (in Netrokona district) and cultivable land in the different *Haors* (in Sunamgonj district) which are highly flashflood prone. Because of such a dilemma, the landowners of *Manderbari* village cannot access the Sunamgonj district public credit facilities and agriculture subsidies which increase crop cultivation cost.

Table 5.5: Household poverty corresponding to HH head earning status in the 5 *Haor* villages, 2010

HH head's earning status	HH poverty						Total	
	Non poor		Moderately poor		Extremely poor			
	Count	%	Count	%	Count	%	Count	%
Not Earning	1	14.3	0	0	6	85.7	7	2.4
Earning	78	27.4	84	29.5	123	43.2	285	97.6
Total	79	27.1	84	28.8	129	44.2	292	100

The incidence of household poverty depends on the earning status of the HH head (Table 5.5). Among the households having heads not earning any incomes, around 86% are extremely poor; they are aged, disabled and chronically sick.

The gender of HH head and poverty are associated. In the survey villages, 93.84% and 6.16% households are respectively male and female-headed (Table 5.6) with the latter being relatively poorer than the former. About 83% of the female-headed households are

poor while 56% are extremely poor. Gender stereotyping is the main reason behind such financial deprivation that makes women economically powerless, socially insecure and less productive and leads to their extreme vulnerability (Rahman & Razzaque, 2000).

Table 5.6: Poverty and gender of HH head in 5Haor villages, 2010

Gender	HH poverty						Total	
	Non poor		Moderately poor		Extremely poor			
	Count	%	Count	%	Count	%	Count	%
Male	76	27.7	79	28.8	119	43.4	274	93.84
Female	3	16.7	5	27.8	10	55.6	18	6.16
Total	79	27.1	84	28.8	129	44.2	292	100

Table 5.7 and Table 5.8 show the incidence of poverty classified according to age and marital status of the household head. The incidence of extreme poverty is relatively low in young (up to 30 years) household heads, probably because of the low dependency ratios. The old (51-60 years) household heads are extremely poor (54.3%) due to the low resource endowment, culture of nuclear family and lack of public social welfare.

Table 5.7: Household income poverty in respect to the age of HH head in 5Haor villages, 2010

Age	HH poverty						Total	
	Non poor		Moderately poor		Extremely poor			
	Count	%	Count	%	Count	%	Count	%
<20	1	50.0	0	0	1	50	2	0.7
20-30	20	26.7	28	37.3	27	36.0	75	25.7
31-40	21	21.9	28	29.2	47	49.0	96	32.9
41-50	19	35.8	9	17.0	25	47.2	53	18.2
51-60	7	20.0	9	25.7	19	54.3	35	12.0
>60	11	35.5	10	32.3	10	32.3	31	10.6
Total	79	27.1	84	28.8	129	44.2	292	100

About 74% of the married household heads are poor in aggregate of which 45% and 29% are extremely and moderately poor, respectively. The widow headed households are vulnerable to extreme poverty.

Table 5.8: Marital status of HH head and poverty in 5 *Haor* villages, 2010

Marital status	HH poverty						Total	
	Non poor		Moderately poor		Extremely poor			
	Count	%	Count	%	Count	%	Count	%
Married	69	26.1	77	29.2	118	44.7	264	90.4
Unmarried	8	61.5	2	15.4	3	23.1	13	4.5
Divorced	1	50.0	1	50.0	0	0	2	0.7
Widow	0	0	4	33.3	8	66.7	12	4.1
Others	1	100	0	0	0	0	1	0.3
Total	79	27.1	84	28.8	129	44.2	292	100

Table 5.9: Education level of HH head and poverty in 5 *Haor* villages, 2010

Education level	HH poverty						Total	
	Non poor		Moderately poor		Extremely poor			
	Count	%	Count	%	Count	%	Count	%
Primary	28	28.0	33	33.0	39	39.0	100	34.2
Secondary	18	46.2	10	25.6	11	28.2	39	13.4
Higher secondary	3	50.0	3	50.0	0	0	6	2.1
Degree	4	100	0	0	0	0	4	1.4
Uneducated	26	18.2	38	26.6	79	55.2	143	49.0
Total	79	27.1	84	28.8	129	44.2	292	100

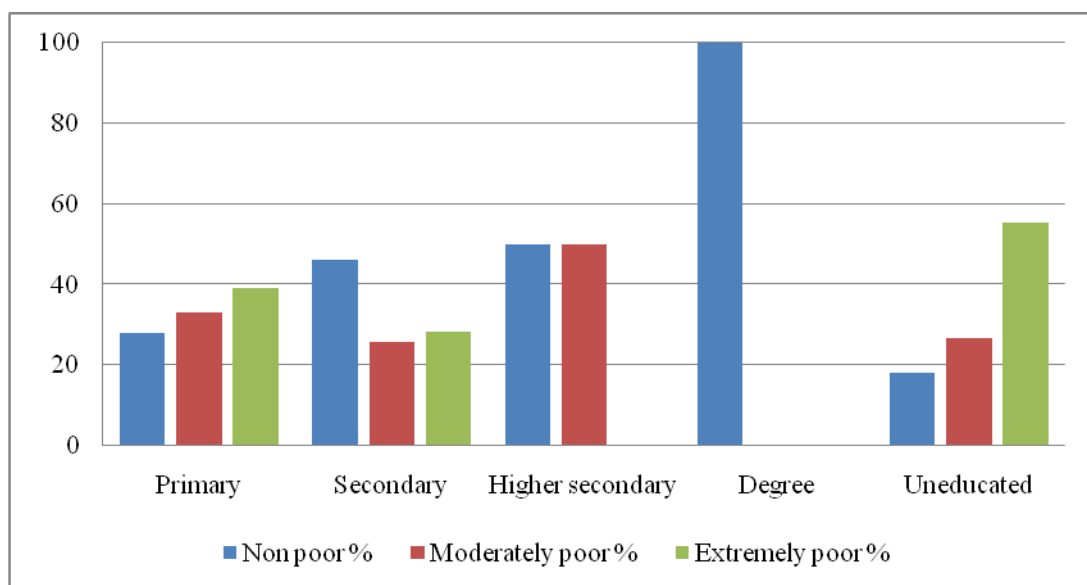


Figure 5.2: Education and poverty in the *Haor* villages

The relationship of the incidence of poverty with the education level of the household head is given in Table 5.9 and Figure 5.2: 82% of the households with uneducated heads are poor in aggregate of which 55% and 27%, respectively, are extremely and moderately poor.

Table 5.10: Household size and poverty in 5*Haor* villages, 2010

HH size	HH poverty						Total	
	Non poor		Moderately poor		Extremely poor			
	Count	%	Count	%	Count	%	Count	%
1-2	14	50.0	6	21.4	8	28.6	28	9.6
3-4	24	27.6	28	32.2	35	40.2	87	29.8
5-6	22	20.2	33	30.3	54	49.5	109	37.3
7-13	19	27.9	17	25.0	32	47.1	68	23.3
Total	79	27.1	84	28.8	129	44.2	292	100

In Table 5.10 and Figure 5.3 relating the household size and poverty association, households having 5-6 members are mostly moderately (30.3%) and extremely (49.5%) poor. But surprisingly, the incidence of poverty is not so pervasive for households with

more than 7 members compared to other household groups due to the larger numbers of earning members.

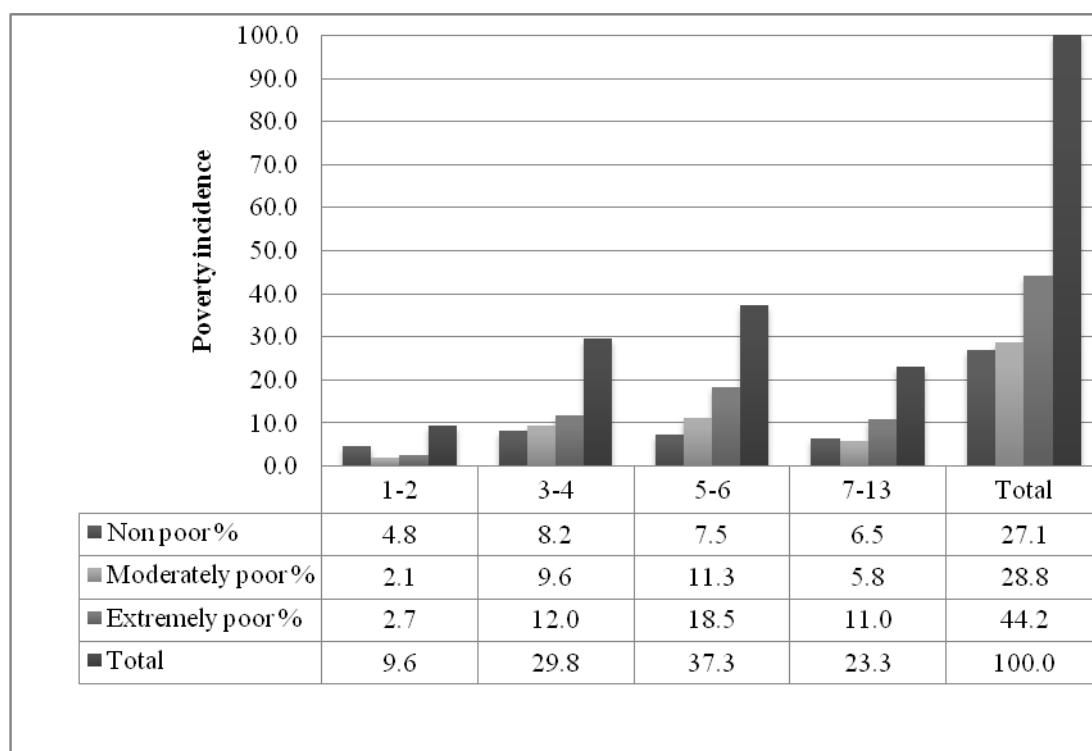


Figure 5.3: Household size and poverty in the 5 *Haor* villages

Table 5.11: Cultivable landownership and household income poverty in 5*Haor* villages, 2010

Landownership	HH poverty						Total	
	Non poor		Moderately poor		Extremely poor			
	Count	%	Count	%	Count	%	Count	%
Landless (0-49)	39	13.4	48	16.4	83	28.4	170	58.2
Marginal (50-149)	18	6.2	21	7.2	17	5.8	56	19.2
Small (150-249)	9	3.1	3	1.0	11	3.8	23	7.9
Medium (250-749)	9	3.1	9	3.1	11	3.8	29	9.9
Large >749	4	1.4	3	1.0	7	2.4	14	4.8
Total	79	27.1	84	28.8	129	44.2	292	100

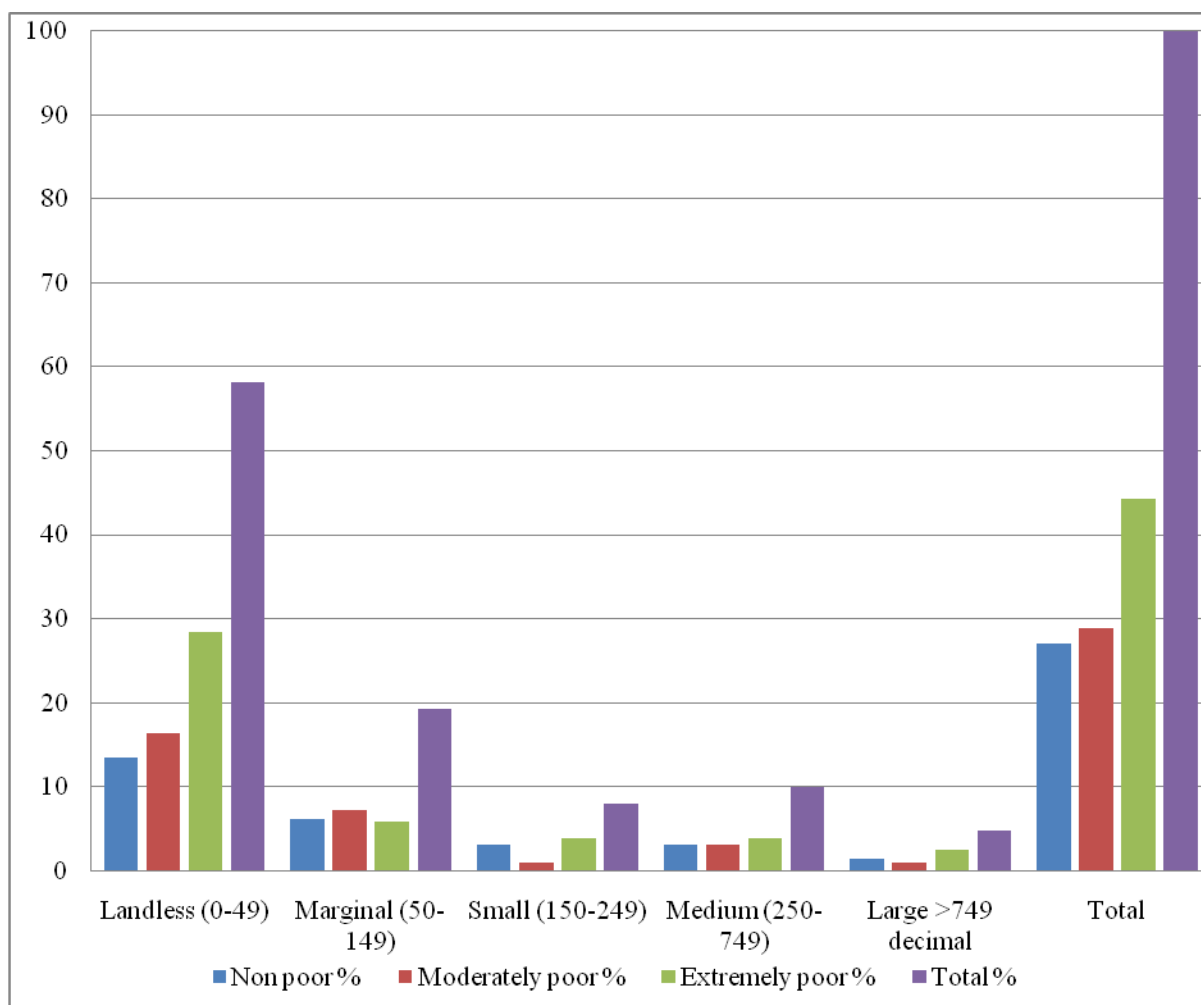


Figure 5.4: Landownership and poverty in the *Haor* sample households

Table 5.11 and Figure 5.4 indicate that the natural capital endowment has a strong relationship with the poverty of households: 58% of all households are landless of whom most are poor. Among the landless involving 170 households, 23% and 77% are non-poor and aggregate poor, respectively and of the aggregate poor, 28% are moderately poor households compared to 49% who are extremely poor. As the average household size in the *Haor* area is substantially larger than the national average, the household's land per capita is gradually decreasing resulting in more landless and wage labourers. Among the 4.8% who are large farmers, 1.4%, 1.0% and 2.40% are non-poor, moderately and extremely

poor, respectively. Since the *Haor* area is ecologically vulnerable, the medium, small and marginal farmers are forced to divest their natural resources to cope with crises (DER Secretariat, 2004) and probably end up among the landless and those vulnerable to extreme poverty.

### **5.3.2 Seasonal income distribution among households**

Table 5.3 shows that the sample villagers tend to engage in diversified livelihood activities but this varies among different household types and their poverty status. As the wet season monsoonal deluge severely constrains the labour market, the dry season mono crop and related activities are the main cash income generating sources for them.

From Table 5.12, it can be seen that 50% of the total income of the extremely poor, 58% of that of the moderately poor and 70% of that of the non-poor are generated from crop season activities which mainly includes subsistence farming, daily labouring and fishing. The landless labourers are the extremely poor and earn the lowest (50%) cash income together with the lowest income share (64%) from dry season activities among all the households. Both the moderately and extremely poor earned nearly the same amount of cash income (25% and 26%, respectively) during the wet season. This implies two issues: (a) they could not save for the lean wet season, and (b) the necessity of cash flow compels them to diversify their sources of livelihood. The poor would usually tend to find their livelihoods in fishing as the ecology creates such opportunities; however, the constraints of the high volume of water and inaccessibility to *beels* force them to undertake seasonal migration which is a major source of cash income for them. The poor consume more of their output than the non-poor in both seasons including fish from their own catch, vegetables from the steep roof of house, fowls and eggs tended at home, and trees in the

homestead for firewood. Such in-kind income is relatively low and insignificant and reflects that social *daya* (kindness) no longer provides the historical safety net for the extremely poor in rural Bangladesh (Maloney, 1986).

Table 5.12: Income structure of different types of *Haor* sample households, 2010

		Household poverty status		
		Extremely poor	Moderately poor	Non poor
<b>A. Dry season (crop season) net income (%)</b>				
	Cash income (After deduction of production costs)	49.88	57.84	69.95
	Kind income	2.54	1.69	1.94
	Self consumption	11.54	8.41	4.99
	Sub-total (%)	63.96	67.94	76.88
<b>B. Wet season (non-crop season) net income (%)</b>				
	Cash income	25.91	24.57	18.81
	Kind income	1.21	1.26	0.42
	Self consumption	8.91	6.23	3.89
	Sub-total (%)	36.04	32.06	23.12
Total income of HH (A+B) (%)		100	100	100
Average annual income/HH (Taka)		21407	43442	97410
Average monthly income/HH (Taka)		1784	3620	8118
Average annual income/capita (Taka)		3993	8772	19093
Average monthly income/capita (Taka)		333	731	1591

Source: Survey data, 2010

Table 5.13: Seasonal expenditure structure of different types of *Haor* sample households, 2010

Seasonal average expenditure (Taka)		Household type		
		Extremely poor	Moderately poor	Non poor
	Dry season	3767	4321	79389
	Wet season	2490	3692	5253
Annual average		3128	4007	42321

Source: Survey data, 2010

The average annual income (TK. 3993) (Table 5.12) of the extremely poor is very close to average annual expenditure (TK. 3128) (Table 5.13) limiting severely the capacity to save to meet emergencies and unexpected costs. All types of households spend



comparatively more during the dry season than the wet season. Along with investment in crop cultivation, the poor people spend on rice, clothing and health needs during the dry season. Purchasing rice is the highest expenditure in the wet season for the poor while the non-poor normally would depend on their stocks of rice for the non-crop season. Since the non-poor are mostly farmers cultivating their own land, their average annual expenditure, including investment, is the highest (TK. 42321) among the sample households. The lowest expenditure, by the extremely poor in the wet season, is TK. 2490 and for the moderately poor, TK. 3692, indicating less consumption and greater financial incapability.

Overall, the aggregate poor have a tendency to consume rather than to save; such behavior not only constrains economic upliftment but also the poverty mitigation process. The focus group data and interviews reveal that the poor are frustrated with life and its unending struggles; in their own words, ‘What else have we in our life but suffering? What can we do if Allah (God) does not bless us?’

### **5.3.3 Seasonal changes in occupation**

Dry season occupation has been recognized as the primary occupation of the *Haor* community. As the *Haor* ecosystem necessitates the search for new work activities during the wet season particularly by the poor, an understanding of occupational switching is central to examining the poverty and livelihood strategies of the villagers. For comparative purposes, this analysis is extended to the aggregate poor and non-poor households in the study villages.

### A. Switching occupations: non-poor

Table 5.14 and Figure 5.5 depict data pertaining to how the non-poor household heads engage in different occupations in the dry and wet seasons. The non-poor households predominantly (62%) depend on crop cultivation. Among other activities, 3.8% and 12.7% households are involved in catching fish and business, respectively, while the 6.3% of households who provide service probably have more skills and capital. As the monsoonal deluge impedes crop cultivation, many farmers either move into other occupations or become unemployed.

Table 5.14: Engagement in dry season occupations by non-poor HH in 5 *Haor* villages, 2010

	Frequency	Percent	Valid Percent	Cumulative Percent
Artisan	1	1.3	1.3	1.3
Business	10	12.7	12.7	13.9
Daily labour	10	12.7	12.7	26.6
Farmer	49	62.0	62.0	88.6
Fisherman	3	3.8	3.8	92.4
Livestock rearing	1	1.3	1.3	93.7
Services	5	6.3	6.3	100.0
Total	79	100.0	100.0	

From Table 5.15 and Figure 5.6, during the wet season the number of unemployed household heads, and those involved in fishing and business are significantly more than in the dry season. While the number of households dependent primarily on daily wage labour remains the same for both seasons, a big occupational shift occurs in fishing where the number of household heads involved in fishing increases from 3.8% during the dry season to 16.5% in the wet season. A large number of household heads (25.3%) become unemployed during the wet season compared to virtually zero in the dry season.

Table 5.15: Engagement in wet season occupation or unemployment among non-poor HH in 5 *Haor* villages, 2010

	Frequency	Percent	Valid Percent	Cumulative Percent
Artisan	2	2.5	2.5	2.5
Business	23	29.1	29.1	31.6
Daily labour	10	12.7	12.7	44.3
Fisherman	13	16.5	16.5	60.8
Livestock rearing	2	2.5	2.5	63.3
Services	6	7.6	7.6	70.9
Transport	1	1.3	1.3	72.2
Construction	1	1.3	1.3	73.5
Village doctor	1	1.3	1.3	74.8
Unemployed	20	25.3	25.3	100.0
Total	79	100.0	100.0	

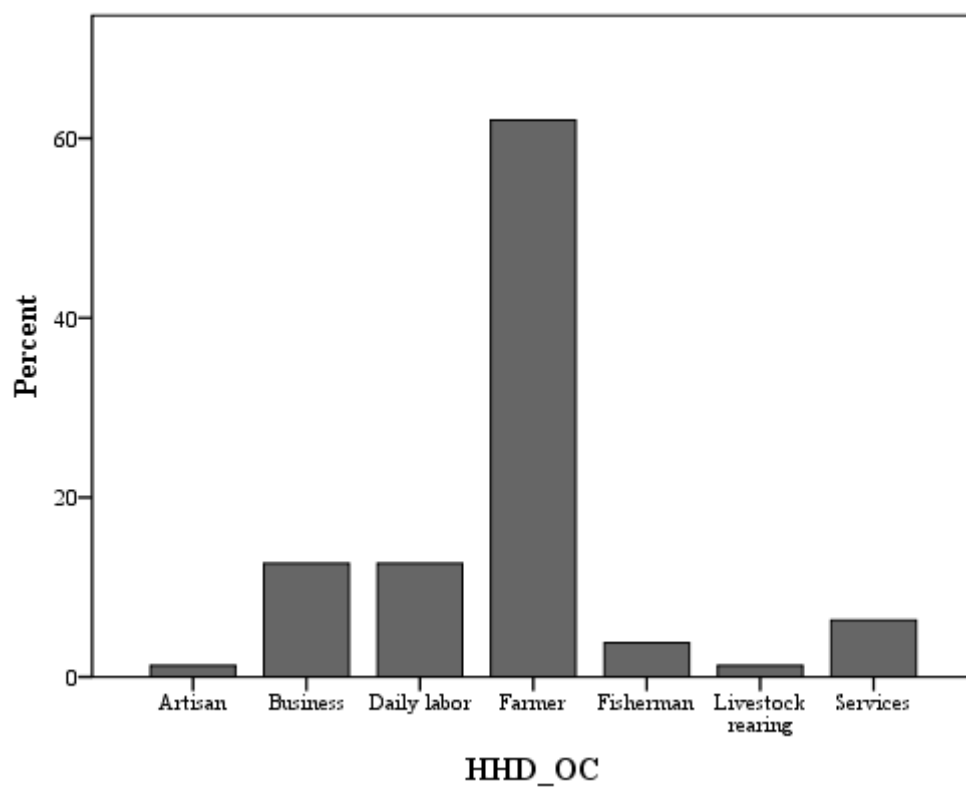


Figure 5.5: Schematic presentation of HH dry season occupation (HHD\_OC), for the non-poor HH, 2010

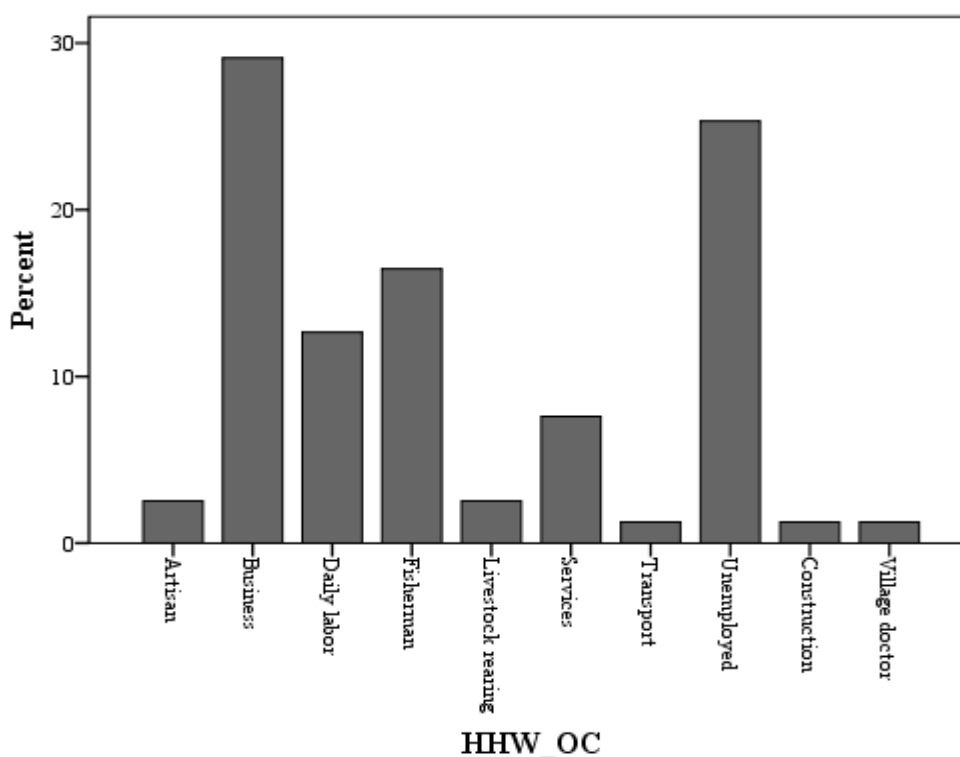


Figure 5.6: Schematic presentation of HH wet season occupation (HHW\_OC), for the non-poor HH including unemployment, 2010

The distribution of occupational mobility is reported in Table 5.16 and Figure 5.7. In the latter, all farmers during the dry season completely switch to other occupations including fishing, business, artisanal work, service, transport, construction and being a village doctor, and some are unemployed. It is also noted that some daily labourers switch to fishing.

Table 5.16 shows that among the farmers (62%), 38.8% became unemployed, 28.6% engaged in business, 16.3% became fishermen and 4.1% shifted into daily labour. For the day labourers, 20% moved into fishing. All the occupations, excluding farming, daily labouring and business, are stable occupations for the non-poor households.

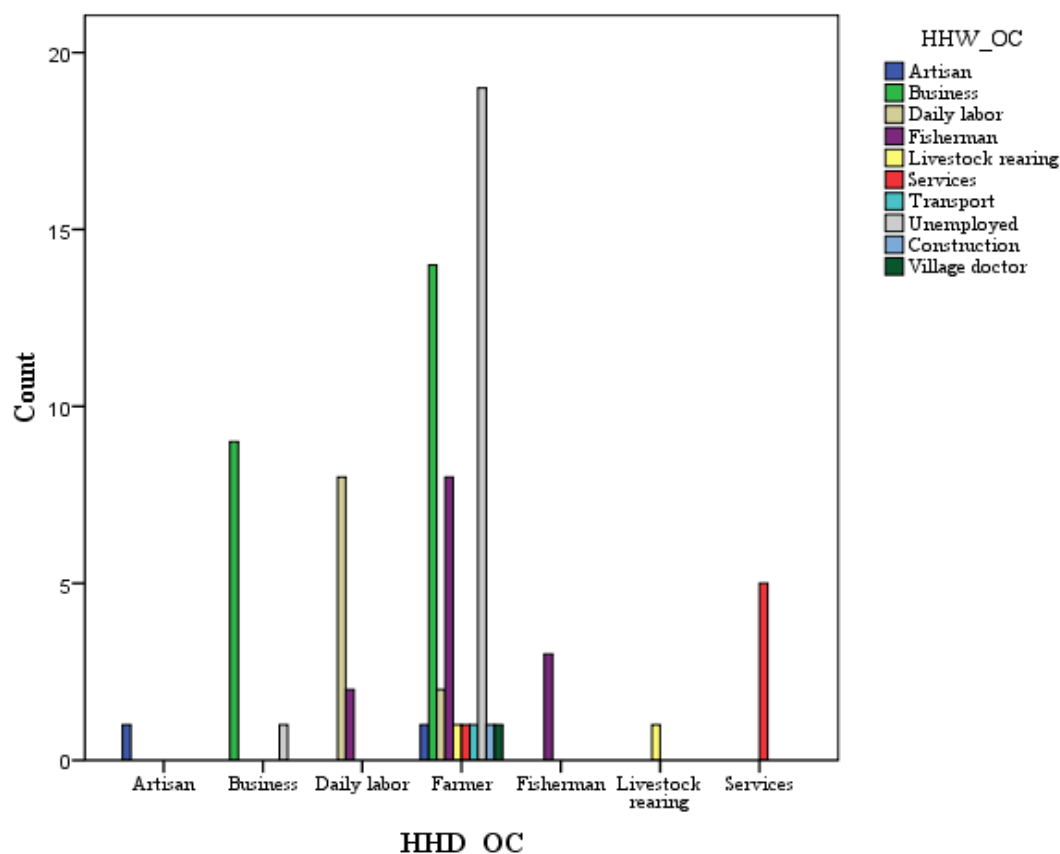


Figure 5.7: Cluster diagram of non-poor HH occupation mobility from dry to wet season including unemployment, 2010

Table 5.16 shows that from 16.5% of wet season fisherman, 12.6 % are transitional fishermen comprising of 2.5% daily labourers and 10.1% farmers. The total number of wet season businessmen comprised 17.7% of the dry season farmers revealing that the non-poor household's capacity of financial investment into paddy and rice market mediation, seasonal fruit business, stock business, renting boats, livestock trading, etc.

It is clear that during the monsoonal deluge, many farmers become seasonally unemployed (38.8%) which implies the necessity of creating *in situ* development initiatives.

Table 5.16: Switching and distribution of dry season occupation during wet season by the non-poor household in 5 *Haor* villages including unemployment, 2010

			Wet season occupation										Total %
			Artisan	Business	Daily labour	Fisherman	Livestock rearing	Service	Transport	Construction	Village doctor	Unemployed	
Dry season occupation	Artisan	a	100.0	0	0	0	0	0	0	0	0	0	
		b	1.3	0	0	0	0	0	0	0	0	0	1.3
	Business	a	0	90.0	0	0	0	0	0	0	0	10.0	
		b	0	11.4	0	0	0	0	0	0	0	1.3	12.7
	Daily labour	a	0	0	80.0	20.0	0	0	0	0	0	0	
		b	0	0	10.1	2.5	0	0	0	0	0	0	12.7
	Farmer	a	2.0	28.6	4.1	16.3	2.0	2.0	2.0	2.0	2.0	38.8	
		b	1.3	17.7	2.5	10.1	1.3	1.3	1.3	1.3	1.3	24.1	62.0
	Fisherman	a	0	0	0	100.0	0	0	0	0	0	0	
		b	0	0	0	3.8	0	0	0	0	0	0	3.8
	Livestock rearing	a	0	0	0	0	100.0	0	0	0	0	0	
		b	0	0	0	0	1.3	0	0	0	0	0	1.3
	Service	a	0	0	0	0	0	0	0	0	0	0	
		b	0	0	0	0	0	0	0	0	0	0	6.3
Total			2.5	29.1	12.7	16.5	2.5	7.6	1.3	1.3	1.3	25.3	100

Note: a- represents % within household dry season occupation; b - represents % of total.

## B. Switching occupations: moderately poor

Table 5.17 and Figure 5.8 indicate data on the inter-seasonal occupational mobility of the moderately poor household heads. Since livelihoods in the *Haor* area, directly or indirectly, depend on dry season agriculture activities, 85.7% of the moderately poor households are engaged in farming (52.4%) and daily labour (33.3%) which become the two most important income sources.

Table 5.17: Engagement in dry season occupation or unemployment among moderately poor HH in 5 *Haor* villages, 2010

	Frequency	Percent	Valid Percent	Cumulative Percent
Artisan	3	3.6	3.6	3.6
Business	2	2.4	2.4	6.0
Daily labour	28	33.3	33.3	39.3
Farmer	44	52.4	52.4	91.7
Fisherman	2	2.4	2.4	94.0
Other activities	2	2.4	2.4	96.4
Service	1	1.2	1.2	97.6
Transport	1	1.2	1.2	98.8
Unemployed	1	1.2	1.2	100.0
Total	84	100.0	100.0	

During the wet season, the number of household heads who become unemployed, fishermen and businessmen increased compared to the dry season while household heads depending primarily on daily labour was unchanged at 33.3%. Fishing recorded a big occupational shift: household heads involved in fishing increased from 2.4% during the dry season to 26.2% in the wet season. While there were 1.2% household heads unemployed in the dry season, this increased significantly to 15.5% in the wet season reflecting the near absence of the seasonal labour market.

Table 5.18: Engagement in wet season occupation or unemployment among moderately poor HH in 5 *Haor* villages, 2010

	Frequency	Percent	Valid Percent	Cumulative Percent
Artisan	2	2.4	2.4	2.4
Business	10	11.9	11.9	14.3
Daily labour	28	33.3	33.3	47.6
Fisherman	22	26.2	26.2	73.8
Other activities	2	2.4	2.4	76.2
Service	3	3.6	3.6	79.8
Transport	1	1.2	1.2	81.0
Boating	1	1.2	1.2	82.2
Market mediation	1	1.2	1.2	83.4
Religious activities	1	1.2	1.2	84.6
Unemployed	13	15.5	15.5	100.0
Total	84	100.0	100.0	

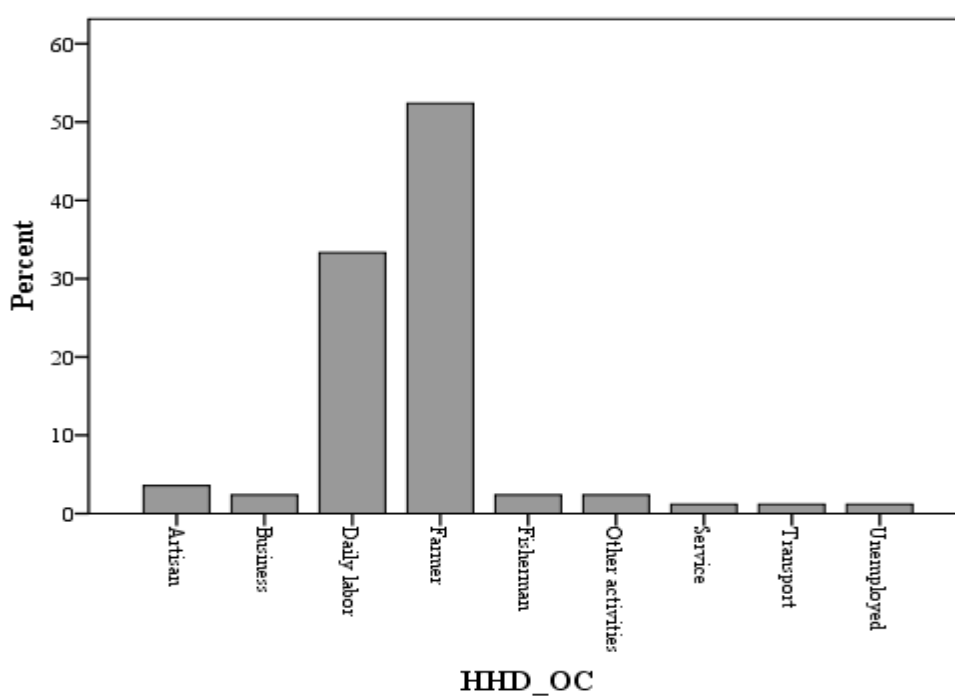


Figure 5.8: Schematic presentation of HH dry season occupation (HHD\_OC) or unemployment for the moderately poor HH, 2010



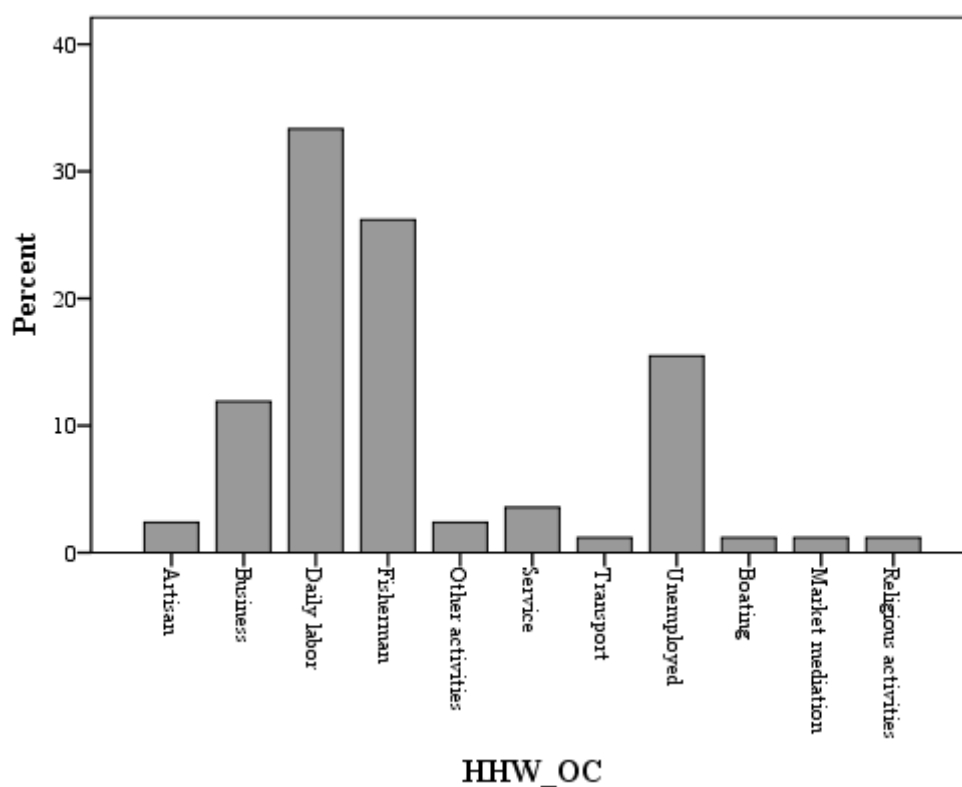


Figure 5.9: Schematic presentation of HH wet season occupation (HHW\_OC) or unemployment for the moderately poor HH, 2010

In terms of inter-seasonal occupational mobility, Figure 5.10 shows that all the dry season farmers completely switch to other occupations in the wet season including fishing, daily labour, business, service, market mediation and religious activities apart from being unemployed. The daily labourers in the dry season move into fishing and boating activities.

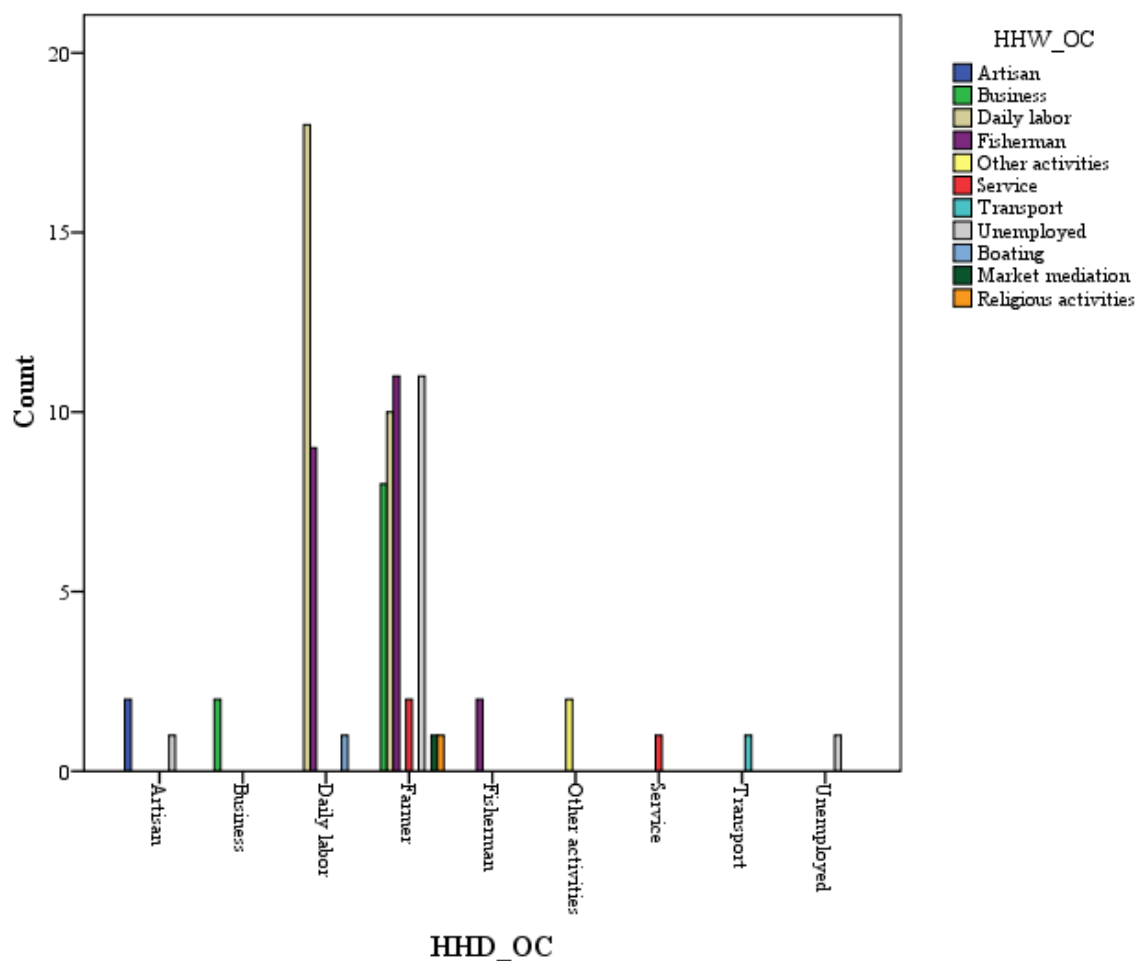


Figure 5.10: Cluster diagram of moderately poor HH occupation mobility from dry to wet season including unemployment, 2010

In Table 5.19, among the 52.4% who are dry season farmers, 25% become unemployed, 25% turned to fishing, 22.7% daily labour and 18.2% shifted into seasonal business. For the dry season daily labour, 10.7% and 1.2% moved into fishing and boating, respectively. All occupations excluding farming, daily labourers and artisanal work are stable occupations for the moderately poor households. Some farmers and daily labourers undertake seasonal domestic migration to work in wage labor in the agriculture sector at the destinations. Table 5.19 shows that of the 23.8% wet season transitional fishermen, 10.7% were daily labourers and 13.1% farmers in the dry season. The number of wet season

businessmen (11.9%) comprised 9.5% dry season farmers and 2.4% year round businessmen, the latter reflecting skill and capital constraints. The inflated inter-seasonal unemployment is seen in the 13.1% wet season unemployed farmers and the 1.2% artisans.

Table 5.19: Switching and distribution of dry season occupation during wet season by the moderately poor household in 5Haor villages including unemployment, 2010

			Wet season occupation											Total %
			Artisan	Business	Daily labour	Fisherman	Other activities	Service	Transport	Boating	Market mediation	Religious activities	Unemployed	
Dry season occupation	Artisan	a	66.7	0	0	0	0	0	0	0	0	0	33.3	
		b	2.4	0	0	0	0	0	0	0	0	0	1.2	3.6
	Business	a	0	100.0	0	0	0	0	0	0	0	0	0	
		b	0	2.4	0	0	0	0	0	0	0	0	0	2.4
	Daily labour	a	0	0	64.3	32.1	0	0	0	3.6	0	0	0	
		b	0	0	21.4	10.7	0	0	0	1.2	0	0	0	33.3
	Farmer	a	0	18.2	22.7	25.0	0	4.5	0	0	2.3	2.3	25.0	
		b	0	9.5	11.9	13.1	0	2.4	0	0	1.2	1.2	13.1	52.4
	Fisherman	a	0	0	0	100.0	0	0	0	0	0	0	0	
		b	0	0	0	2.4	0	0	0	0	0	0	0	2.4
	Other activities	a	0	0	0	0	100.0	0	0	0	0	0	0	
		b	0	0	0	0	2.4	0	0	0	0	0	0	2.4
	Service	a	0	0	0	0	0	100.0	0	0	0	0	0	
		b	0	0	0	0	0	1.2	0	0	0	0	0	1.2
	Transport	a	0	0	0	0	0	0	100.0	0	0	0	0	
		b	0	0	0	0	0	0	1.2	0	0	0	0	1.2
	Unemployed	a	0	0	0	0	0	0	0	0	0	0	100	
		b	0	0	0	0	0	0	0	0	0	0	1.2	1.2
Total			2.4	11.9	33.3	26.2	2.4	3.6	1.2	1.2	1.2	1.2	1.5.5	100

Note: a- represents % within household dry season occupation; b - represents % of total.

### C. Switching occupations: extremely poor

The cross-seasonal occupational mobility among the extremely poor is depicted in Table 5.20 and Figure 5.11. Since *Haor* livelihoods depend, directly or indirectly, on dry season agricultural activities, 91.5% of the extremely poor households are engaged in farming (65.1%) and daily labour (26.4%) for their income. They move into other occupations or become unemployed in the wet season: the number of unemployed household heads, fishermen, daily laborers and businessmen rose significantly compared to the dry season. Households who depend primarily on daily labor shift their occupations marginally from 26.4% to 27.1% inter-seasonally. A bigger occupational shift occurs in fishing: fishing household heads was 2.3% in the dry season increasing to 27.1% in the wet season. The 1.6% unemployed household heads in the dry season increased to 29.5% during the wet season attesting to the virtual absence of the seasonal labor market.

Table 5.20: Engagement in dry season occupation by extremely poor HH in 5 *Haor* villages including unemployment, 2010

Occupation	Frequency	Percent	Valid Percent	Cumulative Percent
Artisan	1	.8	.8	.8
Business	2	1.6	1.6	2.3
Daily labour	34	26.4	26.4	28.7
Farmer	84	65.1	65.1	93.8
Fisherman	3	2.3	2.3	96.1
Other activities	1	.8	.8	96.9
Service	2	1.6	1.6	98.4
Unemployed	2	1.6	1.6	100.0
Total	129	100.0	100.0	

Table 5.21: Engagement in wet season occupation by extremely poor HH in 5 *Haor* villages including unemployment, 2010

Occupation	Frequency	Percent	Valid Percent	Cumulative Percent
Artisan	4	3.1	3.1	3.1
Business	9	7.0	7.0	10.1
Daily labour	35	27.1	27.1	37.2
Fisherman	35	27.1	27.1	64.3
Other activities	2	1.6	1.6	65.9
Service	3	2.3	2.3	68.2
Transport	1	.8	.8	69.0
Boating	2	1.6	1.6	70.6
Unemployed	38	29.5	29.5	100.0
Total	129	100.0	100.0	

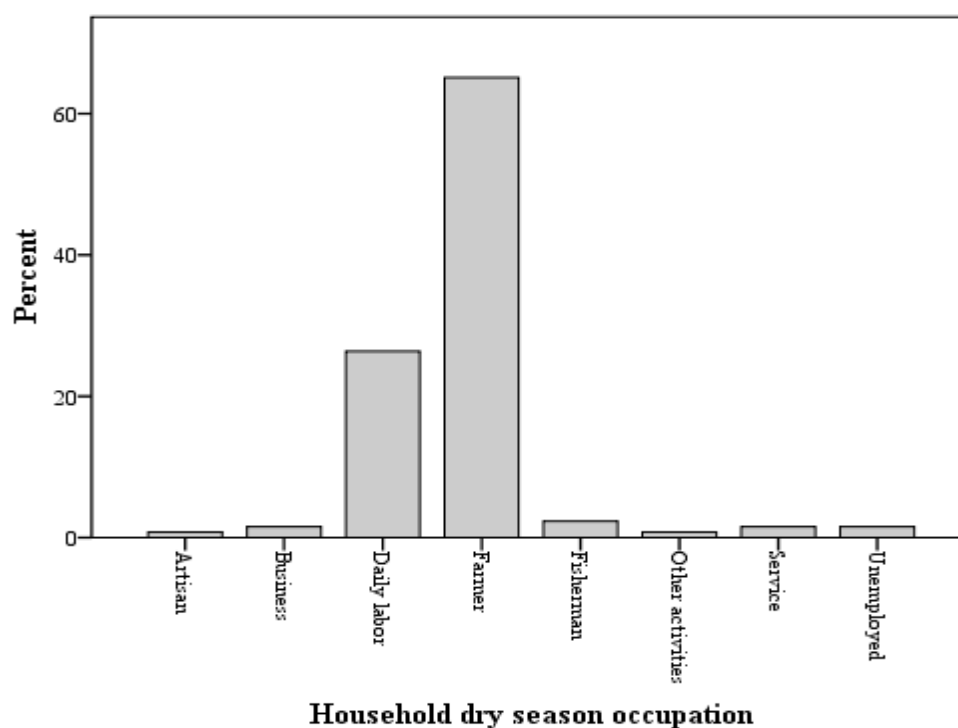


Figure 5.11: Schematic presentation of HH dry season occupation, for the extremely poor HH including unemployment, 2010

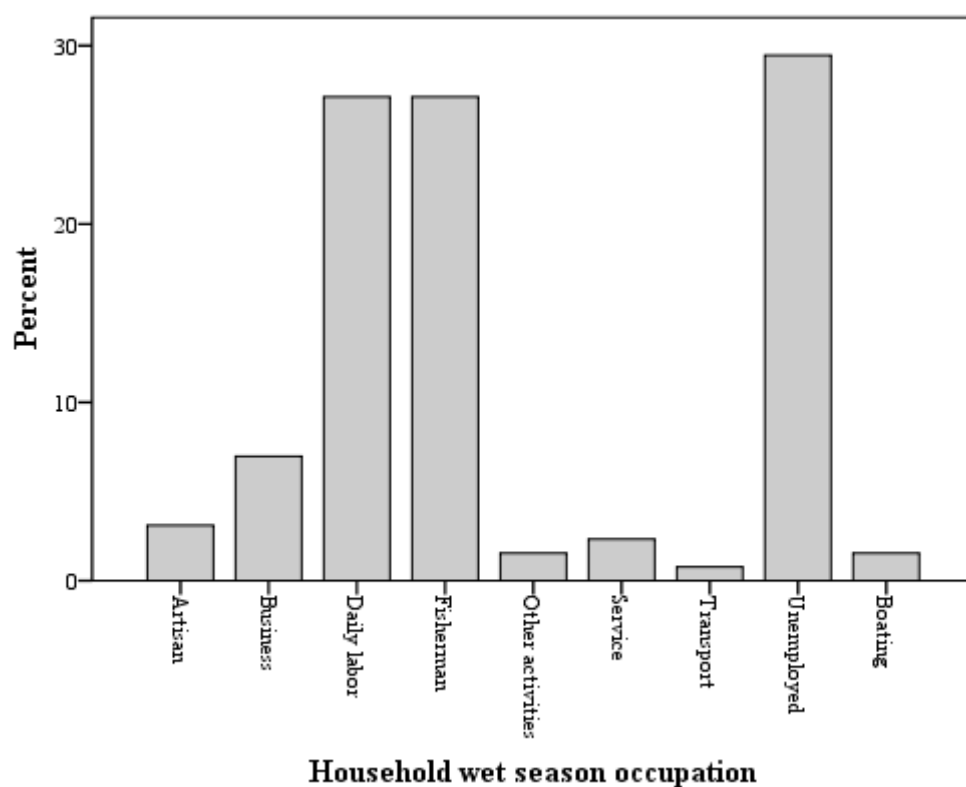


Figure 5.12: Schematic presentation of HH wet season occupation, for the extremely poor HH including unemployment, 2010

For the inter-seasonal occupational mobility distribution, Figure 5.13 shows that all dry season farmers completely switched to other occupations in the wet season including fishing, daily labour, business, artisanal work, service, transport and other activities, and some became unemployed. Daily labourers in the dry season moved into fishing, boating activities or became unemployed.

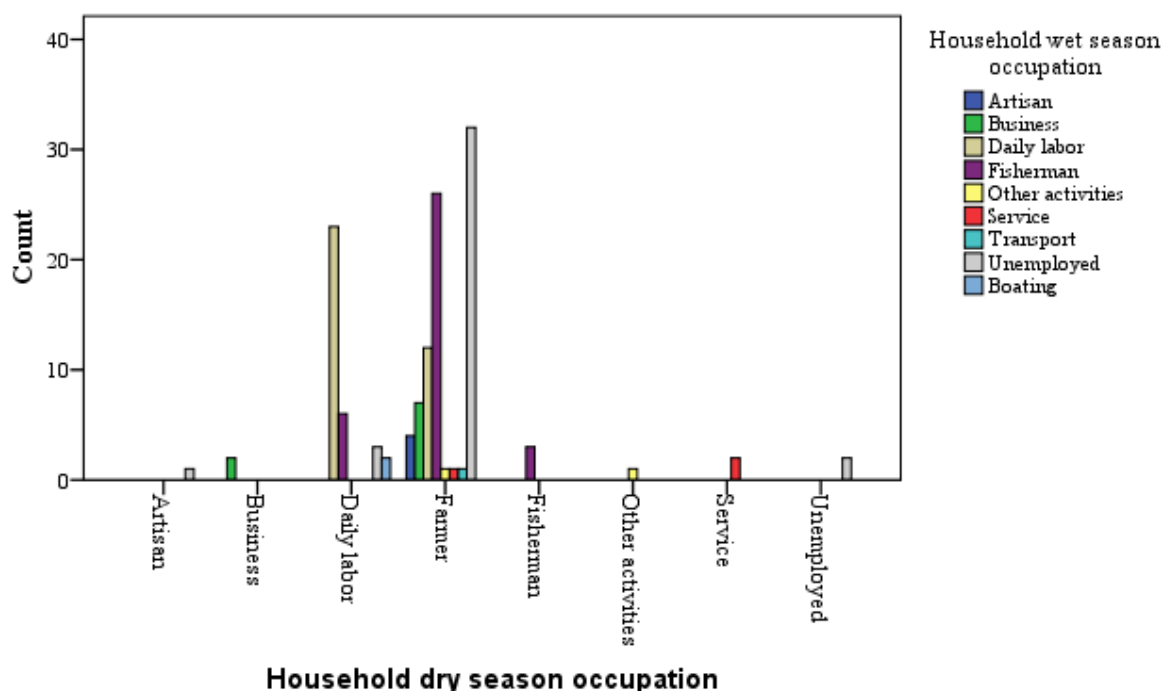


Figure 5.13: Cluster diagram of extremely poor HH occupation mobility from dry to wet season including unemployment, 2010

In Table 5.22, among the 65.1% dry season farmers, 38.1% become unemployed, 31.0% caught fish, 14.3% engaged in daily labour and 8.3% shifted into seasonal business in the wet season. For the daily labourers, 17.6%, 8.8% and 5.9% moved into fishing, unemployment and boating, respectively. All occupations excluding farming, daily laborers and artisans are stable occupations for the extremely poor households. Daily laborers move into labour work or become seasonal migrants involved in labour work in agriculture at the destinations. Table 5.22 shows that of the wet season fishermen, 91.8% had shifted occupations from the dry season where 17.3% were daily labourers and 74.5% farmers while only 8.3% of dry season farmers became wet season businessmen, reflecting capability and capital constraints. The inflated seasonal unemployment is shown in the wet season unemployment (29.5%) of 38.1% of dry season farmers compared to 8.8% of the



daily labourers who were unemployed in the wet season. Among 44.2% extremely poor households (129 households) in the sample villages, 35.7% (46 households) were farmers comprise of 13.2% (17 households), 8.5% (11 households), 8.5% (11 households) and 5.4% (7 households) marginal, small, medium and large farmers, respectively (Table 5.11). Resource deficiencies (e.g., inaccessibility to credit, illiteracy, lack of fishing gear, boats, etc.) and old age inhibit *in situ* capacity building and demotivate seasonal migration for the unemployed extremely poor. The illiterate and aged household heads are reluctant to migrate elsewhere because of the extensive physical efforts and outlays needed. Although some who are involved in fishing use cheap fishing gear, the period is too short to provide any significant income; thus, they become the disguised unemployed.

Table 5.22: Switching and distribution of dry season occupation during wet season by the extremely poor household in 5 *Haor* villages including unemployment, 2010

			Household wet season occupation									Total (%)
			Artisan	Business	Daily labour	Fisherman	Other activities	service	Transport	Boating	Unemployed	
Household dry season occupation	Artisan	a	0	0	0	0	0	0	0	0	100.0	
		b	0	0	0	0	0	0	0	0	0.8	0.8
	Business	a	0	100.0	0	0	0	0	0	0	0	
		b	0	1.6	0	0	0	0	0	0	0	1.6
	Daily labour	a	0	0	67.6	17.6	0	0	0	5.9	8.8	
		b	0	0	17.8	4.7	0	0	0	1.6	2.3	26.4
	Farmer	a	4.8	8.3	14.3	31.0	1.2	1.2	1.2	0	38.1	
		b	3.1	5.4	9.3	20.2	0.8	0.8	0.8	0	24.8	65.1
	Fisherman	a	0	0	0	100.0	0	0	0	0	0	
		b	0	0	0	2.3	0	0	0	0	0	2.3
	Other activities	a	0	0	0	0	100.0	0	0	0	0	
		b	0	0	0	0	0.8	0	0	0	0	0.8
	Services	a	0	0	0	0	0	100.0	0	0	0	
		b	0	0	0	0	0	1.6	0	0	0	1.6
Unemployed	a	0	0	0	0	0	0	0	0	100.0		
	b	0	0	0	0	0	0	0	0	1.6	1.6	
Total		b	3.1	7.0	27.1	27.1	1.6	2.3	0.8	1.6	29.5	100

Note: a- represents % within household dry season occupation; b - represents % of total.

The inter-seasonal occupational transition or mobility provides information about household income sources given the ecological conditions constraining livelihoods in the *Haor* region. In the following section, an analysis is given of the principal economic activities of the study households and the sustainability of their income flows.

#### **5.3.4 Major economic activities of the *Haor* households**

Given the properties of the *Haor* ecosystem, households in the study villages frequently engage in different activities to generate a continuous flow of income. The income flow approach (IFA) applied below explores the divergences in the sources of income and their flows for the non-poor, moderately and extremely poor *Haor* households in Tables 5.23, 5.24 and 5.25 respectively.

##### **A. Income diversity for the non-poor households**

From Table 5.23, it is seen that the non-poor households have diversified sources of income which can be categorized into 4 groups to facilitate the analysis.

##### ***(i) Mainly farmers remain unemployed during the wet season***

They are large (>749 decimals) farmers, cultivate their own land, employ seasonal contract labour and hire daily labour in the cropping cycle. They never work on other farms but rather allocate land to share-croppers and undertake money lending activities. They own livestock and provide loans to borrowers with land as the collateral.

Table 5.23: Income activities of non-poor households by month in 5 *Haor* villages, 2010

Name of Bengali month	Major income activity	Unemployment
<i>Boishakh</i> (14 <sup>th</sup> April -14 <sup>th</sup> May)	Engaged in harvesting	---
<i>Joistho</i> (15 <sup>th</sup> May – 14 <sup>th</sup> June)	Harvesting, catching fish	---
<i>Aashar</i> (15 <sup>th</sup> June – 15 <sup>th</sup> July)	Market mediation, petty trading, migrate elsewhere for seasonal business (e.g., hawking seasonal fruits)	Unemployed
<i>Shraban</i> (16 <sup>th</sup> July – 15 <sup>th</sup> August)		Unemployed
<i>Bhadra</i> (16 <sup>th</sup> August – 15 <sup>th</sup> September)	Market mediation	Unemployed
<i>Aashin</i> (16 <sup>th</sup> September – 15 <sup>th</sup> October)	Catching fish	Unemployed
<i>Kartik</i> (16 <sup>th</sup> October – 14 <sup>th</sup> November)	Catching fish; green vegetable cultivation by the homestead;	---
<i>Agrahan</i> (15 <sup>th</sup> November – 14 <sup>th</sup> December)	Own cultivation, trading agriculture inputs; daily labour; fish trading	---
<i>Poush</i> (15 <sup>th</sup> December – 13 January)		---
<i>Maagh</i> (14 <sup>th</sup> January – 12 February)	Drying ditches in the <i>Haor</i> to catch fish, start harvesting at end of the month of <i>Chaitra</i>	---
<i>Phalgun</i> (13 <sup>th</sup> February – 14 <sup>th</sup> March)		---
<i>Chaitra</i> (15 <sup>th</sup> March – 13 <sup>th</sup> April)		Unemployed

**(ii) Mainly businessmen who also farm during the dry season**

They provide year-round repair services for power pumps, hand trolleys, boat engine, rice mills, tractors, paddy hullers, etc. Along with crop cultivation, income sources include trading in agricultural inputs, rice and other goods; tailoring; money lending; medicines and village doctoring; renting out land, boat and agriculture equipment.

***(iii) Cultivating crops during the dry season and undertaking seasonal business during the wet season***

They are mainly medium size (250-749 decimals) farmers; cultivate their own land, sharecrop and rent in land; catch fish for sale seasonally during the months of *Aaasher-Shraban-Bhadra* and engage in seasonal fruit hawking at destinations; undertake large scale market mediation of paddy and rice during the wet season.

***(iv ) Cultivating own small size farm land, sharecropping and daily labour***

Attempt to fish the whole year round; occasionally engage in earth cutting during the month of *Phalgun*; undertake seasonal domestic migration for the months of *Aaashar-Shraban-Bhadra* and engage in daily labour in the agricultural sector, rikshaw pulling, van driving, helping in workshops and saw mills at the destination.

**B. Income diversity for the moderately poor households**

Farming, daily labour and fishing are the most common economic activities for the majority of this group of people (Table 5.24). Most of them undertake seasonal domestic migration of which two third migrate to Chittagong, Sylhet and Comilla and the rest to Dhaka. Migrants engage in crop cultivation, masonry work, rikshaw pulling, housework, sewing garments and driving three-wheelers. The relatively solvent households in this group have multiple income sources throughout the year. The data from the focus group discussions classify the moderately poor households into 3 groups.

Table 5.24: Income activities of moderately poor households by month in 5 *Haor* villages, 2010

Name of Bengali month	Major income activity	Unemployment
<i>Boishakh</i> (14 <sup>th</sup> April -14 <sup>th</sup> May)	Crop harvesting; daily labour	---
<i>Joistho</i> (15 <sup>th</sup> May – 14 <sup>th</sup> June)	Crop harvesting; daily labour; wood cutting; seasonal fruits trading	---
<i>Aashar</i> (15 <sup>th</sup> June – 15 <sup>th</sup> July)	Assign SDM; rice trading	Unemployed
<i>Shraban</i> (16 <sup>th</sup> July – 15 <sup>th</sup> August)		Unemployed
<i>Bhadra</i> (16 <sup>th</sup> August – 15 <sup>th</sup> September)		Unemployed
<i>Aashin</i> (16 <sup>th</sup> September – 15 <sup>th</sup> October)	Catching fish	Unemployed
<i>Kartik</i> (16 <sup>th</sup> October – 14 <sup>th</sup> November)	Catching fish; cultivate green vegetable by the homestead	Unemployed
<i>Agrahan</i> (15 <sup>th</sup> November – 14 <sup>th</sup> December)	Crop cultivation; fishing; daily labour	---
<i>Poush</i> (15 <sup>th</sup> December – 13 January)		---
<i>Maagh</i> (14 <sup>th</sup> January – 12 February)		---
<i>Phalgun</i> (13 <sup>th</sup> February – 14 <sup>th</sup> March)	Catching fish; earth cutting	Unemployed
<i>Chaitra</i> (15 <sup>th</sup> March – 13 <sup>th</sup> April)	Fishing; harvesting start in a very small scale at the end of the month	Unemployed

**(i) Farming and petty trading**

Cultivate own land and often rent relative's land; cultivate green vegetables in *Bisra* or *Lama* (arable land by the homestead); never work as daily labourer but employ daily labour for the whole crop season; some of them undertake seasonal migration and became *coyal* (weigher) in paddy selling *in situ* markets; are engaged the whole year in small-scale shop keeping in the locality, buy and sell rice in local bazaars around the villages; involved in seasonal fruit business during the wet season.

***(ii) Farming, share cropping, daily labouring***

They are mainly daily labourers who cultivate a small plot of own land; engage in small-scale sharecropping; undertake seasonal domestic migration for 2-3 months; fishing is the major source of income during the monsoonal deluge;

***(iii) Daily labour***

They work as daily labourers in the agriculture sectors in the *Haor* villages throughout the year; migrate for 2-3 months during the monsoonal deluge; fishing often in a group.

**C. Income diversity for the extremely poor households**

Table 5.25 shows that daily labour is the main income source of the extremely poor households although they also fish and undertake seasonal domestic migration. While they prefer regular income flows to prevent borrowing, the range of available economic activities is very limited and, thus, they are often remained unemployed. As even a one-day unemployment is unaffordable, they depend substantially on the natural resources of the *Haor* ecosystem for sustenance. These households can be categorized into the following 4 groups.

***(i) Farming***

They were large farmers but gradual leasing or selling out land have made them become small farmers and sharecroppers; they cultivate green vegetable in *bisra* (arable land by the homestead); work also as daily labourers on other farms but never engaged in earth cutting; engaged in fishing throughout the year.

Table 5.25: Income activities of extremely poor households by month in 5Haor villages, 2010

<b>Name of Bengali month</b>	<b>Major income activity</b>	<b>Unemployment</b>
<i>Boishakh</i> (14 <sup>th</sup> April -14 <sup>th</sup> May)	Daily labour; crop harvesting	---
<i>Joistho</i> (15 <sup>th</sup> May – 14 <sup>th</sup> June)	Daily labour; fishing	---
<i>Aashar</i> (15 <sup>th</sup> June – 15 <sup>th</sup> July)	Catching fish; seasonal domestic migration (SDM)	Unemployed
<i>Shraban</i> (16 <sup>th</sup> July – 15 <sup>th</sup> August)		Unemployed
<i>Bhadra</i> (16 <sup>th</sup> August – 15 <sup>th</sup> September)		Unemployed
<i>Aashin</i> (16 <sup>th</sup> September – 15 <sup>th</sup> October)	Catching fish	Unemployed
<i>Kartik</i> (16 <sup>th</sup> October – 14 <sup>th</sup> November)	Catching fish; daily labour	Unemployed
<i>Agrahan</i> (15 <sup>th</sup> November – 14 <sup>th</sup> December)	Daily labor	---
<i>Poush</i> (15 <sup>th</sup> December – 13 January)		---
<i>Maagh</i> (14 <sup>th</sup> January – 12 February)		---
<i>Phalgun</i> (13 <sup>th</sup> February – 14 <sup>th</sup> March)	Earth cutting	Unemployed
<i>Chaitra</i> (15 <sup>th</sup> March – 13 <sup>th</sup> April)	Unemployed	Unemployed

***(ii) Daily labour and sharecropping***

Although daily labourers, they are given preference in cultivating relative's land; undertake seasonal domestic migration; engage in fishing.

***(iii) Daily labour***

Engaged in daily labour, catching fish, earth cutting and sometimes they are unemployed during the dry season; undertake seasonal domestic migration and catch fish during the wet season.



***(iv) Seasonal contact labouring***

They work for a specific household for the whole crop season; undertake migration for 4-5 months during the wet season.

**5.3.5 Mediators of *Haor* household income**

The interviews provided qualitative information on strategies to expand economic activities and enhance income of the aggregate poor study households. They pull rikshaws, drive vans, work in the transportation sector, open small tea stalls and engage in petty trading, etc. If all weather asphalt roads are available and accessible, they can commute and work in the *upazila* daily.

By the same argument, if electricity, public health and veterinary services are available, accessible and affordable, the villagers can obtain the means of economic sustenance in many small and medium enterprises like ice factories, workshops, handicraft factories, poultry, dairy and duck farms, etc., throughout the year.

These mediators would help in obtaining higher produce prices in the village, transport and health treatment costs would be reduced, there would be easy access by females to the health services which would save the opportunity cost of male's working day, child mortality would be reduced encouraging smaller household size, and veterinary services would encourage large scale livestock rearing.

Better roads would mean relatively better product prices and cheaper agricultural inputs. The moderately poor could sell paddy directly to the mill owner or wholesaler at a better price (Figure 5.14).

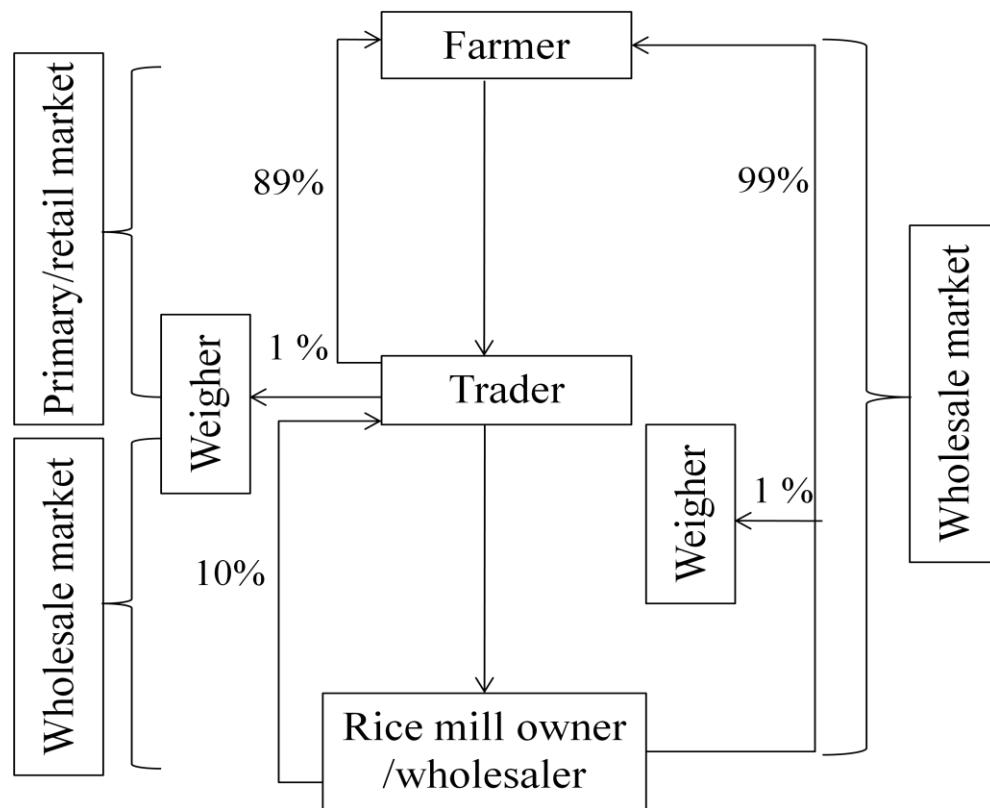


Figure 5.14: Paddy supply chain and returns to the households in the 5 Haor villages

After daily labour work, fishing is the second most important economic activity for the extremely poor but their daily catch is low that provides inadequate income because of poor roads and accessibility to the main markets where a higher mark-up could be obtained (Figure 5.15).

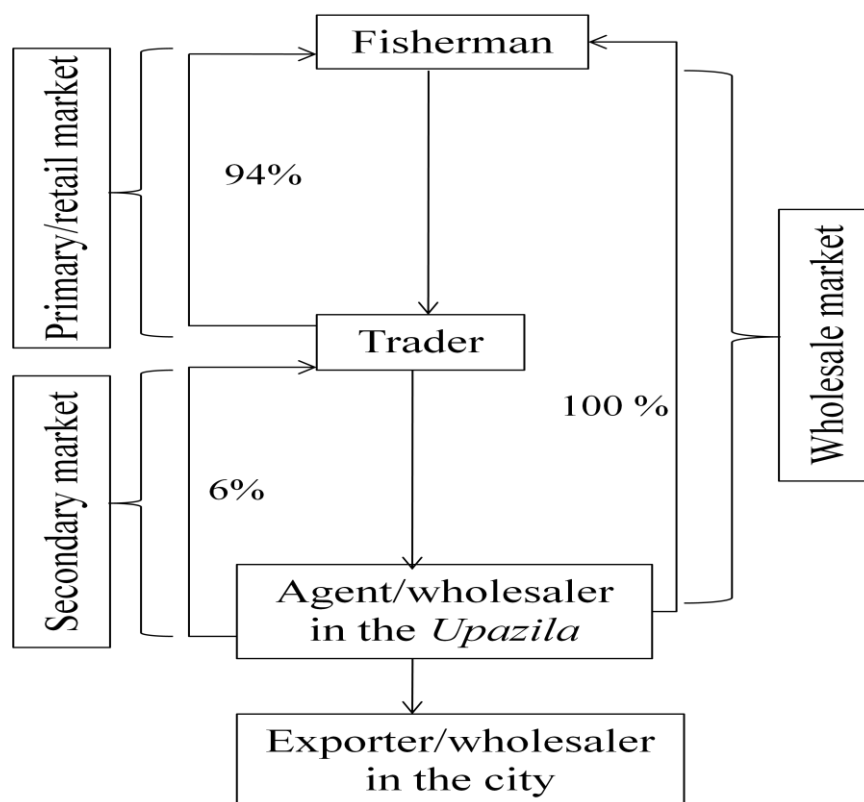


Figure5.15: Fish supply chain and returns to the households in the 5Haor villages

### 5.3.6 Conclusion

*Haor* livelihoods are mainly based on the single *boro* crop. Although the poor, both moderately and extremely poor, households engage in crop cultivation, daily labour and fishing, they confront challenges in escaping the poverty trap. The poor are mainly landless, uneducated and female-headed households affected by the geographical location (e.g., proximity to the river, bazaar, etc.) of the *Haor* villages and location of cultivable land in different *Haors*. The households headed by widows and divorcees are the most vulnerable. The extremely poor are unable to afford any opportunity cost of unemployment. Households headed by the young are relatively less poor than those headed by the middle-aged and old household heads. Among the landless, 77% are poor in aggregate of which 28% and 49% are moderately and extremely poor indicating that not all the landless are

poor. In contrast, among the 4.8% of large (>749 decimals) farmers, 3.4% are poor in aggregate of which 2.4% are extremely poor. It implies that recurrent flashfloods, monocropping, seasonal unemployment and very low human capital endowment result in such income and livelihood degradation.

Monocropping and related activities provide almost 70%, 58% and 50% of the total household cash income for the non-poor, moderately and extremely poor survey households. The highest cash income (26%) generated during the wet season implies that the extremely poor are comparatively more involved in diversified activities than other groups. Livelihoods in the *Haor* area are sensitive to seasonal occupational mobility. The extremely poor 2.3% dry season fishermen rise to 27% in the wet season and a similar trend is observed for the moderately poor households. A large number of poor remain unemployed reflecting the marginal seasonal labour market in the study villages. During the wet season, the poor villagers are involved in boating, transportation, petty trading of seasonal fruits, artisanal activities and seasonal migration. Availability of and accessibility to year-round roads and public health services could be the two most important income mediating factors for the poor villagers. Better all-weather roads extend the boundaries of the labour market, decrease transportation and communication costs; provide scope for obtaining better produce prices and increase *in situ* business opportunities. Health, medical and medicine costs will be reduced, women do not need to be escorted by their menfolk saving a single day's wage, reducing health hazards and decreasing transportation costs.

## 5.4 Econometric model building and multivariate analysis

This section constitutes two parts: the first delineates the justification for the econometric model while the second part analyzes the income determinants using the multivariate analytical model.

The econometric model has been built in two stages: first, Equation 4.3 has been regressed to observe the association between household incomes and the exploratory determinant variables. During the data analysis, if the model did not have a good fit, variable reduction was undertaken through a process of ‘backward elimination’ which starts by including all potential variables and assessing their statistical significance one by one and discarding those which are highly non-significant.

Empirical evidence (Gujarati, 2003) states that a model has to be considered to have the best fit if it has the smallest Akaike information criterion (AIC), highest adjusted  $R^2$ , smallest Schwarz information criterion (SIC), lowest sum of squared residual (SSE) and Durbin-Watson ( $d$ )  $< 2$ . Compared to the F-test, AIC is a more efficient and effective index (Glatting, Kletting, Reske, Hohl & Ring, 2007; Kletting & Glatting, 2009; Kletting, Reske & Glatting, 2009). It is a filtering process where one model is compared with another using these cut-off values.

Before starting the ‘backward elimination’ approach (Hocking, 1976), it is essential to check whether the collected data satisfy some fundamental statistical assumptions to justify the selection of the best fit model. For the cross sectional data used in this study, the following three are considered important - normality, multicollinearity and autocorrelation because, as Gujarati (2003) states, not all assumptions are applicable for every type of data.

### 5.4.1 Data normality

One of the most important statistical conditions is that the collected data should be normally distributed in the sense that the variables have a bell-shaped (symmetric) distribution about their mean. As normality tests<sup>56</sup> need to be conducted on continuous variables, six variables were selected:  $Y$ ,  $AGE_{hh}$ ,  $HH_{size}$ ,  $D_i$ ,  $REMT$  and  $LAND_{hh}$ . Here, the P-P (Proportion-Proportion) probability plot is used as a normal distribution method in which the observed cumulative proportion is plotted against the expected cumulative proportion if the data were a sample from a specific distribution. The experimental results for these six continuous variables are shown in Figures 5.16-5.18. The P-P plots indicate that the variables are normally distributed about their means.

---

<sup>56</sup> Though nearly 40 different tests for normality have been developed (Yazici & Yolacan, 2007) but the most appropriate test depends on several factors, including the number of samples, the sample size and the underlying assumptions regarding the type of data and the type of distribution (Vassalos, Dillon & Childs, 2012; Yazici & Yolacan, 2007), therefore anomalies have often been observed in the results of various test of normality (Yazici & Yolacan, 2007). Suppose, Kolmogorov-Smirnov (KS) test is found inappropriate for the sample size 192 (Vassalos, Dillon & Childs, 2012) and 327 ([www.psychwiki.com/images/7/79/Lab1DataScreening.doc](http://www.psychwiki.com/images/7/79/Lab1DataScreening.doc)) as KS is the least powerful than other tests for all types of distribution and sample sizes (Razali & Wah, 2011; Stephen, 1974). In this research study, KS test has not been adopted due to the following specific limitations- (a) the KS test is most sensitive for differences in medians (Parikh, Li & Ramanathan, 1999) and tends to exhibit poor sensitivity to deviation from the hypothesized distributions that occur in the tails (i.e., the test tends to be more sensitive near the center of the distribution than at the tails) (Vassalos, Dillon & Childs, 2012); (b) in KS test the data distribution must be fully specified; that is, if location, scale, and shape parameters are estimated from the data, the critical region of the KS test is no longer valid (Vassalos, Dillon & Childs, 2012); (c) KS test – used often in the past - compares the cumulative distribution of the data with the expected cumulative normal distribution, and bases its p-value simply on the largest discrepancy, which is not a very sensitive way to assess normality, thus becoming obsolete (Marusteri & Bacarea, 2010). Besides this test, there are a relatively large number of other tests available and many analysts (e.g., Jarque & Bera, 1987; Stephen, 1974) prefer to use other tests (Marusteri & Bacarea, 2010).

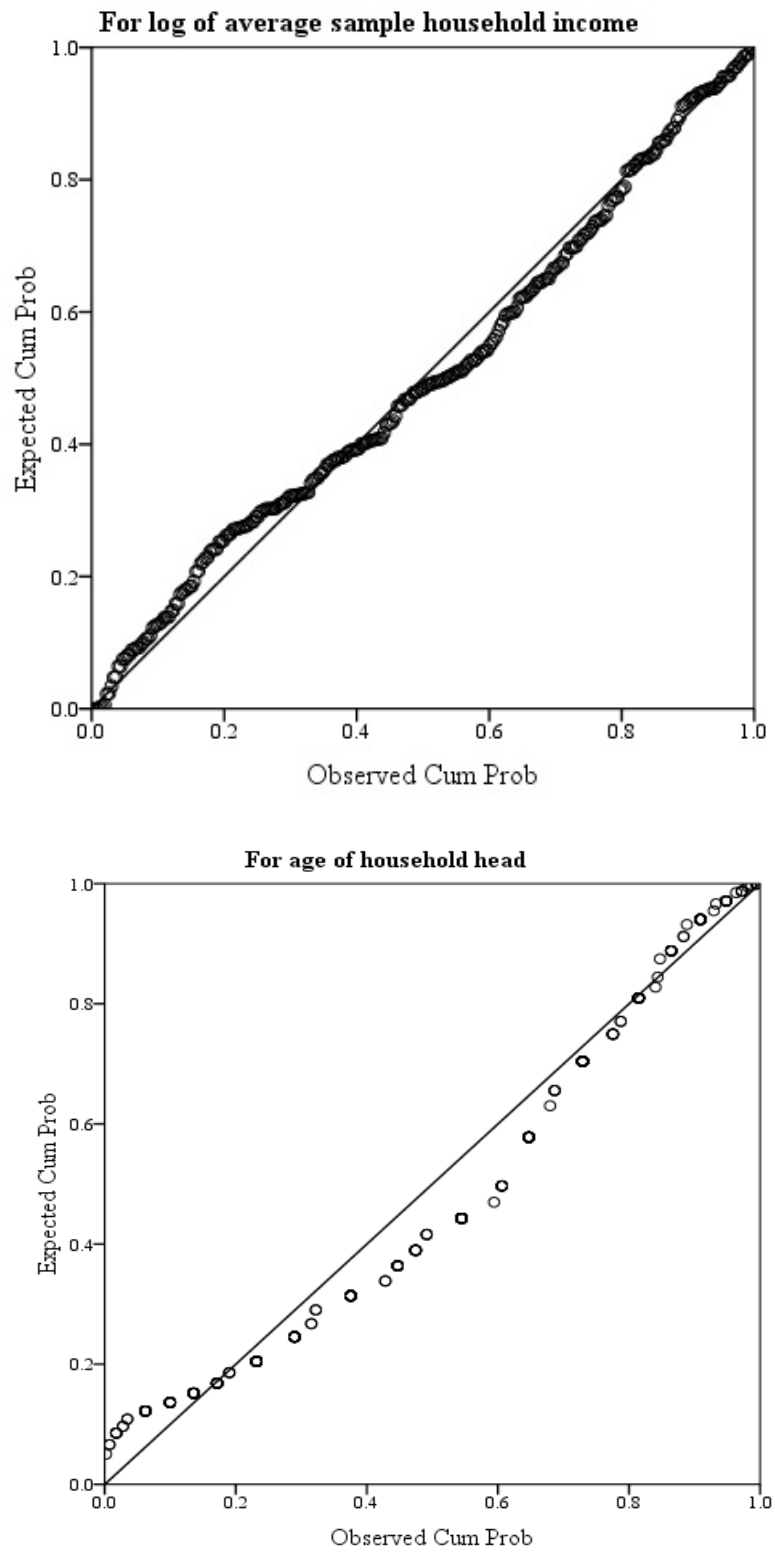


Figure 5.16: Normal P-P plot for average sample household income and age of household head

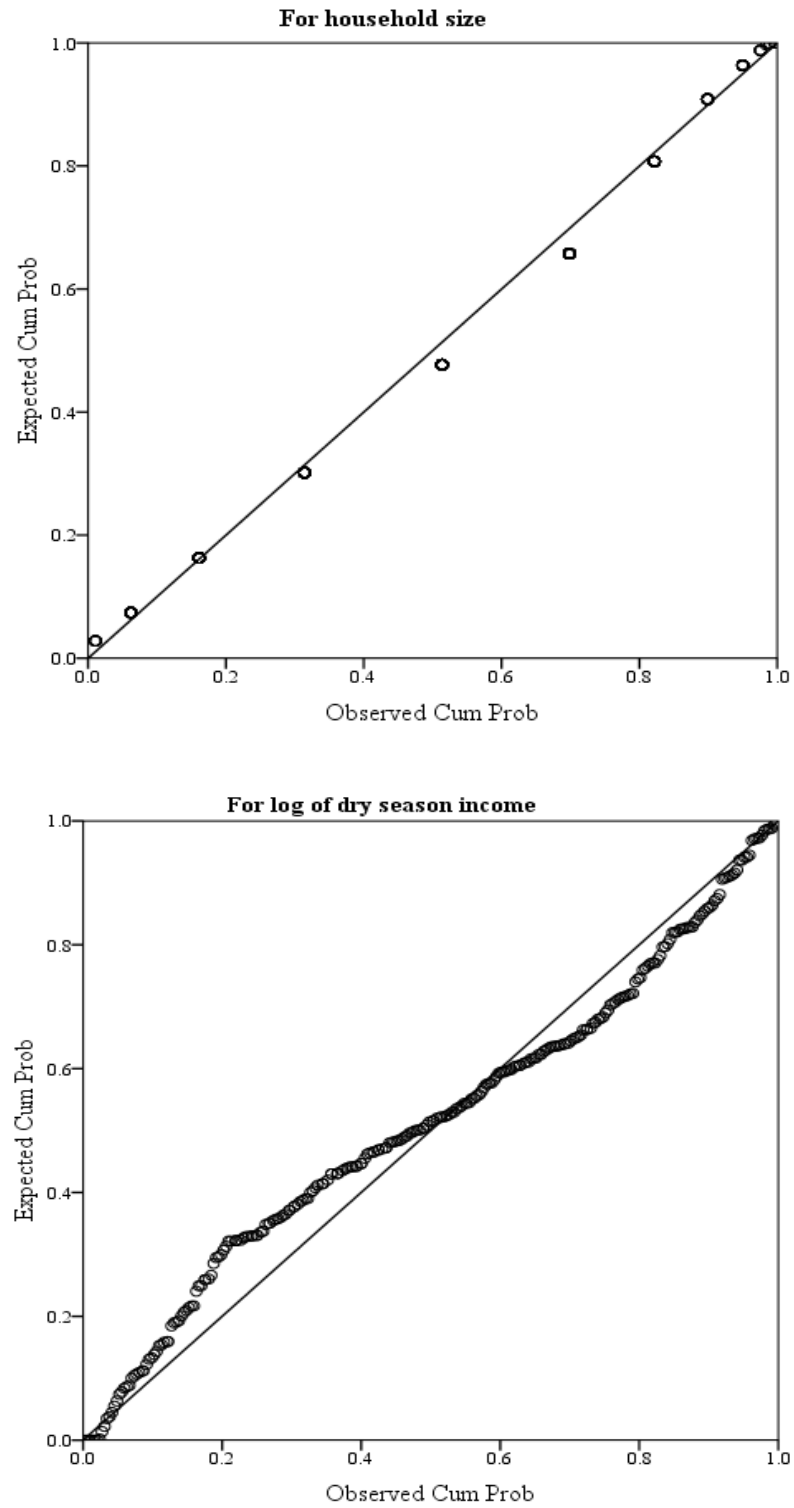


Figure 5.17: Normal P-P plot for household size and dry season income of household



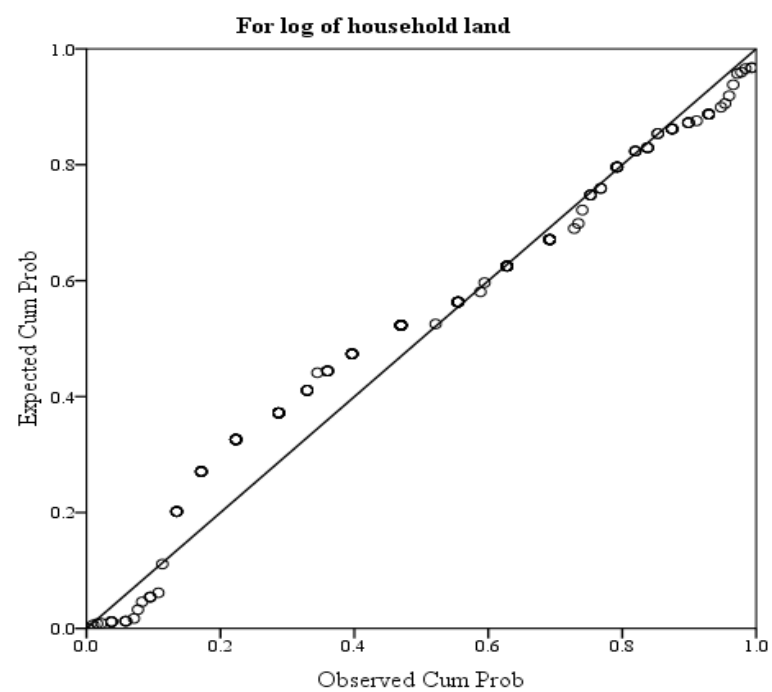
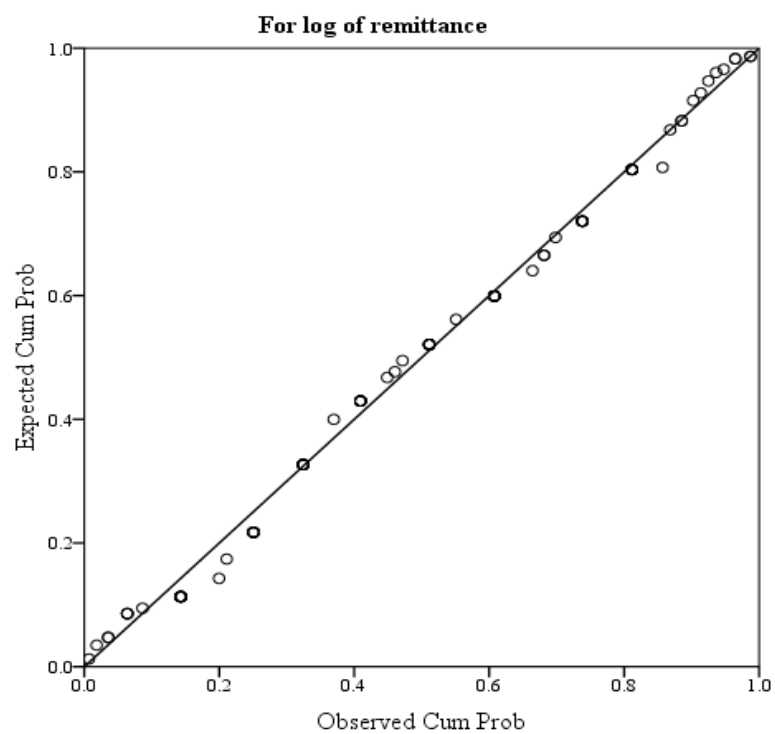


Figure 5.18: Normal P-P plot for remittances and land of household

### 5.4.2 The full model: long regression

In constructing a complete model, some variables are purposively removed from the tentative model (Equation 4.3), since those variables suffer the constant value problem. For example, there is no road communication and public hospital services in the study area, so all respondents provide similar responses for these two variables which are coded ‘zero’ for all. Similarly, flashflood affects, directly or indirectly, all the respondents and a similar code applicable to all as ‘1’. Therefore, these three variables cannot be considered as independent variables on the right hand side of the equation. Hereafter, the complete model is:

$$\begin{aligned}
 \ln Y = & \alpha + \alpha_1 AGE_{hh} + \alpha_2 EDE_{hh} + \alpha_3 EMPS_{hh} + \alpha_4 HH_{size} + \alpha_5 GEN_{hh} + \alpha_6 \ln D_i \\
 & + \alpha_7 \ln REMT + \alpha_8 ND + \alpha_9 LAND_{hh} + \alpha_{10} ACC_{hh} + \alpha_{11} ACCFG_{hh} + e_i \\
 & - - - - - (5.1)
 \end{aligned}$$

The regression results of the complete model (Equation 5.1) are given in Table 5.26. The results postulate that all variables are not statistically significant. Except the variables, education and land holding of households, all other variables have the expected signs. The obtained  $R^2$  value (0.592644) is high and highly significant because the calculated F statistic (9.6549) is highly significant as its ‘p’ value is almost zero. These results indicate that all the explanatory variables jointly strongly impact the ‘average sample household income’ (dependent variable).

Table 5.26: Regression results of the full model (Equation 5.1)

Model	Dependent variable			
	<i>ln Y</i>			
	Coefficient	Standard Error	t-statistics	Prob.
$AGE_{hh}$	-0.011372	0.004233	2.686345	0.0089
$EDE_{hh}$	-0.074836	0.066360	1.127722	0.2631
$EMPS_{hh}$	-0.273014	0.130882	2.085950	0.0405
$HH_{size}$	-0.136465	0.026808	5.090410	0.0000
$GEN_{hh}$	-0.055416	0.325837	0.170072	0.8654
$ln D_i$	0.221957	0.064032	3.466335	0.0009
$ln REMT$	0.418413	0.079076	5.291265	0.0000
$ND$	-0.058322	0.150404	0.387772	0.6993
$LAND_{hh}$	-7.08E-06	0.000168	0.042098	0.9665
$ACC_{hh}$	1.298704	0.296699	4.377176	0.0000
$ACCFG_{hh}$	0.013226	0.342286	0.038642	0.9693
Intercept	4.478367	1.015998	4.407848	0.0000
$R^2$	0.592644			
Adjusted $R^2$	0.531261			
F-statistic	9.654929			
Akaike information criterion (AIC)	1.288271			
Schwarz information criterion (SIC)	1.633115			
Sum squared residual (SSE)	13.60846			
Durbin-Watson statistics (d)	1.126743			

### A. Multicollinearity

Multicollinearity represents a state of linear relationships existing among some or all the predictor variables in a regression model. It occurs when explanatory variables in the model are highly correlated to each other. Testing multicollinearity is important for model specification and is considered in this study.

#### (i) Detecting multicollinearity

The results in Table 5.26 would support the classical assumption of multicollinearity, for the high  $R^2$  value (0.592644) and 5 variables ( $EDE_{hh}$ ,  $GEN_{hh}$ ,  $ND$ ,  $LAND_{hh}$  and  $ACCFG_{hh}$ ) are statistically insignificant in the complete model of 11 variables.

Since the classical symptom of multicollinearity - ‘high  $R^2$  but few significant  $t$  ratios’ - are found in the complete model, clarification is needed of the statistical problem by observing the variance and covariance of the regression estimators. Gujarati (2003, p. 354) states ‘the OLS estimators and standard errors can be sensitive to even the smallest change in the data’. The increase of variance and covariance of coefficients are falsified and that can be observed with ‘variance-inflating factors (VIF)’ and ‘tolerance (TOL)’ in Table 5.27.

Table 5.27: TOL and VIF for coefficients

Model	Dependent variable						
	<i>ln Y</i>						
	Unstandardized Coefficients		Standardized Coefficients	t (absolute)	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			TOL	VIF
Constant	4.478	1.016		4.408	.000		
$AGE_{hh}$	-.011	.004	-.230	2.686	.009	.761	1.314
$EDE_{hh}$	-.075	.066	-.098	1.128	.263	.734	1.363
$EMPS_{hh}$	-.273	.131	-.162	2.086	.040	.931	1.075
$HH_{size}$	-.136	.027	-.481	5.090	.000	.626	1.598
$GEN_{hh}$	-.055	.326	-.013	.170	.865	.899	1.112
$ln D_i$	.222	.064	.288	3.466	.001	.806	1.241
$ln REMT$	.418	.079	.446	5.291	.000	.785	1.275
$ND$	-.058	.150	-.032	.388	.699	.800	1.251
$LAND_{hh}$	-7.083E-6	.000	-.004	.042	.967	.588	1.700
$ACC_{hh}$	1.299	.297	.382	4.377	.000	.732	1.367
$ACCFG_{hh}$	.013	.342	.003	.039	.969	.815	1.227

The rule-of-thumb states that the closer the value of TOL and VIF is to 1, the greater the evidence that one explanatory variable is not collinear with the other explanatory variables (Gujarati, 2003). The values of Tolerance (TOL) and VIF in Table 5.27 indicate that there is no multicollinearity existing among the regressors (explanatory variables).

## **B. Autocorrelation**

Since the data were collected by conducting a cross-sectional primary survey and the household was considered as the unit of analysis, there is a possibility that the error term relating to one household is correlated with the error term of another household (Gujarati, 2003). As Gujarati (2003, p. 441) states “If unexpectedly such a correlation is observed in cross-sectional units, it is called spatial autocorrelation, that is, correlation in space rather than over time”. As the data is of economic interest, as suggested by Gujarati (2003), clarification must be made of whether spatial autocorrelation exists or not.

### ***(i) Detecting Autocorrelation***

Using OLS in the presence of autocorrelation makes the estimators of the model inefficient (i.e., maximum variance) relative to other linear and unbiased estimators. Thus, deriving efficient estimators would be helpful to develop a classical linear regression model appropriate for cross sectional data. Although there are many heteroscedasticity tests, ‘White’s heteroscedasticity test’ seems appropriate for cross- sectional data (Gujarati, 2003; Gujarati & Porter, 2009).

***White’s heteroscedasticity test:*** Following the procedures given in the Gujarati (2003) and Gujarati& Porter (2009), White’s test has been applied for Equation 5.1. After applying the test to the residuals found from the regression of Equation 5.1, the results illustrate that  $\text{obs} \cdot R^2 = 85 \cdot 0.229894 = 19.54100$ , which has, asymptotically, a chi-square distribution with 20 df (degree of freedom). The chi-square value (19.54100) is lower than the critical value of chi-square at the 5% and 10% level of significance. It can be concluded, thus, that there is no heteroscedasticity in the model.

### 5.4.3 Backward elimination: short regression

As stated earlier, the variables are considered for removal sequentially based on their statistical non-significant p value in the equations<sup>57</sup>. For example, the regression results of the complete model (Equation 5.1: long regression) in Table 5.26 shows that<sup>58</sup>  $R^2 = 0.592644$ , adjusted  $R^2 = 0.531261$ , AIC = 1.288271 and SIC = 1.633115 with acceptable value of  $d = 1.126743$ . The elimination process has begun by laying aside the variable  $ACCFG_{HH}$  having the highest p value (0.9693), from the model. In the subsequent regression, the results are  $R^2 = 0.592474$ , adjusted  $R^2 = 0.537$ , AIC = 1.264, SIC = 1.580 and  $d = 1.122$  which indicate improvement in the model fit. This procedure is continued until a best fit model for the explanatory variables has been found. The result of the whole backward elimination process is given in Table 5.28. The ultimate outcome of this process is the best fit model (Equation 5.2: short regression).

Table 5.28: Statistics of the gradual improvement of the model towards the best fit

Eliminated variables	Criteria results after elimination						P-value
	$R^2$	Adjusted $R^2$	AIC	SIC	d-value	SSE	
$ACCFG_{hh}$	0.592	0.537	1.264	1.580	1.122	13.608	0.969
$LAND_{hh}$	0.592	0.543	1.241	1.528	1.121	13.609	0.968
$GEN_{hh}$	0.592	0.549	1.218	1.476	1.116	13.614	0.867
$ND$	0.591	0.554	1.197	1.427	1.118	13.655	0.633
$EDE_{hh}$	0.581	0.548	1.198	1.399	1.106	13.996	0.169

<sup>57</sup> P-value of  $ACCFG_{hh}$  (0.969) is found in estimation of the equation 5.1 then after elimination of this variable, the derived equation is:  $\ln Y = \alpha + \alpha_1 AGE_{hh} + \alpha_2 EDE_{hh} + \alpha_3 EMPS_{hh} + \alpha_4 HH_{size} + \alpha_5 GEN_{hh} + \alpha_6 \ln D_i + \alpha_7 \ln REMT + \alpha_8 ND + \alpha_9 LAND_{hh} + \alpha_{10} ACC_{hh} + e_{ai} - (A)$ . The P-value of  $LAND_{hh}$  is retrieved from the above equation (A) and hereafter eliminated to find another equation:  $\ln Y = \alpha + \alpha_1 AGE_{hh} + \alpha_2 EDE_{hh} + \alpha_3 EMPS_{hh} + \alpha_4 HH_{size} + \alpha_5 GEN_{hh} + \alpha_6 \ln D_i + \alpha_7 \ln REMT + \alpha_8 ND + \alpha_9 ACC_{hh} + e_{bi} - (B)$ . The P-value of  $GEN_{hh}$  is found from the equation-B and then eliminated to build up a comparatively more robust model:  $\ln Y = \alpha + \alpha_1 AGE_{hh} + \alpha_2 EDE_{hh} + \alpha_3 EMPS_{hh} + \alpha_4 HH_{size} + \alpha_5 \ln D_i + \alpha_6 \ln REMT + \alpha_7 ND + \alpha_8 ACC_{hh} + e_{ci} - (C)$ . The P-value of  $ND$  is obtained from the equation-C and then eliminated to develop the following model:  $\ln Y = \alpha + \alpha_1 AGE_{hh} + \alpha_2 EDE_{hh} + \alpha_3 EMPS_{hh} + \alpha_4 HH_{size} + \alpha_5 \ln D_i + \alpha_6 \ln REMT + \alpha_7 ACC_{hh} + e_{di} - (D)$ . The P-value of  $EDE_{hh}$  is retrieved from the equation-D and after elimination, the derived model is the equation 5.2 which is the best fit model.

<sup>58</sup> A model has to be considered to have the best fit if it has the smallest Akaike information criterion (AIC), highest adjusted  $R^2$ , smallest Schwarz information criterion (SIC), lowest sum of squared residual (SSE) and Durbin-Watson (d):  $0 < d < 2$  (Gujarati and porter, 2009). Compared to the F-test, AIC is a more efficient and effective index (Glatting, Kletting, Reske, Hohl & Ring, 2007; Kletting & Glatting, 2009; Kletting, Reske & Glatting, 2009).

Although, overall, the complete model (Equation 5.1) is statistically highly significant, the results (Table 5.26) note that 5 variables (Table 5.28) are individually statistically insignificant. In contrast, after dropping those 5 variables, the results of best fit model (Table 5.29) show that all the variables in the model become individually statistically significant at a range of 1% to 5% level. Hereafter, the best fit model equation is-

$$\ln Y = \alpha + \alpha_1 AGE_{hh} + \alpha_2 EMPS_{hh} + \alpha_3 HH_{size} + \alpha_4 \ln D_i + \alpha_5 \ln REMT + \alpha_6 ACC_{hh} + \pi_i - - - - - (5.2)$$

Table 5.29: Regression results of the best fit model (Equation 5.2)

Model	Dependent variable			
	<i>lnY</i>			
	Coefficient	Standard Error	t-statistics	Prob.
<i>AGE<sub>hh</sub></i>	-0.011753	0.004111	2.859102	0.0054
<i>EMPS<sub>hh</sub></i>	-0.292338	0.126142	2.317538	0.0231
<i>HH<sub>size</sub></i>	-0.134834	0.025814	5.223309	0.0000
<i>ln D<sub>i</sub></i>	0.211237	0.060331	3.501304	0.0008
<i>ln REMT</i>	0.430239	0.075816	5.674799	0.0000
<i>ACC<sub>hh</sub></i>	1.301962	0.273876	4.753831	0.0000
Intercept	4.353916	0.904695	4.812577	0.0000
<i>R</i> <sup>2</sup>	0.581023			
Adjusted <i>R</i> <sup>2</sup>	0.548794			
F-statistic	18.02793			
Akaike information criterion (AIC)	1.198752			
Schwarz information criterion (SIC)	1.399911			
Sum squared residual (SSE)	13.99668			
Durbin-Watson statistics (d)	1.106165			

The adjusted *R*<sup>2</sup> value has slightly decreased in the best fit model. This was expected as increasing the number of variable increases the value of *R*<sup>2</sup> and vice versa. Excepting this criterion, AIC and SIC impose penalties for adding a large number of explanatory variables. In this regard, the AIC, SIC and ‘d’ have gradually attained lower values relative to preceding models. As the ‘d’ value is greater than 0 (zero) but less than 2, there is no autocorrelation in the model. The ultimate outcome of the whole process of

model building is Equation 5.2 which has been used to analyze the influence of income determinants for the aggregated poor and non-poor households in the sample *Haor* villages.

#### **5.4.4 Multivariate regression of income determinants of the *Haor* households**

Both regressions, long and short, allow the assessment of the direction and strength of causality existing between the dependent variable which is the ‘average sample household income’ and the explanatory variables - income determinants identified through theoretical justification. The assessment has been accomplished through observing the effect of one explanatory variable on the dependent variable while holding constant the effects of other independent variables.

In this study, the regression approaches adopted are based on the natural logarithm of average sample household income, dry season income and remittance of household. The transformation of these three types of data into logarithm is helpful to increase the strength of the models by providing consistent variance and fulfilling the central theorem hypothesis (normality assumption). Among these three variables, household ‘average sample household income’ is the only dependent variable as the other two belong to the group of independent variables in the regression models. Although the best fit model (the short regression) has statistically been built up, both regression models are applied in the data analysis because the whole sample has been broken into sub-samples with specific attributes (e.g., labour, landlessness, financial status of household, etc.) to generate a clear picture about the factors influencing the income of those specific study households. Therefore, the regressions are:



$$\begin{aligned}
\ln Y = & \alpha + \alpha_1 AGE_{hh} + \alpha_2 EDE_{hh} + \alpha_3 EMPS_{hh} + \alpha_4 HH_{size} + \alpha_5 GEN_{hh} + \alpha_6 \ln D_i \\
& + \alpha_7 \ln REMT + \alpha_8 ND + \alpha_9 LAND_{hh} + \alpha_{10} ACC_{hh} + \alpha_{11} ACCFG_{hh} + e_i \\
& \text{--- (5.1: Long regression) and}
\end{aligned}$$

$$\begin{aligned}
\ln Y = & \alpha + \alpha_1 AGE_{hh} + \alpha_2 EMPS_{hh} + \alpha_3 HH_{size} + \alpha_4 \ln D_i + \alpha_5 \ln REMT + \alpha_6 ACC_{hh} \\
& + \pi_i \text{--- (5.2: Short regression )}
\end{aligned}$$

The identification of all these variables are given in Table 4.5 with the exception of the error terms  $e_i$  and  $\pi_i$  which satisfy the assumptions of –

(i) zero mean,  $E(e_i) = 0$ ;  $E(\pi_i) = 0$

(ii) constant variance,  $E(e_i)^2 = \sigma e^2$ ;  $E(\pi_i)^2 = \sigma \pi^2$

(iii) no autocorrelation exist in the error  $e_i$  and  $\pi_i$ ;  $E(e_{ij}) = 0$  and  $E(\pi_{ij}) = 0$ ; where  $i \neq j$

Both the regressions are log-linear models (Gujarati, 2003) because the regressand (average sample household income) and two regressors (dry season income and remittance of household) appear in logarithmic form. Gujarati (2003) states that this type of model can be estimated easily using the OLS (Ordinary Least Square) regression method. However, the coefficients of these variables require careful interpretation. The coefficients attached to two independent variables (dry season income and remittance of household) are interpreted as the elasticity of the ‘average sample household income’ with respect to that two variables. Since the natural logarithmic form of dependent variables is considered in both models, the estimated coefficients<sup>59</sup> attached to the independent variables other than dry

---

<sup>59</sup> In other word, it can be said that the estimated coefficient of any independent variable measures the percentage change in ‘average sample household income’ of household from a unit change in that independent variable.

season income and remittances, should be interpreted as the ‘average sample household income’ of household increase or decrease at a percentage rate of that attached coefficients.

Along with the estimation of percentage change, in case of dummy variables such as  $ACC_{hh}$  (household’s accessibility to public credit facilities), the ‘intercept’ and the ‘slope’ coefficient would be interpreted such that the intercept provides the median ‘average sample household income’ of the household and the slope coefficient provides the difference in the median ‘average sample household income’ of two types of households who can or not access public credit facilities.

#### **5.4.5 The empirical results**

The cross sectional data collected from 292 households through a one-off primary survey are used to estimate the two regression models. To identify the variation in the strength of the income determinants, expected relationships between the dependent and independent variables and quantify those relationships with maximum information, the analysis comprises seven parts:

- (A) Analysis of the whole sample in the 5 sample villages;
- (B) Analysis on the basis of engaging in occupation in crop cultivation when the household head is a labourer;
- (C) Analysis on the basis of owning natural asset when the household head is landless;
- (D) Analysis on the basis of household financial status above the upper poverty line (non-poor households);

(E) Analysis on the basis of household financial status below the upper poverty line (poor households in aggregate);

(F) Analysis on the basis of household financial status below the upper poverty line but above the lower poverty line (moderately poor households);

(G) Analysis on the basis of household financial status below the lower poverty line (extremely poor households).

The results of these analyses are reported in Tables 5.30-5.36.

#### **A. The whole sample**

The results of the whole sample consisting of 292 households show the explanatory power of both long and short regression equations measured by adjusted  $R^2$  (hereafter  $R^2$ ) values which are statistically significant and high. Table 5.30 reveals that the  $R^2$  values for long and short regression equations are about 0.5312 and 0.5487, respectively. The test results of overall significance, F-test, are also statistically highly significant at the 1% level in both regression equations. Table 5.30 shows that five variables are statistically insignificant in the long regression whereas the range of significance levels of the rest of the six variables varies between 1% to 5% levels in both equations. Except for education ( $EDE_{hh}$ ) and landholding of household ( $LAND_{hh}$ ), the signs of the all other variables in the long regression are found as expected while these two variables are not statistically significant and rather negatively associated. The average education level in the *Haor* area is below primary level which contributes to the income erosion of the aggregated poor *Haor* households. Descriptive statistics (Table 5.9: Education level of HH head and poverty) indicate that 18.2% of households with uneducated heads are not poor and, in contrast, 69%

of households heads having primary level education are poor. This happens because the average level of education shows a negative relationship with household income (Jolliffe, 2002).

The household's accessibility to public credit ( $ACC_{hh}$ ), age of the household head ( $AGE_{hh}$ ), size of the household ( $HH_{size}$ ), dry season income ( $D_i$ ) and remittance ( $REMT$ ) are statistically significant at the 1% level in both the regressions. The employment status of household head ( $EMPS_{hh}$ ) is found significant at the 5% level in both the regressions.

## **B. Labour households**

Table 5.31 reports the regression results for the sub-sample of household heads who work as labourers during the dry season crop. Of the aggregate 292 households, 72 households are identified as the labour households for which the results of both the long and short regressions are given in Table 5.31. The variable ( $ACC_{hh}$ ) is not reported on the results because of collinearity problem (Eviews 6 User Guide II, 2007)<sup>60</sup>. The  $R^2$  values (0.6956 and 0.7024 in the long and short regressions, respectively) are significantly high and the joint test of significance, i.e., F-test is found significant at the 1% level.

Except the variable education ( $EDE_{hh}$ ) and landholding of household ( $LAND_{hh}$ ) in the long regressions, the signs of all other explanatory variables are found identical to expectations in two regression equations. The  $LAND_{hh}$  variable has a negative sign with a very small coefficient value (-0.000199) which may mean that the most of labour households are landless and for them crop cultivation, if they have a small size of land or are sharecroppers, often increases risks to household's income. The risks arise through (i)

---

<sup>60</sup> According to discussion available in the Eviews 6 User Guide II (2007) (Chapter 24: Basic Regression, page 21-22), the dummy variable ( $ACC_{hh}$ ) and the constant term are collinear. Therefore, this variable is dropped from the regression to estimate the equation specifically for the group of labor households.

increasing debts as the labour households have to borrow from informal rural credit sources to finance the cultivation process; (ii) own cultivation increases the opportunity costs of labouring in other farms; (iii) not having access to public agriculture subsidies and irrigation facilities and (iv) the crop is often vulnerable to flashfloods, hailstorms and droughts.

The variables ( $AGE_{hh}$ ,  $HH_{size}$ ,  $D_i$  and  $REMT$ ) are statistically significant at the 1% level in two models.  $EDE_{hh}$  and  $LAND_{hh}$  remain non-significant in the long regression of sub-sample (72 households) (Table 5.31) as these variables were in the long regression of the whole sample (292 households) (Table 5.30).

Interestingly, the household head's employment status ( $EMPS_{hh}$ ) is significant at the 5% level in both models for the whole sample but becomes non-significant for the sub-sample (labour household group). The possible reasons for such findings are (i) the labour households cannot find year round employment in the agriculture sectors as the annual monsoonal deluge interrupts crop cultivation; (ii) earning wages is not enough to manage the family let alone generate savings; (iii) labourers are not always given the contract salary as flashfloods ruin the employer's (farmer's) crops.

The coefficient value of  $D_i$  is large and significant at the 1% level in both regression equations (Table 5.31) and is obvious for the people living in the *Haor* ecosystem. Working as a daily wage labourer in the agriculture sector is the main source of livelihood and income in the rural area of Bangladesh in general and the *Haor* area in particular given its ecological characteristics. The coefficient of dry season income means that 1% increase in dry season income contributes a 0.22% increase in the household's 'average sample household income' when the result of long regression is considered and household's

‘average sample household income’ goes up by about 0.20% when the result of short regression is taken into account.

The coefficient value of *REMT* is very large and highly significant at the 1% level in both regressions leading to seasonal migration by most of the labour households during the long monsoonal deluge. The large coefficient value indicates that the elasticity of ‘average sample household income’ with respect to earning remittance is about 0.51 in the both regression, suggesting that if household remittance increases by 1%, on average, the ‘average sample household income’ of the household increases by about 0.51%. Therefore, it can be concluded that remittance is very responsive to changes in household’s average income. Being dependent on monocropping and inaccessible to the *beels*, the wet season *in situ* income is too small to overcome seasonal food shortage for the labour households. In such cases, seasonal migration can become a potential income source to maintain families left behind; otherwise they have to resort to borrowing from local informal financial sources increasing debt burdens.

### **C. Landless households**

The regression results in Table 5.32 are based on the sub-sample of 170 landless households. The multiple coefficient of determination,  $R^2$ , is significantly high in both regressions ( $R^2 = 0.62$ ) and means that, for the long regression, about 62% of the variation in ‘average sample household income’ of landless household is explained by the considered explanatory variables on the right hand side of the regressions. Some parts of the variations remain unexplained in both regressions due to some unobserved variables. For both the regression equations, the F-test is statistically significant at the 1% level.

The empirical findings suggest that the variables ( $HH_{size}$ ,  $ACC_{hh}$ ,  $D_i$  and  $REMT$  are significant at the 1% level and associated with correct signs in both regressions as expected. The  $EMPS_{hh}$  is found non-significant in the long regression equation but becomes significant at the 10% level in the short regression equation. The reason may be that the landless household heads are mostly wage labourers and the prevailing daily wages in rural agriculture sector is not adequate to manage a *Haor* household.

One important result is the variable  $EDE_{hh}$  which is not significant in the long regression of whole sample (Table 5.30) but becomes significant at the 10% level and has an unexpected negative sign in the long regression of the sub-sample (Table 5.32). Similar associations between education and income have been reported by other studies (Jolliffe, 2002). This result implies that education alone fails to provide any advantage to the landless since the non-farm sector is non-existent in the *Haor* area. The landless educated household head cannot obtain relatively less labourious wage work in the agriculture sector in the *Haor* area. Because of capital deficiencies, they are unable to realize an advantage from having a traditional formal education.

The value -0.1608 is the partial regression coefficient of  $EDE_{hh}$  which indicates that, *ceteris paribus*, as the qualification of education of landless household heads increases by 1 level, on average, the ‘average sample household income’ of the landless household goes down by 0.1608 units. Such households cannot afford education expenditures and have had to engage in income earning activities since childhood. As Kam *et al.* (2005) state, the average 4.3 years schooling of household heads does not facilitate considerable income increments and poverty reduction.

Another important result is shown by the variable  $ACC_{hh}$  which is highly significant and implies that accessibility to public credit contributes much to the ‘average sample household income’ of landless households. As the  $ACC_{hh}$  is a qualitative variable, i.e., a dummy variable, the economic interpretations of the ‘intercept’ of the regression equation and ‘slope’ coefficient of  $ACC_{hh}$  are as follows for the short regression: the median ‘average sample household income’ of landless household who do not have access to public credit facilities is 11.99775 [antilog of intercept coefficient (2.484719)] and the amount 38.97077 [sum up of antilog of both intercept and variable coefficients (2.484719 + 1.178093)] is the median ‘average sample household income’ of landless household who have access to the public credit system. Thus, the median ‘average sample household income’ of the landless households having access to the public credit system is higher by 69.21347% compared to the equivalent households not having access to public credit systems ( $38.97077 - 11.99775 = 26.97303/38.97077 \times 100 = 69.2135\%$ ).

#### **D. Non-poor households**

The regression results of 79 non-poor households are illustrated in Table 5.33. Two variables ( $GEN_{hh}$  and  $ACC_{hh}$ ) are not reported on the results because of multicollinearity problem (Eviews 6 User Guide II, 2007)<sup>61</sup>. The  $R^2$  values, which are 0.73 and 0.78 in the long and short regressions, respectively, are fairly high and the F-test is statistically significant at the 1% level. Only one variable-  $HH_{size}$  - is significant at the 1% level in both regressions. This is a practical finding similar to other studies (e.g., Rahman, 1996a; Kabeer, 2004).

---

<sup>61</sup>According to discussion available in the Eviews 6 User Guide II (2007) (Chapter 24: Basic Regression, page 21-22), the dummy variables ( $GEN_{hh}$  and  $ACC_{hh}$ ) and the constant term are collinear. Therefore, these variables are dropped from the regression to estimate the equation specifically for the group of non-poor households.



Among the non-significant variables,  $AGE_{hh}$ ,  $EMPS_{hh}$ ,  $D_i$  and  $REMT$  show expected signs in both regressions. The variables -  $EMPS_{hh}$  and  $ND$  in the long regression have a negative association with ‘average sample household income’ of non-poor households which is as expected. But  $LAND_{hh}$  and  $ACCFG_{hh}$  have a negative association in the long regression, which is opposite of expectations. Since these relationships are incongruent (incompatible) to the usual income hypotheses, an explanation is required.

The negative association of  $LAND_{hh}$  is probably linked to the ecological characteristics of the *Haor* area. The recurrent flashfloods cause crop damage and increase debt burdens. The risks and benefits of crop cultivation in the *Haor* ecosystem move alongside each other. It is very rare in the *Haor* area that farmers have cash savings: thus, they usually borrow to finance the cultivation process corresponding to farm size. Thus, a single occurrence of a flashflood thrusts a household into a dismal state which takes four or five good harvests to overcome.

The variable  $ACCFG_{hh}$  has a negative relationship with the ‘average sample household income’ of non-poor households. It may mean that fishing generates low income relative to the opportunity costs of involving cash capital and labour. Another indication of this is that the fishing household heads increase from only 1 % in the dry season to 4.5% in the wet season reflecting its lack of priority as a productive activity for the non-poor households.

### **E. Poor in aggregate**

The estimates given in Table 5.34 correspond to the data on 213 poor (including both moderately and extremely poor) households. The values of  $R^2$ , 0.58 and 0.57 in the long

and short regressions, respectively, are high and overall both the regressions are statistically significant at the 1% level.

The variables  $AGE_{hh}$ ,  $HH_{size}$ ,  $ACC_{hh}$ ,  $D_i$  and  $REMT$  are significant at the 1% level in both regression equations. In the long regression,  $EMPS_{hh}$  is significant at the 10% level which becomes significant at the 5% level in the other regression which is the best fit model.

Except  $EDE_{hh}$  and  $LAND_{hh}$ , other variables' coefficients have correct signs of association.  $ACCFG_{hh}$  is positively related, although not significant, to the dependent variable which is expected and may imply that the fishing income can contribute much to the per capita income. During the monsoonal deluge, given the *Haor* region's ecological attributes, fishing could be ascribed as a rich source of alternative income to substitute dry season crop income. During the fishing season, the poor have access to rivers, canals and *khas* land in the *Haor* areas. However, the harvest from the ebb-tide and perennial rivers, which are open to all and has been extensively exploited, does not sufficiently minimize the opportunity cost of labour let alone investments in the activity, making the variable insignificant to the household income of the poor. The variable  $ACCFG_{hh}$  would be significant if the poor can have access to *beels* which are leased out to the people who are politically aligned to the ruling party and have money and connections to the bureaucrats.

Another important result is that the variable  $ACC_{hh}$  is significant at the 1% level in both regressions implying that accessibility to public credit contributes much to the annual per capita income of poor households. As the  $ACC_{hh}$  is a qualitative, i.e., dummy, variable, the economic interpretations of the 'intercept' of the regression equation and 'slope' coefficient of  $ACC_{hh}$  in the both regressions can be described as given below.

For the long regression, the median ‘average sample household income’ of poor households who do not have access to public credit facilities is 18.16528 (antilog of 2.899512) and the amount 66.78724 (antilog of 2.899512 + 1.30200) is the ‘average sample household income’ of poor households who have access to public credit system. Thus, the median ‘average sample household income’ of the poor households having access to public credit system is higher by 39.58851% compared to the household with no access to the public credit system ( $66.78724 - 18.16528 = 48.62196/66.78724 * 100 = 39.58851\%$ ).

For the short regression, the median ‘average sample household income’ income of poor households who do not have access to public credit facilities is 25.76948 (antilog of 3.249191) and the amount 82.06741 (antilog of 3.249191 + 1.15835) is the median ‘average sample household income’ of poor households who have access to public credit system. Thus, the median ‘average sample household income’ of the poor households having access to public credit system is higher by 50.66703% compared to the households not having access to the public credit system ( $82.06741 - 25.76948 = 56.29793/82.06741 * 100 = 50.66703\%$ ).

## **F. Moderately poor**

Table 5.35 reports the results of two regressions based on 84 moderately poor households in the 5 study villages. Three variables ( $GEN_{hh}$ ,  $ACC_{hh}$  and  $ACCFG_{hh}$ ) are not reported in the results because of collinearity problem (Eviews 6 User Guide II, 2007)<sup>62</sup>. The  $R^2$  values are high enough and, overall (F-test), both regression models are statistically significant at the 1% level.

---

<sup>62</sup>According to discussion available in the Eviews 6 User Guide II (2007) (Chapter 24: Basic Regression, page 21-22), the dummy variables ( $GEN_{hh}$ ,  $ACC_{hh}$  and  $ACCFG_{hh}$ ) and the constant term are collinear. Therefore, these variables are dropped from the regression to estimate the equation specifically for the group of moderately poor households.

Four variables ( $AGE_{hh}$ ,  $EDE_{hh}$ ,  $EMPS_{hh}$  and  $ND$ ) are non-significant in the long regression and, among these four variables,  $AGE_{hh}$  and  $EMPS_{hh}$  also remain non-significant in the short regression.  $D_i$  and  $REMT$  are statistically significant at the 1% level in both models.  $HH_{size}$  is significant at the 1% and 5% levels in the long and short regressions, respectively.

Household land holding ( $LAND_{hh}$ ) is statistically significant at the 10% level in the long regression. In the short regression, all the explanatory variable's, except  $EMPS_{hh}$ , coefficients have correct signs. The rationality of such a finding is that 50.5% of the moderately poor households are small to marginal farmers. Along with cultivating their own land, most of them are engaged in sharecropping. This group is also poor in human capital and 33.3% of them work as daily labourers. Given their precarious economic status, they are neither capable of accumulating assets nor have sufficient financial capability to take entrepreneurial risks in non-farm investment. They are forced to sustain their livelihoods in the traditional economic sectors with its vulnerabilities. For example, flashfloods cause asset and income erosion and increase debts; thus, cultivating land has a negative association with the 'average sample household income' of the moderately poor *Haor* households.

### **G. Extremely poor**

Table 5.36 shows the long and short income regressions of 129 extremely poor households in the five *Haor* villages identifying their most important income determinants.

The  $R^2$  values in the two regression equations are statistically high and overall the equations are statistically significant at the 1% level. In both regressions,  $AGE_{hh}$ ,  $HH_{size}$ ,

$ACC_{hh}$ ,  $D_i$  and  $REMT$  are significant at the 1% level and  $EMPS_{hh}$  is significant at the 5% level. The variables  $EDE_{hh}$  and  $ND$  are significant at the 5% and 10% levels, respectively in the long regression equation.  $GEN_{hh}$ ,  $LAND_{hh}$  and  $ACCFG_{hh}$  are the non-significant variables in long regression. All the explanatory variables have the correct signs in the short regression equation which is the best fit model. This equation is also the best fit model for the whole sample and the poor group of people.

Except three variables,  $EDE_{hh}$ ,  $ND$  and  $LAND_{hh}$ , all other variables in the long regression equation have the expected signs. These associations are unexpected and require logical explanation.

The descriptive statistics show that 2.3% of the extremely poor households are fishermen during the dry season but their numbers increase to 27.1% during the wet season. This implies that the annual monsoonal deluge extends the scope of fishing opportunities for the extremely poor households who cannot afford the risk of searching livelihoods elsewhere. Fishing as an income diversification strategy is obviously more productive than remaining unemployed as farming becomes impossible in the wet season which also opens up new employment prospects in boating (ferries) and transportation (trawler service) activities; also, more of the extremely poor household heads, compared to the dry season, find livelihoods in artisanal and business activities in the wet season.

Although the annual deluge increases unemployment, the qualitative data reveal that the extremely poor cannot be unemployed even for one day. Thus, 27.9% of the extremely poor households choose domestic migration elsewhere for a short 2-4 month period which brings in remittance income ( $REMT$ ) which is found significant at the 1% level.

The variable  $LAND_{hh}$  is not significant which is obvious, as 49% of all sample households and 64.5% of the extremely poor households are landless. Along with this insignificant relationship, the negative association of  $LAND_{hh}$  can be explained by the ecological vulnerabilities. These households live under a precarious agricultural regime where the mature monocrop has often been damaged by flashfloods. Although the extremely poor large landowner ( $>749$  decimals) can access the public credit system, they probably could not reschedule their previous loans resulting from crop failure.

To sustain the family and repay previous debts to informal credit sources, these households pawn their cultivable lands which the recurrence of flashfloods prevents them from redeeming; worse, they fall even deeper into debt and mortgage more land. Recovering the loss from one year's flashfloods requires 4-5 years of good harvests which happens rarely as flashfloods can recur within that period. This happens despite the existence of laws in Bangladesh outlawing the mortgaging of farmland to informal moneylenders.

The variable 'household's accessibility to common fishing ground' ( $ACCFG_{hh}$ ) is not significant probably due to its insignificant contribution to the household's 'average sample household income'. However, it may become significant if the annual net income of the household is considered on the left hand side of the long regression for the extremely poor households.

The long natural deluge ( $ND$ ) is statistically significant at the 10% level in the long regression. The low coefficient value means that this variable does not contribute considerably to average income. Overall, many extremely poor household heads cannot

afford to search for livelihood alternatives elsewhere. They diversify their income sources and resort to *in situ* fishing in a ‘better than nothing’ strategy.

The median ‘average sample household income’ of the extremely poor households affected by the monsoonal deluge is 61.21976 (antilog of 4.11447) and the amount 92.31577 (antilog of  $4.11447 + 0.410745$ ) is the median ‘average sample household income’ of the extremely poor households not affected by deluge. Thus, the median ‘average sample household income’ of the extremely poor households not affected by deluge is higher by 26.00017% compare to the households affected by the deluge ( $92.31577 - 61.21976 = 31.09601/92.31577 * 100 = 26.00017\%$ ).

The variable  $ACC_{hh}$  is statistically significant at the 1% level in both regressions. The very large values of coefficients, for both regressions, imply that accessibility to public credit contributes much to the ‘average sample household income’ of the extremely poor households.

For the long regression, the median average sample household income of the extremely poor households who do not have access to public credit facilities is 61.23384 (antilog of 4.11470) and the amount 287.9811 (antilog of  $4.11470 + 1.548195$ ) is the median ‘average sample household income’ of the extremely poor households who have access to the public credit system. Thus the median average sample household income of the extremely poor households having access to the public credit system is higher by 78.60994 % compare to the households not having access to the public credit system ( $287.9811 - 61.23384 = 226.7473/287.9811 * 100 = 78.60994\%$ ).

For the short regression, the median average sample household income of the extremely poor households who do not have access to public credit facilities is 75.14879 (antilog of 4.319470) and the amount 289.3069 (antilog of  $4.319470 + 1.348018$ ) is the median average sample household income of the extremely poor households who have access to the public credit system. Thus, the median average sample household income of the extremely poor households having access to the public credit system is higher by 74.02454% compared to the household not having access to the public credit system ( $289.3069 - 75.14879 = 214.1581/289.3069 \times 100 = 74.02454\%$ ).

The variable  $EMPS_{hh}$  is statistically significant at the 5% level in both regressions. The negative sign and low value of the coefficient in both regressions imply that wage labour in agriculture is a low income profession. The daily wages are insufficient to manage households and the contribution of wage labour to the average sample household income of the extremely poor households is on a down trend. The people in other occupations are comparatively better off than the wage labour in the agricultural sector.

For the long regression, the median average sample household income of the extremely poor households whose head does not work as a wage labourer in agriculture is 61.21976 (antilog of 4.11447) and the amount 45.97478 [antilog of  $4.11447 + (-0.28638)$ ] is the median 'average sample household income' of the extremely poor household whose head works as a labourer in agriculture. Thus, the median average sample household income of the extremely poor households headed by a wage labourer is lower by 87.1847% compared to the households whose head is engaged in other occupations ( $45.97478 - 61.21976 = -15.245/45.97478 \times 100 = -87.1847\%$ ).



For the short regression, the median average sample household income of the extremely poor households whose head does not work as an agricultural labourer is 75.14879 (antilog of 4.319470) and the amount 56.40608 [antilog of  $4.31947 + (-0.286893)$ ] is the median average sample household income of the extremely poor households whose head works as a labourer in agriculture. Thus, the median average sample household income of the extremely poor households headed by a wage labourer is lower by 33.228% compared to the households whose head is engaged in other occupations ( $56.40608 - 75.14879 = -18.7427/56.40608 \times 100 = -33.228\%$ ).

Table 5.30: Determinants of average sample household income: Log-linear regression results of the 5 *Haor* villages, 2010

Model	Dependent variable			
	Average sample household income			
	Long regression		Short regression	
	Coefficient	t-statistics	Coefficient	t-statistics
$AGE_{hh}$	-0.011372	2.6863***	-0.011753	2.8591***
$EDE_{hh}$	-0.074836	1.1277		
$EMPS_{hh}$	-0.273014	2.0859**	-0.292338	2.3175**
$HH_{size}$	-0.136465	5.0904***	-0.134834	5.2233***
$GEN_{hh}$	-0.055416	0.1700		
$\ln D_i$	0.221957	3.4663***	0.211237	3.5013***
$\ln REMT$	0.418413	5.2912***	0.430239	5.6747***
$ND$	-0.058322	0.3877		
$LAND_{hh}$	-7.08E-06	0.0420		
$ACC_{hh}$	1.298704	4.3771***	1.301962	4.7538***
$ACCFG_{hh}$	0.013226	0.0386		
Intercept	4.478367	4.4078***	4.353916	4.8125***
$R^2$	0.5926		0.5810	
Adjusted $R^2$	0.5312		0.5487	
F-statistics	9.65		18.02	
Observation	292		292	
Note: ***/** significance at 1% and ** significance at 5% respectively				

Table 5.31: Determinants of average sample household income: Log-linear regression results of daily labour headed households in the 5 *Haor* villages, 2010

Model	Dependent variable			
	average sample household income			
	Long regression		Short regression	
	Coefficient	t-statistics	Coefficient	t-statistics
$AGE_{hh}$	-0.009959	2.5926***	-0.010066	2.6962***
$EDE_{hh}$	-0.055909	0.7979		
$EMPS_{hh}$	-0.197829	1.4225	-0.198851	1.4569
$HH_{size}$	-0.123577	4.0558***	-0.119086	4.0021***
$\ln D_i$	0.215421	2.7261***	0.195915	2.6548***
$\ln REMT$	0.510177	6.3590***	0.510203	6.4980***
$LAND_{hh}$	-0.000199	0.5699		
Intercept	3.362489	3.0223***	3.492043	3.2335***
$R^2$	0.7808		0.7619	
Adjusted $R^2$	0.6956		0.7024	
F-statistics	9.1627		12.8023	
Observation	72		72	
Note: *** significance at 1%				

Table 5.32: Determinants of average sample household income: Log-linear regression results of landless households in the 5 *Haor* villages, 2010

Model	Dependent variable			
	Average sample household income			
	Long regression		Short regression	
	Coefficient	t-statistics	Coefficient	t-statistics
$AGE_{hh}$	-0.008611	1.8642*	-0.010114	2.2056**
$EDE_{hh}$	-0.160837	1.7210*		
$EMPS_{hh}$	-0.204863	1.4777	-0.227060	1.6647*
$HH_{size}$	-0.132251	4.8815***	-0.129597	4.8731***
$GEN_{hh}$	-0.153734	0.5249		
$\ln D_i$	0.307481	3.1403***	0.328260	3.4132***
$\ln REMT$	0.507905	6.0491***	0.494979	6.1751***
$ND$	0.196848	1.0834		
$LAND_{hh}$	0.006886	1.2415		
$ACC_{hh}$	1.093077	3.5736***	1.178093	4.0987***
$ACCFG_{hh}$	0.095271	0.2300		
Intercept	2.528731	2.1239**	2.484719	2.1751**
$R^2$	0.7023		0.6624	
Adjusted $R^2$	0.6225		0.6184	
F-statistics	8.7963		15.04	
Observation	170		170	
Note: ***/**/* significance at 1%, significance at 5% and significance at 10% respectively				

Table 5.33: Determinants of average sample household income: Log-linear regression results of non-poor households in the 5 *Haor* villages, 2010

Model	Dependent variable			
	Average sample household income			
	Long regression		Short regression	
	Coefficient	t-statistics	Coefficient	t-statistics
$AGE_{hh}$	0.010338	0.6437	-0.005970	0.6988
$EDE_{hh}$	0.031934	0.1408		
$EMPS_{hh}$	-0.527266	1.5929	-0.469223	1.6549*
$HH_{size}$	-0.342938	4.9112***	-0.305037	5.2700***
$\ln D_i$	0.116495	1.3685	0.118547	1.5584
$\ln REMT$	0.417968	1.4036	0.280627	1.4818
$ND$	-0.329635	1.2763		
$LAND_{hh}$	-0.000431	1.0301		
$ACCFG_{hh}$	-0.355662	0.6398		
Intercept	6.360231	2.1361**	7.607960	3.9844***
$R^2$	0.8958		0.8550	
Adjusted $R^2$	0.7395		0.7825	
F-statistics	5.7321		11.7968	
Observation	79		79	
Note: ***/**/* significance at 1% ; significance at 5% and significance at 10% respectively				

Table 5.34: Determinants of average sample household income: Log-linear regression results of aggregated poor households in the 5 *Haor* villages, 2010

Model	Dependent variable			
	Average sample household income			
	Long regression		Short regression	
	Coefficient	t-statistics	Coefficient	t-statistics
$AGE_{hh}$	-0.011273	2.6906***	-0.011119	2.6666***
$EDE_{hh}$	-0.103363	1.6248		
$EMPS_{hh}$	-0.234036	1.8284*	-0.251065	1.9825**
$HH_{size}$	-0.109067	4.0876***	-0.108021	4.1454***
$GEN_{hh}$	-0.282027	0.9602		
$\ln D_i$	0.365045	4.3636***	0.306774	3.9891***
$\ln REMT$	0.412162	5.3785***	0.416989	5.5211***
$ND$	0.155441	0.8640		
$LAND_{hh}$	-0.000188	0.8971		
$ACC_{hh}$	1.302000	4.5197***	1.158350	4.5325***
$ACCFG_{hh}$	0.325950	0.7294		
Intercept	2.899512	2.6251***	3.249191	3.2495***
$R^2$	0.6533		0.6136	
Adjusted $R^2$	0.5864		0.5763	
F-statistics	9.7654		16.41	
Observation	213		213	
Note: ***/**/* significance at 1%, significance at 5% and significance at 10% respectively				

Table 5.35: Determinants of average sample household income: Log-linear regression results of moderately poor households in the 5 *Haor* villages, 2010

Model	Dependent variable			
	Average sample household income			
	Long regression		Short regression	
	Coefficient	t-statistics	Coefficient	t-statistics
$AGE_{hh}$	0.005248	0.6968	-0.000319	0.0462
$EDE_{hh}$	-0.007071	0.0656		
$EMPS_{hh}$	-0.128299	0.2789	0.015890	0.0359
$HH_{size}$	-0.177510	2.7696***	-0.140142	2.3204**
$\ln D_i$	0.406972	3.0947***	0.397397	3.0809***
$\ln REMT$	0.563167	4.7599***	0.611925	5.6725***
$ND$	-0.098557	0.3415		
$LAND_{hh}$	-0.001664	1.7587*		
Intercept	0.688568	0.3344	0.090605	0.0495
$R^2$	0.7226		0.5860	
Adjusted $R^2$	0.5921		0.3482	
F-statistics	5.5372		8.0792	
Observation	84		84	
Note: ***/**/* significance at 1%, significance at 5% and significance at 10% respectively				

Table 5.36: Determinants of average sample household income: Log-linear regression results of extremely poor households in the 5 *Haor* villages, 2010

Model	Dependent variable			
	Average sample household income			
	Long regression		Short regression	
	Coefficient	t-statistics	Coefficient	t-statistics
$AGE_{hh}$	-0.014639	2.6440***	-0.016868	3.0203***
$EDE_{hh}$	-0.156179	2.0295**		
$EMPS_{hh}$	-0.286377	2.0972**	-0.286893	2.0267**
$HH_{size}$	-0.104425	3.5687***	-0.099085	3.2720***
$GEN_{hh}$	-0.448095	1.5007		
$ln D_i$	0.389472	3.6769***	0.303014	3.1257***
$ln REMT$	0.256563	2.4697***	0.321326	2.9984***
$ND$	0.410745	1.8120*		
$LAND_{hh}$	-0.000147	0.6366		
$ACC_{hh}$	1.548195	5.1263***	1.348018	4.8633***
$ACCFG_{hh}$	0.644484	1.4006		
Intercept	4.114470	3.1447***	4.319470	3.5174**
$R^2$	0.7460		0.6593	
Adjusted $R^2$	0.6560		0.6025	
F-statistics	8.2812		11.61	
Observation	129		129	
Note: ***/**/* significance at 1%, significance at 5% and significance at 10% respectively				

#### 5.4.6 Conclusion

As poverty and income retain a strong correlation (Aikaile, 2010; Chaudhry, 2003), an empirical analysis is conducted to identify the most important micro-determinants that influence income of the different types of the study households. Since the *Haor* community is not homogenous in their attributes, the strength and combination of micro-determinants vary with household characteristics and financial status. The results of the econometric analysis shows that the six variables - accessibility to public credit, remittances, dry season income, household size, employment status and age of household head - are the most important determinants of the ‘average sample household income’ in the study villages.

For the labour households,  $D_i$  and  $REMT$  are positively and  $AGE_{hh}$  and  $HH_{size}$  are negatively providing significant contributions to the average income. Although not significant, the negative association of the variable  $EMPS_{hh}$  indicates that labouring in farm activities is not well remunerated and encourages employment diversification.

All six variables significantly influence the average income of landless households. The variables  $D_i$ ,  $REMT$  and  $ACC_{hh}$  increase income whereas the rest work in the opposite direction. Thus,  $EDE_{hh}$  does not contribute to increasing the income of landless household as reported by A. U. Ahmed (2004).

The results show that  $HH_{size}$  is the only variable that affects, though negatively, the income of non-poor households, while all the 6 variables strongly influence the aggregated poor household income in the study villages. Both regressions (long and short) postulate similar results for the respective households types. But contrasts emerge in the results after dividing the aggregated poor into moderately and extremely poor households.

In the short regression,  $D_i$  and  $REMT$  have positive and  $HH_{size}$  has negative effects on the average income of the moderately poor households. But, ownership of cultivable land ( $LAND_{hh}$ ), in the long regression negatively affects the income of moderately poor households as observed by Minot *et al.* (2003). It implies the high risk of crop cultivation to climatic (e.g., hailstorms, dry weather) and ecological factors (e.g., flashfloods and their recurrent nature). These risks compound ecological vulnerabilities by damaging crops and increasing debt burdens the recovery from which requires 4-5 years of consecutively good harvests which rarely occurs in the *Haor* ecosystem.



The average income of extremely poor households is strongly influenced by all six variables in the short regression. This finding is similar to the results of the long regression excepting the recognition of the contributions accruing from the natural annual deluge (*ND*). The natural annual deluge (*ND*) significantly affects the average income of the extremely poor household in the study villages. As they are mostly uneducated and financially incapable to invest in market mediation and seasonal petty trading, they resort to fishing immediately after returning to the village from their seasonal migration. Although the amount of daily catch is not enough to manage a household, this contribution of the natural monsoonal deluge is significant to the average income of the extremely poor households.

## **5.5 Dynamics of poverty in the *Haor* area**

This section links with the preceding discussions in understanding the poverty phenomenon in the *Haor* area generally. In particular, it highlights the dynamics of poverty by investigating the issues of ecological vulnerability and their impact on livelihoods, asset endowment, the transformation structure and processes involved in the formal and informal social systems and processes, together with the livelihood diversification strategies. The overarching framework used is the sustainable livelihoods analysis (SLA).

### **5.5.1 Purposes of using SLA**

The main objective of using SLA is to comprehend the poverty dynamics in the *Haor* area which a one-off cross-sectional data gathering approach cannot hope to capture. SLA is purposively selected in this poverty study for two reasons: (a) to overcome the limitation of cross-sectional data, and (b) as an alternative to panel data which is unavailable. SLA is an

effective tool to explore the dynamics of poverty from the perspective of the community's perceptions and experiences and to explore the causes rather than the symptoms of poverty (Mukherjee *et al.*, 2002; Ashley *et al.*, 2000). Failure to formulate targeted interventions based on causes makes poverty reduction strategies ineffective.

### **5.5.2 Technique of analysis**

As SLA is a qualitative analytical framework, the following techniques are used in this study:

#### **A. Identification of the poor**

The SLA itself does not offer any indication of how to identify poor and different approaches have been used by scholars. To investigate the dynamics of poverty in the *Haor* area, household poverty is primarily linked to financial strength and capability as, described in Chapter 4.

#### **B. Historical timelines**

From independence from Great Britain in 1947 to 1970, the present 'Bangladesh' was a part of the Pakistan named 'East Pakistan' during which the environmental context and dynamics (population, resource availability and accessibility, social relationships, culture, relationship between religious groups, etc.) were markedly different from the current situation and were grounded on different idealistic platforms. This timeframe is the '1<sup>st</sup> period' in this analysis.

After a long nine-month war with Pakistan, Bangladesh gained Independence. The first two decades saw the country experiencing political turmoil, violence and marshal law

that hindered all development initiatives and negatively impacted overall livelihoods. This timeframe 1971-1990 is the ‘2<sup>nd</sup> period’ in this analysis.

Between 1991-2010, Bangladesh returned to democracy badly scarred by infighting among the political leadership again affecting development processes and economic progress; this is the ‘3<sup>rd</sup> period’ in this analysis.

The six decade-long historical timeline is selected in this study for two reasons: (a) no relevant data on the dynamics of poverty in the *Haor* area are available, and (b) an understanding of the contemporary poverty situation of any community can be obtained from the perspective of past experience (Mukerjee *et al.*, 2002).

### **C. Trend analysis**

In the last 6 decades, the *Haor* people’s livelihood has been examined through varying approaches: their trends over time can provide some understanding of the dynamics of poor households.

### **D. Livelihood asset analysis**

This type of analysis is conducted for the moderately and extremely poor households since their asset endowment and accessibility correspond with their poverty status.

### **E. *In situ* institutional analysis**

This relates to the major local institutions recognized by the poor people and affecting their livelihoods.

### 5.5.3 Context of vulnerability

The livelihoods of the poor households are often vulnerable to either some observed or dormant factors; it is contextual as the struggle involved varies by different characteristics (e.g., gender, age, religion, financial status, etc.) of social groups. Vulnerability is multidimensional and dynamic in nature; SLA considers three types of changes - trend, shocks and seasonality.

‘Trend’ covers changes of household size, shifts in resource accessibility and gradual changes in the environment; ‘shocks’ mean unexpected but sudden changes due to flashfloods, health crises, etc., while ‘seasonality’ underscores the seasonal fluctuation in income due to the crop cycle, annual monsoonal deluge, unproductive labour, etc.

#### A. Trend

Although the current household size is relatively smaller than in periods 1 and 2, population pressures reduce *in situ* income opportunities over time, *ceteris paribus*. Inherited lands are sub-divided among offspring, land for vegetable cultivation gradually transforms into homesteads and land disintegration gradually reduces a large farmer to become a small or marginal landowner and sharecropper who also works as an agricultural labourer. Such landowners prefer to supply their own farm labour instead of hiring landless wage labour. Thus, competition in the *in situ* labour market increases for the wage labour in the agriculture sector in the *Haor* villages as observed by Mukerjee *et al.* (2002) in rural Indonesia.

As the poor are resource poor, their livelihoods primarily depend on accessibility to common resources in and around their villages. In the *Haor* area, these include common

water bodies, reeds, flax and other agricultural resources (e.g., grazing fields). Focus group discussions and key informant interviews reveal that almost 90% of the study sample catch fish to sustain their livelihoods. Some people use *Jogot-Bedh Jal* (seine nets) to fish in the ebb-tide river during the monsoonal deluge impedes fish breeding.

The *Haor* community experienced the easiest accessibility to the common fishing grounds during and before the 1<sup>st</sup> period. Over time, however, accessibility gradually decreased and resulted in a state of controlled access in the 3<sup>rd</sup> period since being leased out by government. The lease holders originate not only from the local community but also from other villages, towns or cities. They are financially rich and politically powerful and maintain close ties with the bureaucrats and local government authorities to maintain their hold over what were previously open access resources.

Also, with population growth, fallow land has been converted into cultivable land affecting natural stocks of reed and flax which is part of the *Haor* ecosystem. Such exploitation causes resource scarcity negatively impacting the poor more than the non-poor. The poor are forced to make exhaustive use of the available natural resources around their villages affecting the long term sustainability of their livelihoods.

## **B. Shocks**

### ***(i) Vulnerability to flashfloods***

Flashflood is a typical ecological feature of the *Haor* area and is intimately linked to income fluctuations, consumption levels and asset erosion of the region's households. Although flashfloods are unpredictable, the *Haor* community is familiar with such vulnerabilities caused by huge runoffs from the Himalaya that cannot be carried to the Bay

of Bengal by the rivers which then become shallower and narrower because of siltation exacerbating the incidence and intensity of flashfloods. Not maintaining and upgrading the *Haor* dikes in a timely fashion and leaving channels unprotected worsen the threat of flashflood occurrences. Local efforts and resources are incapable of effectively dealing with such recurrent disasters.

Flashfloods have a strong negative impact on the livelihood of the *Haor* people. Its direct effects include the submersion and damage of standing ripening crops in the fields, loss of contract labour wages, sudden unemployment and food crises, submersion of grazing land (fodder crises for livestock), immediate asset erosion (selling livestock) and shortages of materials to build homestead protection walls.

Their indirect effects include severe food shortages for the whole wet season, increase in debt burdens, difficulties in credit accessibility, unemployment, school-going children who have to drop out, increased incidence of health crises, decreased market mediation (sale of produces at low prices), loss of assets through the pawning of jewellery and land to service debts or to support consumption during the wet season.

In the long run, flashfloods increase landlessness and force the poor to migrate to the *Uzan*<sup>63</sup>, towns and cities. The poor also resort to seasonal domestic migration which sometimes becomes a long term family livelihood strategy. The farmers often become financially unable to buy agricultural inputs in time for the next season.

---

<sup>63</sup> Comparatively high rural agricultural area

### ***(ii) Health crises***

The *Haor* inhabitants are always on the verge of health crises as there are no public service facilities around 15-17 km of the study area making health maintenance (let alone improvements) an expensive undertaking for the poor. To overcome ill-health and sickness, the *Haor* community relies on unqualified village doctors and traditional treatments.

The focus group discussions reveal that sensitivity to health problems has increased and nearly every adult suffers from some disease. Women, in particular, become extremely vulnerable during pregnancy and delivery and have no access to proper medical and health advice. Untrained local women are called upon for assistance during delivery. Over 95% of the *Haor* households use open hanging latrines with all its environmental and health consequences.

## **C. Seasonal stress**

Dependence on natural resources and the rhythms of agriculture are sources of seasonal stress from income uncertainties, asset losses (erosion), debt increments and malnutrition in the *Haor* community. The poor *Haor* households have a very narrow window of protection from adverse happenings and emergencies because of poverty and asset and saving deficiencies. A wide variety of seasonal stresses affect the regular *Haor* livelihood patterns and their poverty dynamics.

### ***(i) Monocropping***

The *Haor* region is a low-lying and deep-sited ecosystem. Historically, all cultivable lands, except homesteads, remain inundated for 5-6 months during the annual monsoonal deluge.

The farmer can cultivate only *boro* rice during the dry season and all other income activities are closely related with this single crop season. This monocropping regime can be affected by such factors as high agriculture input prices, low produce prices, sudden flashfloods, hailstorms, dry weather and lack of irrigation facilities which enhance the risks in cultivating and harvesting the crop. These factors can also impinge upon seasonal food shortages causing malnutrition, income depletion, increase seasonal unemployment and vulnerabilities in the *Haor* community.

**(ii) *Deluge***

The peculiarity of the *Haor* region can be realized from this typical attribute. During the annual monsoonal deluge, no crop or vegetable can be cultivated on the farm. Particularly for the poor, although 90% of the *Haor* households catch fish nowadays, the only *in situ* source of income is fishing which is obstructed by the government leases on water bodies and the increased water volume during *Aashar* and *Shraban* due to torrential rain. This seasonal stress makes livelihoods difficult for the poor by disrupting communication, increasing transportation costs and squeezing employment options.

Focus group participants point out that the monsoonal deluge interrupts regular schooling, high waves erode homestead land, heavy wind storms and torrential rain cause homestead damage and even sometimes prevent leaving homesteads. Children in particular have to be carefully watched over.







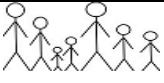




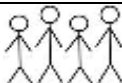
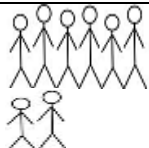
#### **5.5.4 Assets and livelihood**

Contextualizing vulnerability recognizes the importance and contribution of assets to livelihoods of the poor. Being poor implies limited capital endowments affecting livelihoods and their sustainability. In the SLA framework, poor livelihoods depend on 5 types of capital: human, natural, financial, physical and social. Overtime, fluctuations in these capital stocks to the livelihood flows in the *Haor* villages are postulated in Table 5.37.

##### **A. Human capital**

Human capital in this study denotes ability that directly or indirectly impinges upon labour, education, health, skills, knowledge and experience which affect, either together or alone, different *Haor* livelihood strategies.

Table 5.37: Dynamic analysis of livelihoods and resources in the *Haor* area, 2010

Factor	Timelines			Illustrative notes
	1 <sup>st</sup> period (Before independence)	2 <sup>nd</sup> Period (1971-1990)	3 <sup>rd</sup> period (1991-2010)	
Population				Although average household size in the 3 <sup>rd</sup> period has reduced to half that in the 1 <sup>st</sup> period, the overall population has increased. This is due to number of children that exceeds the national average. Media plays the most important role in this. Some people are aware of the negative impact of large populations and practice family planning. People were superstitious formerly but the 1990's generation has become more realistic. They understand the negative effects of large household size.
Household size				
Farmer	Large/medium	Medium/small/ marginal/no cultivable land/landless	Small/ marginal/ landless	The flow depicts the domination of small farmer; land subdivided into heirs' remarks small farms; recurrent flashfloods enforce farmer selling ancestral lands increasing landless farmer.
Yield of paddy	2-3 mound <sup>64</sup> /10 decimal (1 <i>Katha</i> )	3-4 mound/ <i>katha</i>	5-8 mound/ <i>katha</i>	Use of hybrid seeds and chemical fertilizers has increased to get higher yields.
Spring crop cultivation				Vegetable cultivation land is gradually being (a) transformed into homesteads because of increasing numbers of household (b) converted to <i>boro</i> cultivation land to secure crop from flashfloods.
Landless households				The number of landless households is increasing a very high rate. They are gradually building homesteads on government <i>khas</i> land (Government owned settlement land outside the area of permanent settlement).

<sup>64</sup> 1 mound = 37.5 kilograms.

Table 5.37, Continued



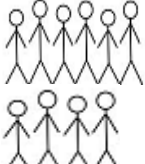


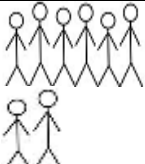




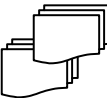
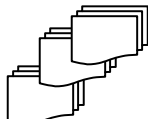








Factors	Timelines			Illustrative notes
	1 <sup>st</sup> period (Before independence)	2 <sup>nd</sup> Period (1971-1990)	3 <sup>rd</sup> period (1991-2010)	
Wage labour				Since landlessness has increased, more people in the 3 <sup>rd</sup> period have become wage labourers. Natural calamities, geography and demography compel small and marginal farmers to diversify income by selling physical labour.
Fisherman				Almost 90% of the people are engaged in fishing during the deluge. Daily catch amount is decreasing.
School dropout (among the extremely poor)				Parents are uneducated, cannot afford schooling, children perform household responsibilities, and are often engaged in income generating activities during dry season.
Cost of education				School fees are rising every year; teachers are not dutiful as formerly; students need private tutor now; government incentives like female stipend and food for education (Table B-1 in appendix B) are not fairly distributed.
Educated people				Number of educated people has increased and the average level of education has also improved. The poor people acknowledge the benefits accruing from human capital investment. People with college and degree level education have more diversified income than other groups.
Trees in the <i>Haor</i>				Has become rare now; in the 1 <sup>st</sup> period, community members cut trees for private use and latter for firewood.
Trees in the homestead				Many people have started tree plantation recently to preserve resources for the future; as a source of firewood; many poor has planted trees to be able to pay future dowries for their daughters.

Table 5.37, Continued








Factors	Timelines			Illustrative notes
	1 <sup>st</sup> period (Before independence)	2 <sup>nd</sup> Period (1971-1990)	3 <sup>rd</sup> period (1991-2010)	
Reed forest in the <i>Haor</i>				This common resource is mostly unavailable now. The reed forest areas changed fallow land into cultivable land and were cut down to build homestead protection walls and for firewood; negative effects of such deforestation are not considered.
Leasing out common water body	III	IIIIIIIIII	IIIIIIIIIIII	Government has a list of water bodies for leasing out (Table C-1 in appendix C). Many unlisted common water bodies (e.g., deepest part of ebb-tide river) are leased out for revenue. Bureaucrats do so to prevent social unrest, but, in fact, they are corrupt and politically alienated. They and their political agents do so to consolidate their mutual interest. At the same time, the working committee of local religious institutions (e.g. mosques and temples) are also leasing out common water bodies to finance their institutions.
Accessibility to common water	IIIIIIIIIIII	IIIIIIIIII	III	The general accessibility is highly reduced for the masses. In this case, the poor are extremely marginalized.
Availability of fish	 			Large fish has become rare. The fish available in the 3 <sup>rd</sup> period is one tenth of that was available in the 1 <sup>st</sup> period due to over fishing; using <i>Jogot Bedh Jal</i> (seine net) of very small mesh, different types of falling net, entangling net (locally known <i>Current Jal</i> ) cause extinction of fish. Destruction of reed forest constrains the natural breeding of fish.
Types of fishing gear	A few	A little	Too many	Poor people are increasingly trying to sustain livelihoods by fishing. With water level variability, they keep on changing fishing gears. Nowadays, people try to catch fish from the bottom of the river. They do not care about the sustainability of this natural resource.

Table 5.37, Continued



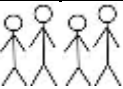


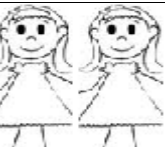
Factors	Timelines			Illustrative notes
	1 <sup>st</sup> period (Before independence)	2 <sup>nd</sup> Period (1971-1990)	3 <sup>rd</sup> period (1991-2010)	
Availability of public health services				Not available.
Number of village doctors				Has increased over the periods with increasing numbers of pharmacies in the local bazaar. The unemployed local youths and retired school teachers are finding livelihoods as village doctors. The poor cannot afford follow up treatment prescribed by professional doctors working in the <i>upazila</i> but seek instant relief from medicines. They are vulnerable to opportunity cost of visiting doctor in the <i>upazila</i> ; therefore often resort to village doctors.
Midwives (birth attendants)				Has increased little; do not have any midwifery training; are unskilled and still use their traditional knowledge. Being unpaid, women work as midwives for social and moral purposes.
Medium of transportation during dry season	Horse, boat, bull carts	Horse, boat, bull cart	Boat, Rikshaw, Motor cycle, hand trolley	Horses and boats were used to transport goods from growth centers ( <i>Upazila</i> ) to the <i>Haor</i> villages throughout the 1 <sup>st</sup> and 2 <sup>nd</sup> periods. Then, bullock carts were used to carry paddy from field to homestead. Recently, the types of transportation vehicles have increased as some culverts have been constructed on the muddy roads which connect the drift roads that pass through the <i>Haor</i> . <i>Rikshaws</i> and vans have replaced horses; hand trolleys replace bullock carts; motor cycle service is also available.
Medium of transportation during deluge	Manual boat	Manual boat	Manual and engine boat	Boats remain the only medium.

Table 5.37, Continued

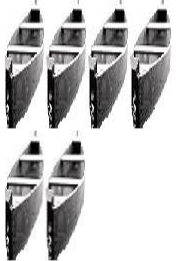


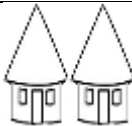
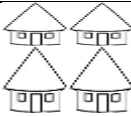






Factors	Timelines			Illustrative notes
	1 <sup>st</sup> period (Before independence)	2 <sup>nd</sup> Period (1971-1990)	3 <sup>rd</sup> period (1991-2010)	
Availability of boats				Boats require upkeep every year which is very expensive for the farmers who small and marginal landowners. For the poor, buying a boat is out of their financial capacity let alone renovation. Now people can use small ferries (canoes) to move around.
Number of local village club (LVC)				Many LVCs; every village cluster has more than one. The main intention of establishing a LVC is to undertake money lending business. In that line, some clubs rent out decorations for various functions.
Livestock				Livestock numbers have reduced alarmingly. People are used to selling livestock to meet crises. The pastures are become smaller discouraging livestock rearing. The usefulness of cattle reduced in many ways nowadays. Instead of using draught animal- now people can hire tractors to cultivate land and machines to thresh paddy. Because of the high population, the area of homestead land becomes small inhibiting livestock rearing.
Technician in the village				As crop cultivation in the 3 <sup>rd</sup> period has become mechanized, than former periods, some people obtained maintenance and repair skills.

Table 5.37, Continued

Factors	Timelines			Illustrative notes
	1 <sup>st</sup> period (Before independence)	2 <sup>nd</sup> Period (1971-1990)	3 <sup>rd</sup> period (1991-2010)	
Number of migrants				Young able bodied people undertake seasonal migration. They are mostly male, predominantly landless and member of large households. Comilla, Sylhet, Chittagong and Dhaka are the most probable destinations. Female migration is a low and a very new phenomenon in the <i>Haor</i> area. They usually work either as house maid or in garment factories. Few people undertake long term migration and work in non-farm sectors. They are mostly highly indebted and slip into extreme poverty. After accumulation of some assets which include a small plot of homestead land, houses and some cultivable land with some cash capital for cultivation, they come back to the <i>Haor</i> villages but undertake seasonal migration every year.
Dowry	\$\$	\$\$\$\$\$\$	\$\$\$\$\$\$\$\$\$ \$	The prevalence of dowries extends to all tiers in the <i>Haor</i> society as is regarded as part of rural culture.

### ***(i) Gift of labour***

It is directly related to age, gender and physical fitness (ability or efficiency) of an individual. Men and young able-bodied individuals are more capable to work hard under adverse working conditions while their number affects household income. Currently, it appears that the *Haor* youth are physically less efficient than previously because of early marriage, large household size, food shortages and malnutrition.

### ***(ii) Education***

Literacy makes a significant difference to the household's financial status. The quantitative data (Table 5.9) show that most non-poor households have heads with higher secondary education while, conversely, household heads with lower educational levels reflect the highest incidence of poverty. The poor are mostly uneducated and cannot afford to educate their children. Those having a primary or lower education level or less education are the households who are mainly the transitory poor <sup>65</sup> who tend to diversify their livelihoods from farm to off-farm and non-farm sectors which was less common in the 1<sup>st</sup> period and even in the 2<sup>nd</sup> period.

Gender-based education common in the 1<sup>st</sup> period has changed gradually; daughters are now (3<sup>rd</sup> period) encouraged attending school as households are more conscious of its long-term value and outcomes. Female contributions to household income and participation in decision making have been reportedly increasing in the contemporary *Haor* community.

Nevertheless, universal primary education will take time to be achieved because of the widespread (but slowly declining) practice of early marriage, loss of female

---

<sup>65</sup> They are poor in one period of time but not others and their financial status always fluctuate over time (Jalan & Ravallion, 2000).



contribution when a girl marries and leaves her household, and female livelihood diversification into the non-farm sectors (e.g., garment industries) located in the cities. For poor households, educating daughters is linked to investment and sacrifice that are unaffordable.

Education enhances the opportunities of understanding and diversifying livelihood options for the *Haor* people as interaction is facilitated with other people in Bangladesh. Educational advantages promote out-migration through which household becomes familiar with new cultures and information about various income diversification activities. The educated seasonal migrants can engage in the relatively higher income non-farm sectors in the towns or cities and can more easily adapt to their destinations than the illiterate poor.

### ***(iii)Health***

Physically, the *Haor* people are less efficient and experience frequent health misfortunes. The household health status is closely associated with poverty status insofar as malnutrition is concerned. Immediately after the flashfloods and during the monsoonal deluge, the poor households have less food of lower quality and with greater irregularity; this affects their ability to access the nearest public hospital which is 15-17 km away from the study area.

During the monsoonal deluge, the non-availability of boat transportation and inaccessibility to credit hinder access to medical services; the expectant mothers are particularly at risk.

The prevalence of drug taking is noticeable in the *Haor* area. Almost all the poor and labourers were found to smoke *bidi*<sup>66</sup> the whole year, a habit begun when young. The

---

<sup>66</sup> A thin and small size hand-rolled cigarette

focus group participants disclosed that these people would sacrifice eating but not smoking despite being aware of its dangers.

#### **(iv) Skills**

Agricultural development and technological innovations require skills upgrading and training. In the *Haor* region, people learn by trail-and-error how to manage hand trolleys, manual weeders, tractors, power pumps, shallow and deep tube wells, portable rice husking machines and paddy threshing equipment, etc.

In the *Haor* region, neither public nor private programs are available for any kind of livelihood development training.

#### **(v) Knowledge**

The power of knowledge can be realized from an understanding of traditional livelihood dynamics of the poor to deal with recurrent crises and vulnerabilities. In the 3<sup>rd</sup> period, some of the traditional knowledge useful to predict the weather, crop cultivation processes, fishing and boating appears to be gradually declining.

In summary, human capital helps to increase accessibility to the labour market and improve the productivity of both individuals and households and thus plays an important role in the dynamics of poverty.

### **B. Natural capital**

Natural capital in the study area refers to agricultural land for food, employment and income; accessibility to common water bodies (e.g., *beels*, perennial water channels) for

both income and livelihood diversification; access to pasture or grazing land to rear livestock; quality ground water for drinking; access to community reed, flax and straw forests to collect fire wood, shade roofs and hedge walls for houses and to build homestead protective walls; availability of quality surface water for regular domestic use when the ebb-tide river dries out during the months of *Chaitra* and *Boishakh* in the dry season.

**(i) Land**

Agricultural land is a safe repository asset for the *Haor* households. In the *Haor* area, per capita landholding has gradually decreased over time because of high population pressure. Landownership is generally gained through inheritance by the males in particular. More than 50% of the *Haor* households own land located in more than one *Haor* which increases cultivation costs and decreases crop vulnerability. Such dispersed landholding impedes farmer's accessibility to government agriculture subsidies because the farmer's permanent residence and owned land may be located into two or more different district jurisdictions.

To cope with the negative impacts of the flashfloods and monsoonal deluge, the community usually resorts to leasing out or selling their cultivable and homestead land. Land is the security against loans taken out by small and marginal landowners, while medium and large landowners use it as collateral to obtain government loans to finance crop cultivation.

While the landless households are increasing in the *Haor* area (Table 5.37), the large landowners are gradually moving to the *upazila* town to educate their children and obtain non-farm livelihood alternatives. Though some people migrate permanently to the cities, they retain their landownership in the *Haor* region. Thus, many households cultivate

land on a sharecropping basis, as tenants or they rent-in land for cash and under pre-fixed contracts. Despite EGE (ecological, geographical and environmental) constraints, the local land market plays a role in asset accumulation affecting the livelihoods of the poor.

The agricultural land in the *Haor* area is highly fertile but, to increase land productivity, the excessive use of chemical fertilizers and pesticides have led to a decline in soil fertility. Historically, there was an abundant supply of fallow land in the region used for grazing during the dry season. Currently, to increase crop output, fallow land has been converted into cultivable land. Thus the right of access to such common land is gradually become difficult; it is being worsened by the illegal leasing of such land by local institutions such as mosques and temples (see Table 5.37). These developments increase livestock tending expenses and inhibit the landless poor from seeking a livelihood alternative in livestock farming.

#### ***(ii)Forest***

During and prior to the 1<sup>st</sup> period, there were extensive natural tree, deep reed, flax and straw forests in the region: in the 3<sup>rd</sup> period, they have become a part of the *Haor* legend (Table 5.37). Deforestation occurs mainly due to the indiscriminate search for firewood by the local people unaware of proper sustainable management practices. Its short term impact has been felt in the difficulties in collecting fire wood, flax for hedges and roofs, straw for homestead protective walls in the wet season, and declining food sources for fish affecting fish breeding and catches.

### *(iii) Water*

Water resources are one of the main income contributors to the financial status of the *Haor* household as it facilitates cultivation in the dry season and fishing as a livelihood diversification option during the wet season. Traditionally, fishing was a profession of a specific group of Hindus in the region. In the 3<sup>rd</sup> period, over 90% of households catch fish either for self consumption or to increase income leading to declining catches due to overfishing and the restricted entry into the common water resources by the selective assignment of leases by the government to those who are well connected.

Despite the declining contribution of fishing to incomes, fishing remains a critical livelihood strategy for many *Haor* households.

However, there are some rivers including perennial and ebb-tide rivers, abandoned small channels, canals, ponds and ditches<sup>67</sup> which could be potential sources of livelihood for the poor.

Accessibility to tube wells for drinking water has increased over the 3<sup>rd</sup> periods although its quality has declined together with the level of ground water. During the monsoonal deluge, some poor households collect drinking water from tube wells at a distance from their homesteads incurring transportation costs.

During the months of *Chaitra* and *Boishakh*, when the ebb-tide river dries out, the local people historically used ponds and ditches, located near homesteads, for domestic purposes. Households now report lower and deteriorating quality of water from such sources due to siltation, lack of management, ignorance and over-exploitation. The long-

---

<sup>67</sup> Ebb-tide rivers, channels, canals and ditches in the *Haor* area dry out during the months of *Chaitra* and *Boisakh* in the dry season

term consequences of this resource mis-use are bound to impact negatively on the livelihoods of the *Haor* villages.

### **C. Financial capital**

From the focus group discussions, sources of financial capital comprise the informal money lenders who are mainly locals, village clubs (*somitis*) which are unregistered organizations like small cooperatives, local shops, bazaar clubs, fishing agents, relatives, friends, government aid projects for education (e.g., PESP, FSSAP)<sup>68</sup>, agriculture subsidies, Grameen Bank, NGOs and the public bank in the *upazila* town. None of these sources are accessible or available in emergencies. For example, during flashfloods, local money lenders and other informal sources also run short of financial capital since the whole community is affected. All other sources have policies which have not been formulated to be in line with the community's livelihood processes. The micro-credit organizations' (e.g., Grameen Bank, BRAC, ASA, etc.) programs have inherent weakness (Rahman & Razzaque, 2000) as their services are normally promotional rather than protectional or survival (Sharif, 1997, as cited in Rahman & Razzaque, 2000). Agricultural subsidies are disbursed during the cultivation period to the landowner farmers only while collateral is a prerequisite to access public bank credit facilities during the cultivation season and is not available for emergencies.

#### ***(i) Borrowing and lending***

Borrowing money seems an intrinsic livelihood problem for the poor villagers. Access to government financial services (e.g., public bank), located in the *upazila* town requires land for collateral. The landless, homestead owners, sharecroppers and tenants are not eligible

---

<sup>68</sup> Primary Education Stipend Project (PESP) and Female Secondary School Assistance Program (FSSAP).

borrowers although they need credit to buy agriculture inputs and pay for field preparation, irrigation, and weeding costs.

The poor market mediators (e.g., petty traders dealing in rice and seasonal fruits, hawkers, etc.) need short-term credit as working capital and are forced to borrow from informal credit sources. The poor who are landless and own only homestead land need money for emergencies; they also borrow to meet social obligations, to maintain social cohesion and family ties which sometimes leads to unnecessary borrowing (Mukharjee *et al.*, 2002). The maintenance of social cohesion permits the poor to access *howlat* (short-term, interest-free loans) from relatives, friends and neighbors.

In the study region, there are a few NGOs and Grameen Bank credit programs unlike in northwestern Bangladesh; they, moreover, have design weaknesses which fail to meet the needs of the poorest. The focus group participants report that the Grameen Bank and NGOs are more keen to invest and gain returns than help the extremely poor which proves their 'promotional policy' (Rahman & Razzaque, 2000).

Lending money is a highly profitable business for the informal money lenders in the region as high interest is commonly levied at compound rates. In an emergency or crises, the poor often cannot access any type of credit facility in the study area; during flashfloods, for instance, moneylenders themselves run short of cash capital, while the seasonal contract labour and daily wage labourers become unemployed. In such situations, villagers sometimes resort to seasonal domestic migration or buy basic goods from local shops at high prices.

Thus, the poor enter and often cannot escape their cycle of poverty as incomes are used to pay off accumulated debts rather than add to household capital stocks.

#### **(ii) Savings**

The poor do not have any institutional savings options; they invest in livestock, tin sheets (to shade and/or protect houses), jewelry, land, etc. Very few save by investing in seasonal migration, buying poultry, farm tools and fishing gear, or small boats. Women save by hoarding a handful of rice from the amount required for cooking. Such savings serve more as a protective shield against emergencies and ecological vulnerabilities than investments to enhance income generating opportunities.

#### **D. Physical capital**

The lack of and low quality of physical infrastructure is probably the most conspicuous factor hampering development in the region linked to its ecological challenges, geographical remoteness and low government priority for development. The villagers do not have access to such public facilities such as public baths and toilet facility, local bazaar and both public and private roads.

The focus group participants identified the *Haor* dikes protecting crops from flashfloods as a critical public infrastructure which however are not well maintained because of bureaucratic inefficiency and the dysfunctional local government. The impact on local livelihoods and poverty becomes tangible when a major dyke fault submerges and devastates standing crops within a day because of the interconnecting water channels.



The second most critical physical asset is boats and fishing gear which provide an important livelihood option throughout the year and particularly during the monsoonal deluge. As most of the poor do not own such assets, they partner others and receive low returns for their labour. Sometimes the poor may rent boats in a group but this strategy carries the risk of damage to boat and gear.

Focus group participants noted the accessibility to one private junior high school, two public primary schools and one local bazaar (without any toilets, resting area or storage facilities for business). Hand trolleys, threshing machines, tractors, power pumps and sewing machine are private assets owned by some households which, being labour-displacing, can reduce work opportunities for the poor households.

In the study area, drinking water facilities and public washing places (especially needed in the dry season) are in poor condition while the drainage infrastructure for gutter water is non-existent increasing health hazards for the poor.

Lack of an all-weather road network compels the poor to walk during the dry season and use boats during the wet season adding to household expenditure. One submergible road funded by an international NGO is under construction linking the local bazaar to the *upazila* town; it, however, may not be able to provide opportunities to increase the seasonal income of the extremely poor.

Within the 5 study villages, only 2 clusters of 2 villages (one from *Chawrapara* and another from *Manderbari* village) have electricity power connection. For the poor, no economic outcome is realized except for saving kerosene costs and charging mobile

phones. Moreover, the poor cannot afford the power connection costs which must be paid for in cash.

### **E. Social capital**

Social capital is rooted in social cohesion, norms and practices and appears in the family ties, social bonds and their links to formal and informal institutions in a community; such networks of relationships constitute social capital. Its value and accessibility depend upon on individual and household characteristics, attributes and position in the community. Among the advantages that access to social capital brings are the following:

#### ***i) Prioritizing credit accessibility***

The informal financial facilities in the region are available subject to conditions. To be a trusted borrower, one must be physically fit, honest, own natural or physical assets and have some form of education. Apart from honesty, the poor are lacking in the other attributes. A *somiti* (village club) member is given priority and the poor can leverage on such members if they have amicable links with them. Social links then can be construed as collateral for the loan.

#### ***ii) Provide social security***

The local people help each other in many mutually beneficial ways. They can use each other's yards to dry paddy or borrow cooking utensils and husking paddles to process paddy into rice. In the absence of a household head, womenfolk are usually given support by other women in cash or kind while the local shops allow credit purchases to be settled on the return of the household head.

When flashfloods affect crops, relatives and others willingly help in harvesting the crop or when high waves and storms erode and damage homesteads.

In the region, it is now common for the poor to offer their labour in groups for contract work to cut the earth, dig ponds and ditches, weeding and cutting paddy fields. Based on performance and social ties, the same group members are given preference in employment.

***(iii)Protecting income erosion (dispute resolution)***

Living in a community creates conflicts among individuals and households which are often resolved through the intervention of the community leaders. Land disputes are normally minimized by invoking family and social ties while social problems like petty theft, divorce disputes, quarrels, unpaid credit and illegitimate pregnancy are resolved personally rather than through the formal judicial system which apart from being sluggish, involves a long process, time and money.

***(iv) Continuity in farming***

Members of the same clan (*ghosti*) are given priority to cultivate land as a tenant or sharecropper under flexible conditions.

The poor sometimes continue cultivating their own land even after being leased out to relatives. Sharecroppers and tenants are given waivers from paying the contracted share to the landowner during flashfloods affecting the harvest and they are commonly given priority for the following year's cultivation; this reflects loyalty as stressed by the focus group participants.

***(v) Working as social safety net***

During the month of *Chaitra*, people can borrow newly- harvested paddy from relatives, friends and neighbors. These provide 10-15 days food supply and must be returned soon after harvesting their own crop.

The villagers combine their contributions to assist poor households to pay the dowry payment for their daughter's marriage. In shared undertakings such as fishing and livestock rearing where working capital is required, first the extremely poor and then the moderately poor relatives and neighbors are given priority by the non-poor households live in town to earn some income.

**5.5.5 Access to and magnitude of assets owned by the *Haor* households**

Based on the above descriptive analysis, a diagrammatic representation of the asset pentagon could help in understanding the complex relationships between access to assets and household poverty status. Holding assets by female-headed households, male-headed moderately and extremely poor households were explored in focus group discussions and given in Tables 5.38-5.40 where positive and negative signs are assigned for owning and lacking assets, respectively.

Table 5.38: List of holding assets and relevant effects (RE) for the female-headed *Haor* household, 2010

Human capital	RE	Social capital	RE	Natural capital	RE	Physical capital	RE	Financial capital	RE
Very poor in education.	-	Cannot do socially unacceptable work (e.g., sawing, planting, boating).	-	Mostly landless.	-	Can access local bazaar for weekly shopping.	+	Local rich people are the main sources of credit.	+
Weak in management.	-	Feel insecurity without husband.	-	Small plot of land provides some income.	+	Can access tube well to collect drinking water.	+	Some widows get partial access to government social welfare programs (e.g., widow allowance) (Table B-1 in appendix B).	+
Can discuss children's' education with teacher.	+	Need men's intervention to resolve socio-economic problem.	-	Didn't get share of land from husband's parents.	-	Very small house and in bad condition built on land of relatives or <i>Khas</i> .	-	<i>Howlat</i> (interest free loan) from relatives.	+
Get less privilege from officials.	-	Cannot participate in <i>shalish</i> <sup>69</sup> unless victim.	-	Cannot work during deluge.	-	Own very little fishing gear (e.g., fishing rods).	+	Cannot access all informal credit sources.	-
Cannot visit doctor alone.	-	Cannot migrate alone outside the village.	-	Don't have any livestock.	-	Do not own any boat.	-	Borrow to pay dowry.	-
Know tailoring, handicraft and housework.	+	Get cow-dung on condition of sharing firewood.	+	Have trees in the homestead.	+	Use hanging/open latrine often sharing with others.	-	Credit withdrawn from NGO causes livelihood deterioration.	-

<sup>69</sup> Arbitration arranged by informal judicial system in the village

Table 5.38, continued

Human capital	RE	Social capital	RE	Natural capital	RE	Physical capital	RE	Financial capital	RE
Sons provide income if they can do labouring and fishing.	+	Daughter marriage in the village.	+	Son cannot access all fishing ground.	-			No public credit source available around the village; being landless cannot access public bank located in <i>upazila</i> .	-
Brothers, son-in-law help to construct houses if they live in same village.	+	In-kind help from parents, relatives and neighbors.	+	Torrential rain erodes houses.	-			Children never get stipends for education.	-
The old widow cannot migrate.	-							Can access government emergency relief if flashflood affects the <i>Haor</i> area (Table B-1 in appendix B).	+
Husband became old and have only daughter.	-								

Table 5.39: List of holding assets and relevant effects (RE) for the male headed moderately poor *Haor* household, 2010

Human capital	RE	Social capital	RE	Natural capital	RE	Physical capital	RE	Financial capital	RE
Primary and secondary levels of education are available.	+	Can share each other agriculture instruments for crop cultivation	+	Agricultural land is the main source of dry season income	+	No useable year round road.	-	Usually borrow from rich people but sometimes from same group of people.	+
Mostly uneducated.	-	Membership in <i>somiti</i> (Village club).	+	Cannot fish in all common water bodies.	-	No hospital service available around 15-17 km around the villages.	-	Cannot use agricultural land for collateral since located in another district.	-
Daily labour is the main source of income.	+	Extended family members are not helpful.	-	Planted trees in the homestead reduce erosion; provide firewood and cash income.	+	Do not have electricity.	-	Can borrow from fish agents.	+
Often suffer health crises.	-	Local <i>shalish</i> is not fair but effective in resolving problems.	+	Some rear livestock and most tend in-house poultries.	+	Most do not have mobile phone.	-	Seasonal migration provides some remittances.	+
Have experiences into market mediation, small and seasonal business.	+	No unity in the society.	-	Do not have spring crop cultivation land.	-	Poor housing condition.	-	No public credit facilities around the villages.	-
Children cannot go to school during deluge.	-			Can get tube well water.	+	Using open/hanging latrine cause diseases.	-	NGO's loan is not helpful and rather exploitative.	-

Table 5.39, continued

Human capital	RE	Social capital	RE	Natural capital	RE	Physical capital	RE	Financial capital	RE
Have some artisanal skills (e.g., Idol making).	+			Cannot get free access to pasture to graze cattle.	-	<i>Haor</i> dikes left unprotected.	-	Share cropper cannot access agriculture subsidies.	-
				No trees and reed forests in the <i>Haor</i> .	-	Although little in amount, have different types of fishing gears.	+	The school authority and teachers do not follow proper rules of selecting eligible student for government provided stipends for girls.	-
				Recurrence of flashfloods and still not controlled.	-	Do not have boat.	-	Can get interest free loan from relatives.	+
						Can access pure drinking water.	+	Have access to some poverty reduction programs (e.g., Old age allowance, VGF card) (Table B-1 in appendix B). Can access emergency relief if flashflood affects the <i>Haor</i> area.	+



Table 5.40: List of holding assets and relevant effects (RE) for the male headed extremely poor *Haor* household, 2010

Human capital	RE	Social capital	RE	Natural capital	RE	Physical Capital	RE	Financial capital	RE
Mostly uneducated.	-	Discriminated by local money lenders.	-	Mostly landless.	-	Useable public roads are not available.	-	Old age allowance doesn't bring any changes since offered for a short period.	-
Daily labouring is the main source of income.	+	Some can do sharecropping.	+	Do not have any livestock and most are incapable to rear.	-	Cannot afford mobile phone.	-	By default, public credit system does not have any provision for them.	-
Catching fish is the second most important source of income after daily labouring.	+	Form labour group to bargain collectively.	+	Cannot fish in all common water bodies.	-	Do not have fishing gear and boat for fishing.	-	Getting <i>howlat</i> (interest free loan) is a dream.	-
Often suffer health problems.	-	Do not believe each other.	-	Wife does homestead gardening and in-house poultry tending.	+	Very poor housing condition; roofs often leak water during deluge.	-	Seasonal domestic migration provides some income.	+
Large household with single earner.	-	No membership in village club.	-	Flashflood yet to be controlled.	-	Unprotected <i>Haor</i> dikes.	-	Although charges high price, local shops allow to buy necessary goods in credit.	+

Table 5.40, continued

Human capital	RE	Social capital	RE	Natural capital	RE	Physical capital	RE	Financial capital	RE
								Local money lenders are the main sources of credit.	+
								Have to borrow to pay dowry.	-
								Children never get stipend (Table B-1 in appendix B).	-
								Stopped NGO membership.	+
								Can access emergency relief if flashflood affects the <i>Haor</i> area; some get VGF card.	+

From the qualitative information in Tables 5.38-5.40, a two dimensional schematic representation of the asset pentagon provides the direction of access and the magnitude of accessibility for five different types of capital among three household types: female-headed, male-headed moderately and extremely poor households (Figures 5.19- 5.21). The arrows in the pentagon illustrate the directions in access (described in chapter 4) noted by the sample respondents.

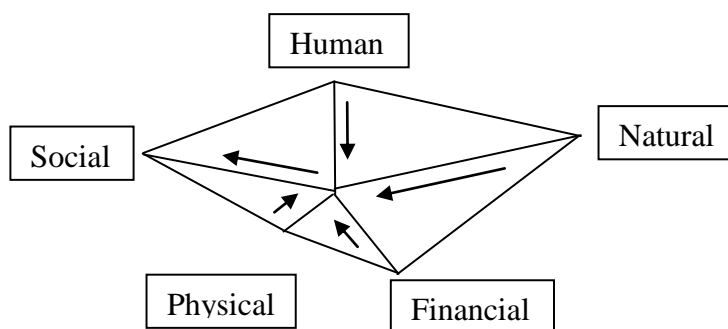


Figure 5.19: Access direction and magnitude of assets by the female-headed *Haor* households, 2010

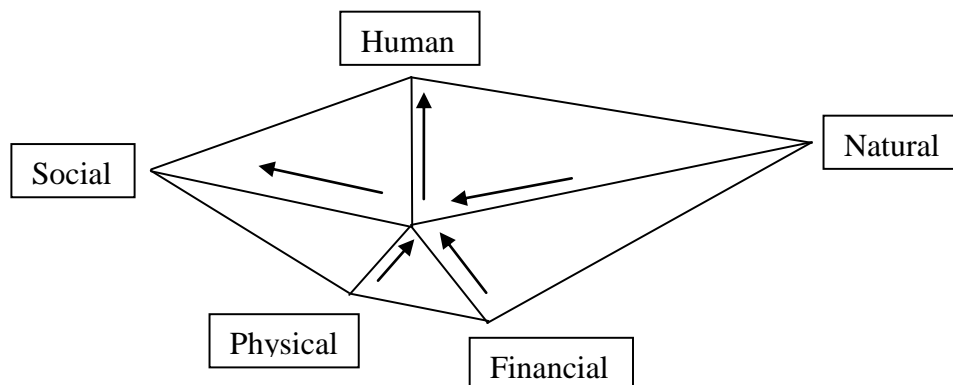


Figure 5.20: Access direction and magnitude of assets by the male-headed moderately poor *Haor* households, 2010

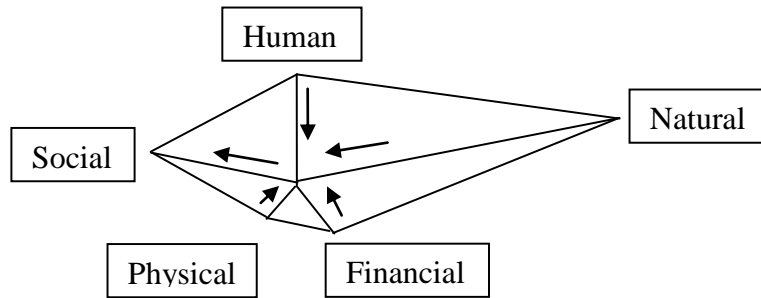


Figure 5.21: Access direction and magnitude of assets by the male-headed extremely poor *Haor* households, 2010

### 5.5.6 Transforming structure and process (TSP)

To increase income, households usually use their asset endowments; in this process, the productivity of capital is fundamentally determined by different functionaries involved in the structures and processes. The elements of structure include both public and private organizations and process includes law, policy, culture and institution.

In livelihood analysis, the SLA is given weight in this part of the framework as the coherent elements of TSP are beyond household control. TSP influences the household's decision in adopting strategies conducive to its socio-economic upliftment. Figure 5.22 illustrates the existing links between structure and process,

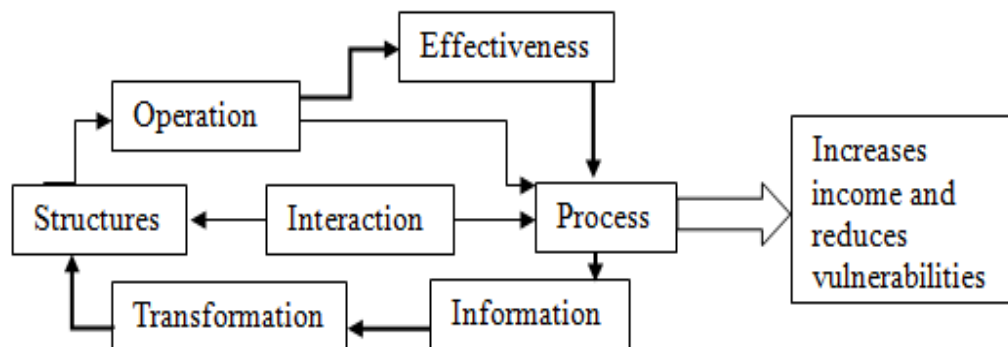


Figure 5.22: Guided outcomes and the interacting flows between structures and process

In TSP, structure promotes process through the policies implemented; laws enacted creating an environment conducive for investment and trade, and provision of services that affect livelihoods. Assuming a conducive structure, process mediates by providing information to further transform structure to resolve livelihood barriers (e.g., unemployment, income erosion, etc.). Thus, TSP elements serve as a guide to explore poverty dynamics in a wider socio-economic context.

In the following description, the focus is only on those TSP elements raised by the focus group participants and the researcher's own observation during the study period. The aim is to understand how the transforming structures and processes affect the livelihoods of the poor in the *Haor* area.

## **A. Structure**

The main structural elements that impinge upon the livelihoods of the poor in the region pertain to government, semi-government and private organizations.

### ***(i) Government organization***

All government departments (e.g., agriculture, fisheries, family planning, local government, engineering, etc.) in the *upazila* are responsible for livelihood improvement in the region. The focus group discussions revealed that the poor lack confidence in the government bureaucrats, policies and programs that influence their livelihood outcomes. None of the parameters of good governance (transparency, accountability, efficiency, and responsiveness to peoples' needs) have been noted by the poor participants. However, they are aware of the extent of corruption at all levels of the government system.

Government policies and programs are exploited politically ensuring that project benefits accrue to the supporters of the ruling political party which have created political schisms in the community. The poor attempt to cope with this situation by becoming more politically aware than previously; voting is valued as political capital by the poor.

The focus group participants and key informants state that the bureaucrats and extension workers in the *upazila* town are eager to receive payola (bribes) from all types of public programs and projects.

The *UP (Union Porisad)* authorities play an important role in disbursing government relief funds and monitoring development programs. The focus group participants indicate the *UP* are not impartial and transparent in monitoring the *Haor* dike development projects, selecting vulnerable women for the food-for-work program and distributing VGF (Vulnerable Group Feeding) cards and emergency relief to the poor households.

#### ***(ii) Information gap***

If inaccessibility to information is considered as ‘information poverty’, then the poor are powerless to improve their status (Mukerjee *et al.*, 2002). The perception of the focus groups is that the poor receive controlled and distorted information by the local bureaucrats and political leaders.

#### ***(iii) Semi-government and private organization***

Despite their potential to upgrade livelihoods of the poor, the Grameen Bank (the only semi-government organization) and three other NGOs - BRAC, ASA and POPY - only

provide credit services that excludes the extremely poor households. In their credit reimbursement policy, no consideration is given to the ecological vulnerabilities of the area. The focus group participants termed the credit recovery policy as being inhuman in demanding weekly installments from dead borrowers.

Savings and credit programs were found to be inappropriate to meet the needs of the client groups. They do not monitor the use of the credit extended, its appropriateness in contributing to livelihoods, who controls the credit in households and do not provide the training or supplementary services to enhance livelihoods.

## **B. Process**

### ***(i) Criminal and civil law (social security)***

Although the presence of police is limited due to physical structure of the region, the level of crime is very low. The local community leaders take immediate action when any minor crime is committed. People normally do not resort to the police unless a serious offence like murder has been committed. Also, community leaders help to resolve many civil disputes including land disputes, minor quarrels, divorce, household violence, etc.

### ***(ii) Sharecropping***

According to the existing public law, the tenant, landowner and input suppliers should each receive one third of the crop harvested. However, in the region, the share-cropping system has evolved over the years and makes allowance for the ecological and environmental risks attached to crop cultivation and harvesting. Where previously landowners were considerate

and generous to poor sharecroppers, now the quality of land and relative bargaining power of the parties involved are important.

### **C. Policies and the poor**

#### ***(i) Agriculture policy***

Livelihoods in the villages depend on the productivity of the dry season *boro* crop. From the qualitative enquiries made in this study, the government policies are ineffective in improving livelihoods; the poor farmers noted that the selling price of paddy marginally exceeds production costs (for pesticides, fertilizers, diesel, kerosene, labour wages and transportation). Also, farmers use high yielding seeds and farm technology which increase production costs. The people perceive that such cost increases are due to the government's agriculture policy while the official procurement price of rice does not fully account for the production cost increases.

The farmers, particularly sharecroppers, tenants and small farmers assert that crop cultivation is less profitable than previously. The daily wage labourers are in a relatively better position than them since they (wage labourers) do not encounter investment risks incurred after crop failure. The agriculture subsidy services are insufficient and inappropriate to the nature of the ecosystem and do not help the sharecroppers and tenants who do not have any cultivable land.

The focus group participants and key informants indicate that they have no access to agriculture best practices such as crop protection, input use, etc., as the agriculture extension workers have not visited the study area in recent years.



## ***ii) Public credit service***

Farmers are aware that the public bank in *upazila* provides cheap agricultural credit provided collateral in the form of properly documented cultivable land is available. This provision excludes farmers who have no documented cultivable land. For those eligible farmers, a broker's services are needed for which commissions need to be paid.

## ***(iii) Education policy***

Empowering women by providing educational incentives has met with limited success as its disbursement has been biased towards political supporters, relatives and neighbors. Incentives can be considered once a 75% class attendance is recorded but, as the demand of incentives exceeds the supply, the impartiality of the selection process is questionable.

The prevailing universal primary education policy has also met with limited success as the poor are burdened with the high opportunity cost of sending children to school rather than contribute their labour directly or indirectly into income generating activities.

In sum, therefore, there is no specific or combination of policies found to be effective in promoting livelihood development in the study area. None of the current antipoverty programs (Table B-1 Appendix B) appear appropriate.

## ***(iv) Cultural changes***

Culture and social norms consolidate social harmony in the *Haor* community which has historically been chauvinistic adding to its vulnerabilities and discriminatory practices. Changes are, however, being gradually made and the respondents feel that women are

becoming accepted as active family members or partners. Such changes can create several social and economic impacts on the livelihood of the poor households including:

***Decision-making*** - Traditionally, women enjoyed less freedom in rural Bangladesh society. Although the female respondents do not wish to challenge the role of men, they demand recognition of their contribution to the household's livelihood. For a married woman, the husband is of prime significance as, if she is divorced, her only alternative is to return to her parent's house with the entire associated stigma.

The women focus group participants confirmed that education, employment opportunities and accessibility to NGO credit have tended to offset their cultural submissiveness and vulnerabilities. Nowadays, they are asked to give their views on many issues like how to increase household income, manage income, cope with crises, obtain credit, lease out and/or in land, childrens' schooling, arrange their daughter's marriage and when and where to undertake seasonal migration, etc.

***Social values*** –*Haor* communities operate on the basis of social relationships and values such as mutual assistance in times of need, the role of traditional leaders in maintaining social stability, etc. Focus group discussions reveal a gradual deterioration of such values and institutions while the increasing materialism has tended to transcend traditional networks and linkages. Thus, it is felt that the young and more educated members of village society should replace the traditional leaders who are perceived to be biased and even taking advantage of the poor because of their social position.

***Dowry*** - The institution of dowry is a widely accepted social norm in the community (Table 5.37). However, where traditionally the dowry was paid by the bridegroom, nowadays, it is

an integral part of the marriage arrangement with the bride's parents 'buying' happiness for their daughter; for the poor households, such payments often push them deeper into the poverty trap.

#### **D. Institutions**

Social institutions change with the transformation in structures and process (Mukherjee *et al.*, 2002). There are many indigenous institutions in rural Bangladesh (Ashley *et al.*, 2000) which have evolved on the basis of mutual need.

##### ***(i) Somaj and Shalish***

These informal institutions are widely visible in the *Haor* community. The *somaj* consists of extra-familial, loose social groups whose members are mainly neighbors headed by a *matabbor* who have certain attributes such as being from the community, have large land holdings, possess significant *guisti* (lineage), be honest, respected, able to influence or control hoodlums and those engaged in criminal activities. The female focus group discussants expressed no desire to hold the leadership posts which are reserved for the males.

Five different types of *Somaj* exist in the villages based on geographic proximity, kinship and political alienation led by *jubok* (young leader) and *murubbi* (old leader) whose power varies with the level of leadership (Table 5.41).

Table 5.41: Leadership (*matabbor*) in the *somaj* in the *Haor* community, 2010

Extend of <i>somaj</i>	Types of <i>somaj</i>	Characteristics	Level of leadership			<i>Matabbor</i>
			Lower	Middle	Upper	
Intra-village	<i>Para</i> (Cluster)	Neighborhood	.....			Junior
			●	-----	●	Senior
	<i>Gushti</i> (Linage)	Kinship	◀...▶			Junior
			●	-----	●	Senior
	Religious	Belief	●	-----	●	Senior
	Political alienation	Views	◀...▶			Junior
Inter-village	Villages	Geographical proximity	●	-----	●	Senior
			●	-----	●	Senior

The *somaj* functions as an informal judicial system but does not pose any contradiction or challenge to the formal judicial system; its most important task is to arbitrate (*shalish*) the civil and criminal offences involving neighbors, family members, clans and even villages.

The informal institutions illustrated in Table 5.42 reflect different functions and attributes but are secured on the tradition of mutual benefit or interest. For example, the economic institutions in the community provide equitable arrangements which rarely exploit the poor while the social institutions support them by lessening their social burden and providing opportunities during difficult times.

Table 5.42: Observed informal institutions in the *Haor* community

Institutions		Attributes
Economic Institutions		
Irrigation facilities		People often use common place to withdraw water manually from the <i>beel</i> ; use common drainage system to irrigate crop land; often use common channels to provide water to make land cultivable.
Land tenure system		Three types of conditional arrangements are available in land rental market of which general standard is found for individual type of rent.
	<i>Nogod Cukhti</i> (Cash contact)	In this arrangement, tenant has to pay a fixed amount of cash to get only one season cultivation right. This type of contact is non-flexible to any unexpected situation occurred during cultivation season.
	<i>Fosol Cukhti</i> (Crop contact)	It is a common practice of leasing land on mutual understanding that tenant will give a pre-fixed amount of crop to the owner. The owner is not responsible for any expenditure required for crop cultivation. In this one season contract, the pre-fixed amount is flexible to the severity of natural calamities (e.g. flashflood, hail storms).
	<i>Bondok</i> (Leasing out)	In this practice certain amount of cash is exchanged once. The lease holder can hold cultivation and fishing rights for a minimum of three seasons and this duration remains until the cash amount is returned to the lease holder.
	<i>Adi-bhaga</i> (Share cropping)	In this one season leasing of land, the owner and tenant share the crop output equally. In this case, the owner provides only half of fertilizer expenditure required in cultivation process.
	<i>Homod</i> (Joint cultivation)	In this practice, generally two farmers verbally agree to share all labour, animals and equipments equally in cultivation and harvest.
Group formation		Forming a group under the leadership of a foreman in a common arrangement is found in the labour headed households in the <i>Haor</i> community. The group members negotiate collectively and take fixed price contracts for earth cutting, fishing and harvesting.
Livestock (share rearing)		This arrangement is like share cropping. In this practice, the tender takes care of another person's livestock (cows, goats, and poultry) in his/her homestead. Although the tender is solely responsible to rear and bear costs, at the end of the contract, either annually or seasonally, the off-springs or the added value have to be shared by both parties. Sharing contract is associated to different types of livestock species which is generally standard for that each type of species.

Table 5.42, continued

Institutions	Attributes
Financial Institutions	
Cash credit	The local informal financial systems are generally observed in the <i>Haor</i> community are- money lender (male/female), <i>grameen somiti</i> (village club) and <i>bazaar somiti</i> (bazaar club). Different types of credits with specific arrangement are available as follows:
<i>Shoptahik Dottha</i> (Weekly)	In this arrangement normal rate of interest is 1% per week.
<i>Masik Dottha</i> (Monthly)	For this type of practice, rate of interest varies from 5% to 10% per month.
<i>Choy Maisa</i> (Semi-annual)	In this type of practice, normal rate of interest is 50% for the duration of six to nine months.
Goods and services credit	This type of arrangement is available during crop season when farmer runs short of cash on the condition of immediate return after crop harvest.
	Farmers buy repair services for hand trolley, tractors and power pump (shallow tube well) in credit during dry season. Share croppers always buy seeds, fertilizer and fuel since they are not eligible for government agriculture subsidies.
	The wage labour buy goods in advance from local shops and pay weekly. Being busy in labour work, they allocate the evening of the weekly bazaar day to settle the debts and buy basic goods for the next week.
	During wet season, the seasonal domestic migrant households buy goods in credit on condition of paying after the return of migrants.
Advance labour selling	It is a familiar practice of credit contract for the labour-headed household in the <i>Haor</i> community. The labour receives some cash in advance that would be adjusted with daily wages later on.
Social Institutions	
<i>Howlat</i> (Interest-free loan)	The people in the <i>Haor</i> community can get <i>howlat</i> from friends, relatives and neighbors.
	This in-kind practice supports them to get meet of difficulties.
<i>Gusti-Chanda</i> (Lineage contribution)	In this arrangement, almost all members of a <i>gusti</i> (lineage) contribute some according to their financial condition to help the poorer members to pay dowry for their daughter's marriage.

**(ii) The dynamics of informal institutions**

Informal institutions are often dynamic (Mukerjee *et al.*, 2002) in extending employment opportunities for the poor households and reducing the constraints and risks in selling crops.

Formerly, many moderately poor households had small boats for moving around the village clusters and also for fishing during the monsoonal deluge. However, the scope of *hawlat* (interest free loan from relatives, friends and neighbors) has been reduced over time, boat availability has also markedly reduced and free boat rides are no longer allowed.

The dynamic nature of the economic and social institutions is embedded in the intrinsic characteristics of the *Haor* ecosystem as a mechanism to provide some form of social safety support.

#### **5.5.7. Adopted livelihood strategies and relevant outcomes**

Depending on the incidence and severity of vulnerabilities, various livelihood strategies have been adopted by the poor households in the region. In pursuing these strategies, household asset endowments have a direct influence which, together with TSP (Transforming Structure and Process), play a catalytic role in how outcomes are determined.

Based on information given by the focus group participants and the field worker's experience, the researcher identified groups of households (based on specific and common attributes) and their major livelihood strategies. Tables 5.43-5.49 illustrate their diverse livelihood strategies adopted (not all of which could be enumerated) and which did not always produce successful outcomes.

Table 5.43: Adopted livelihood strategies by the female-headed household

Group	The most vulnerable	
Attributes	Female headed; landless; very poor; widow; no cultivable land; cannot access informal credit sources; husband who was a daily labourer left debt burden.	Female headed; have homestead land; moderately poor; widow and divorced; cannot access informal credit sources; have a little cultivable land; husband was doing petty business.
Strategies	Working as maid; get rice as wage with supplementary cooked food; living on in-kind help; sell firewood made on cow-dung and straw or jute-stalk.	Widow allowance; getting cash, rice, pulse and clothes from parent's house; sell firewood; under-aged son catches fish for sale; brother and relatives help to renovate homestead and house.

Table 5.44: Adopted livelihood strategies by the landless daily labourer

Group	Hand-to-mouth repeated seasonal domestic migration (SDM)
Attributes	Landless; extremely poor; work in other's farms during dry season; do not do sharecropping; always in debt; landless; can access informal credit sources; no savings; large family depends on single earner; often suffer health problems; always run short of necessities.
Strategies	Daily labour by the head is the main income source; assign SDM for 2-3 months during deluge; but undertake early and longer period (4-5 months) of SDM if flashflood ruins farmers' crops in their villages; fishing; artisanal works, boating; tending in-house poultry; stopped schooling; avoid visiting doctor; borrow to feed family member; live hand-to-mouth.

Table 5.45: Adopted livelihood strategies by landless daily labourer-sharecropper

Group	Rice and green- inevitable migration
Attributes	Landless, extremely poor; daily labour is the main occupation; most of time remain unemployed during deluge; large household; have scope for year round fishing.
Strategies	Do <i>adhi bhaga</i> (share cropping); earth-digging; catch fish by <i>Thela Jali</i> (one type of cheap and handy fishing gear); forming group to catch fish; assign SDM for 2-3 months and work in agriculture at destination; rear in-house poultry; cultivate gourd on the steep roof of house; stopped schooling; borrow; take low calorie little food twice a day (once a day if flashflood damages crops).



Table 5.46: Adopted livelihood strategies by the daily labourer owning homestead land

Group	Daily labouring - inevitable migration
Attributes	Extremely poor; have homestead land; father sold all cultivable land before death (second generation landless); cannot access informal credit source during health crises; do not get any <i>howlat</i> ; large family but single earner; father left debt burden; form group; membership in village club.
Strategies	Daily labour is the main source of income; assign SDM for 4-5 months during deluge; catch fish; borrow from <i>mohajon</i> during dry season.

Table 5.47: Adopted livelihood strategies by the marginal farmer-daily labourer-no education

Group	Uneducated marginal farmer-daily labour
Attributes	Extremely poor; have homestead and a little cultivable land; can have easy access to informal credit sources; can get <i>howlat</i> ; engaged in work whole year.
Strategies	Work as a wage labor in spare time; earth-digging; catch fish during deluge; borrow to cope with dry season food shortage and for cultivation; homestead vegetable gardening; in-house poultry tending; selling milk; take <i>howlat</i> from friends and at the same time try to control quality and quantity of regular food intake; selling trees, utensils, cheap fishing net and boat; selling livestock (e.g. cattle) then selling expensive fishing net; and then leasing cultivable land and at last sell the cultivable land.

Table 5.48: Adopted livelihood strategies by educated marginal farmer-daily labourer

Group	Marginal farmer-longer SDM
Attribute	Moderately poor; households are more similar in landownership than other groups; membership in village club; can get loan easily from informal credit sources; have primary level of education; 90% work as daily labour during dry season; 80% assign SDM if flashflood damages crop.
Strategies	Daily labour is the main source of income; cultivate own land; assign SDM for 4-5 months during deluge; borrow; rear cows and sell milk; catch fish; sell seasonal fruits, vegetable and livestock to cope with crises.

Table 5.49: Adopted livelihood strategies by farmer-medium land owner-tenant

Group	Medium farmer-rarely migrate
Attribute	Moderately poor; rarely migrate; medium scale land owner; they also do <i>nogod cukthi</i> (cash contact) and <i>fosol cukthi</i> (crop contact) cultivation; get privilege from relatives in <i>adhi bhaga</i> (share cropping).
Strategies	Crop cultivation is the main income source; usually do petty business (e.g. rice trading) during deluge; catch fish; get in-kind help from relatives in emergencies; rear livestock; rent out boat; income from the share of threshing machine and hand trolley; in-house poultry tending; homestead vegetable gardening; selling jewelries, selling livestock and mortgage land.

### 5.5.8 Livelihood outcomes

The goals of undertaking different livelihood strategies are to achieve sustainable livelihood outcomes; the strategies depicted in Tables 5.43-5.49 reveal how the poor attempt to improve their financial status by increasing income and well-being and reduce vulnerabilities and food insecurity. They illustrate the poor peoples' responses to existing income constraints and ineffective government policies. Moreover, they are contextual in nature as they are formulated within the framework of the unique ecological characteristics of the *Haor* basin.

In the traditional agricultural regime of the region, most inhabitants are engaged in dry season crop cultivation with the poor primarily working as wage labourers. As crop cultivation is seasonal, labourers are forced to be involved in the more labourious earth-cutting work. However, despite the seasonality and diversity of income sources, it cannot be assumed that having the same livelihood objectives or even similar strategies will guarantee similar outcomes for all groups.

The primary occupation of the household heads in the various strategic groups is diversified and varies among the groups. In the over-populated traditional agricultural sector, the poor often encounter unemployment, under-employment and low wages which vary with the dry and wet seasons. For the extremely poor household heads who predominantly rely on daily wages which fluctuate with demand and vulnerability to food insecurity is exacerbated and adds to natural resource depletion.

During the wet season, crop cultivation is impossible pushing most of the poor households into fishing and short-term seasonal domestic migration usually in agricultural

activities for those who are uneducated. Migrants with a primary level of education find work in the relatively more lucrative non-farm activities like rikshaw pulling, garment factories, masonry, etc. Seasonal domestic migration of the poor villagers is becoming a more pronounced occurrence.

#### **5.5.9 Overall implication of the livelihood diversification outcomes**

Work diversification is an attempt by the poor *Haor* households to tap multiple sources of income but its impact may not be significant. Labour wages are insufficient to cover basic household consumption which must be supplemented by other income sources but seldom allow savings to be made to meet emergencies. Borrowing is the only way to meet crises which implies that a part of labour wages must be diverted to settling debts. The poor, particularly, the extremely poor cannot rise out of poverty, and if flashfloods during the dry season affect the crop, their vulnerability is heightened and so is the intensity of their poverty.

The focus group discussions and key informant interviews recognize that the poor are strongly oriented to achieving sustainable livelihoods but the ecological, assets and TSP constraints push them towards survival- or subsistence-focused strategies. The income generated from wage labour, fishing and short-term seasonal migration barely meet subsistence requirements; lessen debt vulnerability during the monsoonal deluge but not the process of asset accumulation.

In sum, given the ecological scenario, the poor in the *Haor* region inevitably have to undertake diverse short-term occupations for survival needs. The policy challenge is to

devise sustainable and smooth household income flows consistent with sustainable natural resource utilization.

#### **5.5.10 Conclusion**

Given that the *Haor* communities have, through time and experience, learnt to accommodate their livelihood rhythms to the demographic, geographical, ecological and environmental dimensions and attributes, this study has opted to focus on the dynamics of *Haor* poverty. Although average household size in the *Haor* region has decreased, the increase in aggregate population has narrowed the man-resource ratio. The increasing vulnerabilities of monocropping have compelled the adoption of a livelihood diversification strategy increasing pressure on natural resource use of trees, reed forests, pastures and *khas* lands leading to resource poverty. Except a very limited number of *beels*, the *Haor* community has open access to all types of common fishing grounds during the 1<sup>st</sup> period, although there were fewer fishermen then as compared to currently where almost 90% of the villagers are involved in fishing. The destruction of the natural fish breeding system and over-fishing have led to poor daily catches. Also, the scope for livestock rearing has been restricted because of the encroachment of natural pasture land.

In poor households, the school dropout rate has increased because they are not able to afford the expenditure and the opportunity cost involved. However, on average, the number of educated people has risen in the *Haor* villages. Overall, the quality of the physical infrastructure is very poor as there are no asphalt roads and public health services negatively impacting the livelihoods of the moderately and extremely poor. By default, the landless, sharecroppers and tenants are denied access to public credit pushing the use of local informal credit sources and high interest rates, increasing debt burdens and poverty.

Some large farmers have descended into extreme poverty because of *in situ* ecological vulnerabilities and debt. The historical social relationship based on mutual benefit and interest has become bleak in the 3<sup>rd</sup> period as in-kind assistance is rarely available as social cohesion becomes more flexible. People generally have less confidence in the informal judicial system weakened by dishonesty, bias and corruption. Other local institutions have a strong influence on the livelihood of the poor; some of the newer institutions appear to provide more support for the moderately poor over the extremely poor. The dowry system has become a burden to parents who wish to ensure their daughters' happiness in village society. In such livelihood dynamics, the poor adopt multifarious strategies to cope with vulnerabilities which start from hunger to long-term family migration.

## **5.6 Poverty–migration nexus**

This section explores the characteristics of seasonal migrants, the causes and consequences of migration and its association with poverty to formulate policies to identify alternative options to diversify income sources and achieve sustainable income for the poor villagers.

### **5.6.1 Attributes of migrants and their households**

In this study, the migrants are those people who are the victims of the annual monsoonal deluge and recurrent flashfloods in the *Haor* region. With very limited income diversification opportunities, inaccessible credit markets and dwindling natural resources, seasonal migration is the only option available to the poor households. Northwestern Bangladesh, though different from the *Haor* area, displays similar attributes for its migrant households (Kabir *et al.*, 2008; Shonchoy, 2008; Shahriar *et al.*, 2006).

#### **A. Migrant households**

A total of 90 seasonal migrant households in which at least one member migrates for a short period domestically during the non-crop deluge period were selected. The accrued remittance as wet season cash income is used to identify migrant households. Table 5.50 depicts the education level of migrant household head (MHH), land ownership and poverty status of MH.

##### ***(i) Education profile***

The MH heads who are uneducated comprise 53.3% of the respondent households while the remainder fall into the ‘primary educational level’ (40.0%), ‘secondary level’ (5.6%), and

‘higher secondary level’ (1.1%). Household heads with lower educational levels are economically more vulnerable to a slack labour market than those more educated.

Table 5.50: Profile of migrant households (MH) in the *Haor* study area, 2010

Attributes			Total Amount of MH	
			Count	%
Education of MH head	Uneducated		48	53.3
	Primary		36	40.0
	Secondary		5	5.6
	Higher secondary		1	1.1
	Total		90	100
Land Ownership (in decimal) of MH	Landless (0-49)		63	70.0
	Marginal (50-149)		16	17.8
	Small (150-249)		3	3.3
	Medium (250-749)		5	5.6
	Large (>750)		3	3.3
	Total		90	100
Poverty status of MH	Annual income per capita	Poor	76	84.4
		Non-poor	14	15.6
	Total		90	100
	Dry season income per capita	Extremely poor	65	72.2
		Moderately poor	14	15.6
		Non-poor	11	12.2
	Total		90	100
	Self-perception	Poor	89	98.9
		Not poor	1	1.1
	Total		90	100

**(ii) Natural resource profile**

The natural resource (land) profile of MH (Table 5.50) shows that 70% of MHs are landless and comparatively more vulnerable to seasonal crises than landed households. Of the remainder, the ‘marginal’, ‘small’, ‘medium’ and ‘large’ landownership categories represent, respectively, 17.8%, 3.3%, 5.6% and 3.3%. Land resources provide a form of insurance for overcoming crises, support migration expenditure and increase human capital (e.g., enable education and medical services) in rural Bangladesh.

**(iii) Financial profile**

The financial profile of MH (Table 5.50) reflects that 99% of the respondent household heads are self-perceived poor compared to 84% measured by annual per capita income. The MH's main income sources are the dry season crop and related activities; on this basis, 88% of households are poor and 72% are extremely poor. These statistics differ from the other two measures (annual income and self perception) confirming that the extremely poor migrant households are more vulnerable to crop failure than other household categories.

Table 5.51: Landownership of MH in poverty status, for income poverty, 2010

Land ownership of MH (in decimal <sup>70</sup> )	Distribution of MH according to income Poverty				Total number of MH	
	Poor		Non-poor			
	Count	%	Count	%	Count	%
Landless (0-49)	57	63.3	6	6.7	63	70.0
Marginal (50-149)	12	13.3	4	4.4	16	17.8
Small (150-249)	3	3.3	0	---	3	3.3
Medium (250-749)	3	3.3	2	2.2	5	5.6
Large >749	1	1.1	2	2.2	3	3.3
Total	76	84.4	14	15.6	90	100

Table 5.52: Landownership of MH in poverty status, for self-perception poverty, 2010

Land ownership of MH (in decimal)	Distribution of MH according to self perception Poverty				Total number of MH	
	Poor		Non-poor			
	Count	%	Count	%	Count	%
Landless (0-49)	63	70.0	0	--	63	70.0
Marginal (50-149)	15	16.7	1	1.1	16	17.8
Small (150-249)	3	3.3	0	--	3	3.3
Medium (250-749)	5	5.6	0	--	5	5.6
Large >749	3	3.3	0	--	3	3.3
Total	89	98.9	1	1.1	90	100.0

<sup>70</sup> 100 decimal = 1 acre



***(iv) Resource endowment and poverty status of MH***

All *Haor* households (including the MH) incomes mainly depend on the dry season crop cultivation and related agricultural and non-agricultural activities; this exceeds wet season income. Thus, owning cultivable land affects the financial status of MH. For income poverty, Table 5.51 shows that 84% and 16% of the MHs are poor and non-poor, respectively. Of the former, 63% are landless and 13% are marginal farmers while in the latter group, 7% are landless. This raises two issues: that all landless MHs are not poor and MHs are not always poor. Among the 70% landless migrant households, 63% are poor and only 7% are non-poor.

For self-perception poverty, Table 5.52 shows that 99% of the migrant households are poor of which landless (70%) and marginal landowners (17%) comprise almost 87%. Excluding 1.1% of marginal farmer, all other types of landowners - landless 70%, small 3.3%, medium 5.6%, and large 3.3% - are poor migrants indicating the highly negative magnitude of deluge vulnerability to *in situ* income activities of the sample households.

Overall, it is clear that the landless and marginal farmers in the study area mostly undertake seasonal domestic migration and are highly vulnerable to seasonal unemployment.

Table 5.53: Profile of migrants in the *Haor* study area, 2010

Attributes		Gender of Migrant				Total amount of migrant	
		Male		Female			
		Count	%	Count	%	Count	%
Education level	Uneducated	45	50.00	1	1.11	46	51.11
	Primary	28	31.11	4	4.44	32	35.56
	Secondary	11	12.22	0	0.00	11	12.22
	Higher secondary	1	1.11	0	0.00	1	1.11
Total		85	94.44	5	5.56	90	100.00
Age	<20	0	0.00	0	0.00	0	0.00
	20-30	29	32.22	1	1.11	30	33.33
	31-40	26	28.89	2	2.22	28	31.11
	41-50	14	25.56	1	1.11	15	16.67
	51-60	7	7.78	1	1.22	8	8.89
	>60	9	10.00	0	0.00	9	10.00
Total		85	94.44	5	5.56	90	100.00
Religion	Muslim	78	86.67	5	5.56	83	92.22
	Non-Muslim	7	7.78	0	0.00	7	7.78
Total		85	94.44	5	5.56	90	100.00
Employment status	In agriculture sector	26	28.89	3	3.33	29	32.22
	In other sectors	59	65.56	2	2.22	61	67.78
Total		85	94.44	5	5.56	90	100.00

The discussion above underscores the association between flood-induced seasonal migration and persistent poverty. Capital-deficient migrant households are most vulnerable to seasonal (and other livelihood) crises while the seasonal migration strategy deepens the poverty trap (Deshingkar & Start, 2003; Rafique & Rogaly, 2003; Rafique *et al.*, 2006).

## B. Profile of migrant

Table 5.53 depicts the seasonal migrant's profile; demographically, migrants are predominantly young males - 94% and 6% of migrants are male and female, respectively and among them 64% are below 40 years of age. Most migrants come from households with mainly uneducated heads although they reflect literacy levels close to the national average<sup>71</sup>. Among the educated migrants, 36% have a primary level of education compared to only 12% with secondary and 1% with higher secondary education. Among the migrants, 92% are Muslims and the balance non-Muslim (Hindu). Focus group discussions revealed that female seasonal migration has been obstructed by *porda* (socio-religious seclusion), cultural restrictions, social norms, gender disparity (stereotyping), insecurity and very low wages.

Seasonal migration is mainly undertaken by agricultural labour - above 32% of migrants have worked in the agriculture sector both in their home villages and destinations. Migrants are mostly poor, uneducated, landless, wage and agricultural labour, sharecroppers and marginal farmers in the *Haor* region as also reported by Rabby *et al.* (2011b).

### 5.6.2 Analysis of the simultaneous equation model (SEM)

The following SEM analysis was conducted in two successive phases linked to the objective and subjective poverty dimensions based on the methodological SEM technique delineated in Chapter 4. Prior to this, some technical issues must be clarified about the model building process irrespective of the poverty dimension. To increase the model's specification robustness, some variables are not measured: for example, accessibility to

---

<sup>71</sup> Migrant's illiteracy rate is 53.41% where the national average is 53.85%.

infrastructure helps households to improve poverty but is excluded as its inclusion makes other factors insignificant in the poverty model. Similarly, accessibility to common water resources provides employment opportunities, hence discouraging seasonal domestic migration which is also excluded from the migration model. To overcome multicollinearity, a factor of interaction between the size of cultivable land available to migrant households and dry season income ( $Land_{mh\_Di}$ ) is included in the migration equation.

#### **A. Objective poverty: Income is the threshold**

The relevant results in Tables 5.54-5.58 are pertinent to specific analytical techniques (evolved in chapter 4) which are sequentially connected and purposively applied.

##### **(i) OLS results**

The OLS results of Equation 4.6 are given in Table 5.54 in which ‘income poverty’ is the dependent variable. From the overall F-test, the model is highly statistically significant. The variable ‘cultivable land of migrant household’ is not statistically significant but is positively associated with the household’s poverty status as observed by Minot *et al.* (2003). This can be justified by the descriptive evidence in Table 5.51 that the poor comprise 1.1% of large land owners who undertake seasonal domestic migration. The focus group discussions and key informant interviews reveal that recurrent flashfloods damage the crop aggravating debt burdens year after year. This livelihood failure compels the affected households to lease out land to pay previous debts and survive thus gradually reducing their financial status. The other three independent variables are linked to the dependent variable. While seasonal domestic migration (SDM) is not statistically significant, the dry season income and education of household head retain a statistical

significance at the 1% level. The relationship between income poverty and SDM is further examined in the following analysis.

Table 5.54: OLS regression results for Equation 4.6, for income poverty

	Dependent variable	
	Income poverty	
	Coefficient	t-statistic
Constant	0.922138	24.63679***
Dry season income	-3.27E-06	7.470177***
SDM	0.077058	1.571823
Education of household head	-0.080973	3.013700***
Cultivable land of migrant household	0.000105	1.088301
F-statistics	28.16	
Observations	292	
<i>Notes: *** Significance at 1%.</i>		

Table 5.55 shows the OLS results of Equation 4.7 in which ‘seasonal domestic migration (SDM)’ is the dependent variable when the interacting factor (interaction between dry season income and cultivable land of migrant household) has not been included.

Table 5.55: OLS regression results for Equation 4.7 without interacting factor, for income poverty

	Dependent variable	
	Seasonal domestic migration (SDM)	
	Coefficient	t-statistic
Constant	0.339653	2.425433**
Dry season income	-1.55E-06	2.840764***
Household size	0.033453	2.223238**
Age of migrant	-0.002848	1.461393
Gender of migrant	-0.014131	0.118271
Cultivable land of migrant household	8.92E-05	0.761785
F-statistics	2.75	
Observation	292	
<i>Notes: ** Significance at 5%. *** Significance at 1%.</i>		

The variables - cultivable land and gender of migrant - are not statistically significant. The former has a positive association with SDM which is expected but the latter has an unexpected negative association. This anomaly is examined in the subsequent analysis.

Household size is statistically significant at the 5% level. As the head of large households cannot sustain his/her family in the non-existent labour market during the wet season, migration is the only viable alternative. This option is more viable if the household has multiple earners compared to a single earner household. Although the age of migrant is not statistically significant, a negative relationship is shown as expected. Table 5.53 reveals that 64% of migrants are in the 20-40 year cohort, while 17% and 9% of the migrants are in the 41-50 and 50-60 year cohorts, respectively. The decreasing trend of migration with increasing age confirms the inverse 'U' relationship (Hay, 1980). Though the negative association of 'dry season income' is not strong in magnitude (-1.55E-06) it is statistically highly significant at the 1% level with SDM. An interactive factor ( $Land_{mh\_Di}$ ) has been included in Equation 4.7 to overcome multicollinearity and examine the anomalies reported above.

Table 5.56: OLS regression results for Equation 4.7 with interacting factor, for income poverty

	Dependent variable	
	SDM	
	Coefficient	t-statistic
Constant	0.334876	2.418300**
Dry season income	-2.49E-06	3.894340***
Household size	0.034843	2.340577**
Age of migrant	-0.002396	1.239052
Gender of migrant	0.026839	0.225403
Cultivable land of migrant household	-0.000290	1.609301
Cultivable land*Dry season income (Interacting factor)	2.12E-09	2.745231***
F-statistics	3.60	
Observation	292	
Notes: * Significance at 10%. ** Significance at 5%. *** Significance at 1%.		

After including a mediating (interactive) factor ( $Land_{mh\_Di}$ ), the model becomes statistically highly significant in the overall test (F-test) (Table 5.56). Though the ownership of cultivable land is not statistically significant but maintains a negative association. Table 5.50 also shows that the landless and marginal farmers comprise of 70% and 18% migrants, respectively. Among the landless, 63% are poor and among the marginal farmers, 13.3% are poor (Table 5.51). These findings confirm the associations between landownership and poverty status of the respondent households.

The gender of migrant becomes positive with SDM (seasonal domestic migration) possibly meaning that migration is male dominated as shown in Table 5.53 where 94% and 6% migrants are male and female, respectively.

#### ***(ii) Results of the Hausman endogeneity error test***

After retrieving the residual from Equation 4.9, the OLS regression has been run on the following Equation 4.10 and the results given in Table 5.57. The coefficient of the retrieved residual ( $\pi_m$ ) is -1.0446 and the corresponding absolute t-statistic is 4.3839 which is

highly significant at the 1% level confirming simultaneous quandary. The results indicate that the instrumental variable strategy is necessary and Equations 4.12 and 4.7 are considered to estimate  $P_{hs}$  and  $M_h$  respectively.

Table 5.57: Results of Hausman endogeneity error test, for income poverty

	Dependent variable	
	Income poverty	
	Coefficient	t-statistic
Constant	0.523529	5.347485***
Dry season income	-2.14E-06	4.327544***
SDM	1.078325	4.622236***
Education of household head	-0.021739	0.740687
Cultivable land of migrant household	1.64E-05	0.171214
Retrieve residual from equation 4.9	-1.044646	4.383911***
<i>Notes: *** Significance at 1%.</i>		

**(iii) 2SLS result**

Table 5.58 shows that all the variables excluding ‘cultivable land of migrant household’ have the expected association. Although not significant and with a low coefficient value, the education of household head is negatively (and unexpectedly) related to income poverty. But, Jolliffe (2002) reports that average education works negatively with household income while 4.3 years of schooling does not contribute to poverty reduction (Kam *et al.*, 2005). A possible explanation is that investment in the primary level of education does not sufficiently contribute to the financial upliftment of the poor households. Engaging in available major income activities in the region does not need a formal education. Daily labour is the main income source needing high levels of physical effort. However, household with heads having higher secondary level of education can significantly cope with risks and uncertainty in rural Bangladesh (Azam & Imai, 2009). This finding may indicate the necessity of re-visiting current education policy.



Though cultivable land has a positive association with poverty, its magnitude is very low ( $1.64\text{E-}05$ ) and not statistically significant. The poverty profile of the *Haor* villages reveals that the large landowners (Table 5.11) comprise of 50% extremely and 21.4% moderately poor households. Therefore ‘dry season income’ reflects a high statistical significance at the 1% level with the household’s poverty status. Wet season constrains cultivation and shrinks employment opportunities. Therefore, SDM becomes a seasonal source of income which has a strong relationship with household income poverty at the 1% level.

Table 5.58: Results of 2SLS regression, for income poverty

	Dependent variable	
	Income poverty	
	Coefficient	t-statistic
Constant	0.523529	5.352326***
Dry season income	-2.14E-06	4.331462***
SDM (Mean value)	1.078325	4.626420***
Education of household head	-0.021739	0.741357
Cultivable land of migrant household	1.64E-05	0.171369
F-statistics	34.70	
Observation	292	
<i>Notes: *** Significance at 1%.</i>		

## **B. Subjective poverty: Self-perception is the threshold**

The results of the analysis when ‘self-perception poverty’ is the dependent variable are reported in Tables 5.59-5.63. In this process, the sequential arrangement of equations given in Chapter 4 has been followed. All the techniques are mutually connected and purposively applied where appropriate.

Table 5.59: OLS regression results for Equation 4.6, for self-perception poverty

	Dependent variable	
	Self perception poverty	
	Coefficient	t-statistic
Constant	0.983825	38.44286***
Dry season income	-8.28E-07	2.770892***
SDM	0.072234	2.154945**
Education of household head	-0.044602	2.427842**
Cultivable land of migrant household	-0.000114	1.736901*
F-statistics	13.02	
Observation	292	
<i>Notes: * Significance at 10%. ** Significance at 5%. *** Significance at 1%.</i>		

Table 5.60: OLS regression results for Equation 4.7 without interacting factor, for self-perception poverty

	Dependent variable	
	SDM	
	Coefficient	t-statistic
Constant	0.339653	2.425433**
Dry season income	-1.55E-06	2.840764***
Household size	0.033453	2.223238**
Age of migrant	-0.002848	1.461393
Gender of migrant	-0.014131	0.118271
Cultivable land of migrant household	8.92E-05	0.761785
F-statistics	2.75	
Observation	292	
<i>Notes: ** Significance at 5%. *** Significance at 1%.</i>		

**(i) OLS results**

The OLS results of Equation 4.6 are given in Table 5.59 where ‘self perception poverty’ is the dependent variable. The overall F-test of the model is highly statistically significant. The significant level of variables varies between 1%- 10%. The variable ‘cultivable land of migrant household’ is statistically significant at the 10% level but has a very low coefficient value of -0.000114 negatively associated with household poverty status. This result does not coincide with the finding in Table 5.54 but is expected. The other three independent

variables also have a pertinent relationship with the dependent variable. Among them, dry season income is statistically significant at the 1% level while education of household head and seasonal domestic migration maintain a comparatively stronger association than other variables at the 5% level of statistical significance.

Table 5.60 shows the OLS results for Equation 4.7 where ‘seasonal domestic migration’ is the dependent variable; these are partial results since the interacting factor has not been considered at this stage of the analysis.

Table 5.61: OLS regression results for Equation 4.7 with interacting factor, for self-perception poverty

	Dependent variable	
	SDM	
	Coefficient	t-statistic
Constant	0.334876	2.418300**
Dry season income	-2.49E-06	3.894340***
Household size	0.034843	2.340577**
Age of migrant	-0.002396	1.239052
Gender of migrant	0.026839	0.225403
Cultivable land of migrant household	-0.000290	1.609301
Cultivable land*Dry season income (Interacting factor)	2.12E-09	2.745231***
F-statistics	3.60	
Observation	292	
Notes: ** Significance at 5%. *** Significance at 1%.		

The three independent variables – ‘dry season income’, ‘age of migrant’ and ‘gender of migrant’ - have negative relationships with SDM. Among them, ‘gender of migrant’ would be expected to be positive but does not. Dry season income and household size are statistically significant at the 1% and 5% levels, respectively. The significance of household size may mean that (a) since the large size households are poverty stricken, they are highly vulnerable to the annual monsoonal deluge thus forcing SDM, and (b) if the

household has more than one earner, livelihood diversification elsewhere is more feasible than for single earner households.

The variable - ‘cultivable land of household’ – shows an anomalous positive association with SDM for which clarification will be provided later.

Table 5.61 provides relatively more reasonable results than Table 5.60 and reflects the impact of interactive factors in the model. With this improved model specification, two important findings appear: (a) although not significant, ‘gender of migrant’ has a positive relationship with SDM, and (b) ‘cultivable land of migrant household’ has a negative association with SDM. Both findings correct the anomalies observed in Table 5.60. From Table 5.52, landless and marginal farmers constitute 88% of the migrants; among them, 70% and 17% are poor migrants who are respectively landless and marginal farmers.

***(ii) Results of the Hausman endogeneity error test***

After retrieving the residual from Equation 4.9, the OLS regression was run on the following Equation 4.10 and the results given in Table 5.62. The coefficient of the retrieved residual ( $\pi_m$ ) is -0.3166 and the corresponding absolute t-statistic is 1.8932 highly significant at the 10% level. Therefore, the simultaneity quandary can be presumed and the results confirm that the instrumental variable technique is essential. In this case, Equations 4.12 and 4.7 can be considered to estimate  $P_{hs}$  and  $M_h$ , respectively.

Table 5.62: Results of Hausman endogeneity error test, for self-perception poverty

	Dependent variable	
	Self perception poverty	
	Coefficient	t-statistic
Constant	0.862990	12.55758***
Dry season income	-4.88E-07	1.403636
SDM	0.375762	2.294595**
Education of household head	-0.026645	1.293339
Cultivable land of migrant household	-0.000141	2.105163**
Retrieve residual from equation 4.9	-0.316677	1.893219*
Notes: * Significance at 10%. ** Significance at 5%. *** Significant at 1%		

**(iii) 2SLS result**

In Table 5.63, all the variables have the expected association with SDM. Education of household head has the expected negative relationship with poverty for both OLS and 2SLS, and becomes statistically non-significant because although education may not make a remarkable difference in the quantum of remittances by the migrant, it allows the option of obtaining labourious work at the destination. It is noteworthy that while education increases household income in rural Bangladesh, household heads having higher secondary level of education are not extremely poor and those with a degree are the non-poor (Table 5.9) as reported by Rabby *et al.* (2011 a,b).

Cultivable land has a negative association with self-perception poverty at the 5% level of significance, while the dry season income is not statistically significant although it retains a negative association with the dependent variable. The migrants are mostly landless and marginal farmers whose livelihood is heavily dependent on daily labour inputs in crop cultivation. Dry season wage income is, however, insufficient for savings even during good harvests. SDM thus becomes a strategy to cope with *in situ* unemployment during the wet

season and to sustain year round livelihood (Rabby *et al.*, 2011b); thus, SDM is positively and statistically significant at the 5% level.

Table 5.63: Results of 2SLS regression, for self-perception poverty

	Dependent variable	
	Self perception poverty	
	Coefficient	t-statistic (absolute)
Constant	0.862990	12.51395***
Dry season income	-4.88E-07	1.398759
SDM (Mean value)	0.375762	2.286623**
Education of household head	-0.026645	1.288845
Cultivable land of migrant household	-0.000141	2.097849**
F-statistics	13.20	
Observation	292	
<i>Notes: ** Significance at 5%. *** Significance at 1%.</i>		

### 5.6.3 Relationship between poverty and seasonal domestic migration

As poverty is investigated from the objective and subjective perspectives in this study, it provides a comprehensive picture of the causal linkages between poverty and seasonal migration in the livelihood strategies of the respondent villages. Its ramifications are explored below.

#### A. The case of income poverty

The statistical results examining the link between poverty and SDM are given in Table 5.64. Both for the poverty and migration models, the overall significance level varies between 1%-10%. The migrant's age and gender in the migration model are insignificant; these explanatory variables have the expected association with the dependent variable (Bhuyan, Harun-ar-Rashid & Ahmad, 2001). Table 5.64 shows that land holding and seasonal domestic migration propensity are positively associated but not statistically

significant. However, when the interacting factor ( $Land_{mh\_Di}$ ) is included, household land holding confirms the expected negative association with migration propensity.

In the poverty model, HH education level in the OLS is highly significant but is insignificant in the 2SLS implying that migrants find their livelihood means either in crop cultivation or low income non-farm activities where education is not a strong determinant of earnings.

In both the OLS and 2SLS, the relationship between cultivable land size and the household's poverty status, although not statistically significant, is positive as unexpected. It may imply that the precarious monocropping regime increases the challenges and uncertainties involved in the livelihood strategies of the *Haor* community. The relationship may not coincide with the household's self-perception poverty when it is considered as a dependent variable which is further studied in the following section.

The most important 'poverty-migration' linkage has been established in 2SLS stage. Migration retains a high magnitude (1.0783) with positive relationship to poverty, as expected, and with a statistical significance at the 1% level. The lack of a labour market in the wet season forces the poor to undertake seasonal domestic migration as a livelihood diversification strategy in which remittances become a major income source.

## **B. The case of self-perception poverty**

For all four models of poverty and migration (Table 5.65), the overall significance level varies from 1%-10%. While the age and gender of migrant in the migration model are insignificant, the former explanatory variable has a negative and, later, a positive association with seasonal migration (equation 4.7 with interactive factor) which is logically

and theoretically expected (Hay, 1980; Rabby *et al*, 2011b; Deshingkar & Grimm, 2004). The effect of household's cultivable land on migration propensity depends on land holding size. Table 5.65 shows that landholding and seasonal migration are positively associated as unexpected but statistically non-significant. However, when the interacting factor ( $Land_{mh\_Di}$ ) is included, the relationship confirms the expected negative association between landownership and seasonal domestic migration (SDM).

Dry season income is a statistically highly significant variable in the OLS poverty equation but becomes non-significant in the 2SLS possibly implying that most migrant households are incapable of saving during the crop season. Poverty has seasonal attributes, inasmuch as the wet season<sup>72</sup> (deluge) income strongly influences the poverty perception of households as the absence of a functioning labour market in the wet season increases the motivation and propensity to undertake SDM. In the 2SLS equation, migration becomes highly statistically significant and retains a positive association with poverty status which confirms its contribution to the livelihood of the poor households.

The expected negative association between land holding and household poverty in the 2SLS stage is found to be statistically significant at the 5% level with a very small coefficient value (-0.0001); its rationale is that monocropping is subject to flashfloods causing massive crop damage ultimately increasing debt burdens and pushing households into poverty. This result differs from the previous findings (Table 5.64) by proving the rigidity of the relationship between poverty and seasonal domestic migration.

---

<sup>72</sup> Non-crop season



Table 5.64: OLS and 2SLS estimates of the impact of seasonal domestic migration on income poverty status of the *Haor* households

	Dependent Variables			
	OLS estimates			2SLS estimates
	$P_{hs}$ equation 4.6 (1 if household is poor)	$M_h$ equation 4.7 (but interactive factor)	$M_h$ equation 4.7	$P_{hs}$ equation 4.12 (1 if household is poor)
$M_h$ (1 if household has at least one migrant)	0.0770 (1.5718)	---	---	1.0783 (4.6264)***
$D_i$ (in Taka)	-3.27E-06 (7.4701)***	-1.55E-06 (2.8407)***	-2.49E-06 (3.8943)***	-2.14E-06 (4.3314)***
$Land_{mh}$ (in decimal)	0.0001 (1.0883)	8.92E-05 (0.7617)	-0.0002 (1.6093)	1.64E-05 (0.1713)
$EDE_{hh}$ (level of education)	-0.0809 (3.0137)***	---	---	-0.0217 (0.7413)
$AGE_m$	---	-0.0028 (1.4613)	-0.0023 (1.2390)	---
$GEN_m$ (1 if male)	---	-0.0141 (0.1182)	0.0268 (0.2254)	---
$HH_{size}$	---	0.0334 (2.2232)**	0.0348 (2.3405)**	---
$Land_{mh\_Di}$	---	---	2.12E-09 (2.7452)***	---
Constant	0.9221 (24.6367)***	0.3396 (2.4254)**	0.3348 (2.4183)**	0.5235 (5.3523)***
Observations	292	292	292	292
Notes: Absolute value of <i>t</i> -statistics in the parentheses. * Significance at 10%. ** Significance at 5%. *** Significance at 1%.				

Table 5.65: OLS and 2SLS estimates of the impact of seasonal domestic migration on self perception poverty status of the *Haor* households

	Dependent Variables			
	OLS estimates			2SLS estimates
	<i>P<sub>hs</sub></i> equation <b>4.6</b> (1 if household is poor)	<i>M<sub>h</sub></i> equation <b>4.7</b> (but interactive factor)	<i>M<sub>h</sub></i> equation <b>4.7</b>	<i>P<sub>hs</sub></i> equation <b>4.12</b> (1 if household is poor)
<i>M<sub>h</sub></i> (1 if household has at least one migrant)	0.0722 (2.1549)**	---	---	0.3757 (2.2866)**
<i>D<sub>i</sub></i> (in Taka)	-8.28E-07 (2.770892)***	-1.55E-06 (2.8407)***	-2.49E-06 (3.8943)***	-4.88E-07 (1.3987)
<i>Land<sub>mh</sub></i> (in decimal)	-0.0001 (1.7369)*	8.92E-05 (0.7617)	-0.0002 (1.6093)	-0.0001 (2.0978)**
<i>EDE<sub>hh</sub></i> (level of education)	0.0446 (2.4278)**	---	---	0.0266 (1.2888)
<i>AGE<sub>m</sub></i>	---	-0.0028 (1.4613)	-0.0023 (1.2390)	---
<i>GEN<sub>m</sub></i> (1 if male)	---	-0.0141 (0.1182)	0.0268 (0.2254)	---
<i>HH<sub>size</sub></i>	---	0.0334 (2.2232)**	0.0348 (2.3405)**	---
<i>Land<sub>mh_Di</sub></i>	---	---	2.12E-09 (2.7452)***	---
Constant	0.9838 (38.4428)***	0.3396 (2.4254)**	0.3348 (2.4183)**	0.8629 (12.5139)***
Observations	292	292	292	292
Notes: Absolute value of <i>t</i> -statistics in the parentheses. * Significance at 10%. ** Significance at 5%. *** Significance at 1%.				

#### 5.6.4 Conclusion

Seasonal migrant households are mostly poor, 70% of migrant households are landless and 3.3% are large landowners. In the case of dry season income, 72% of MHs are extremely poor. For income poverty, all landless MHs are not poor and MHs are not always poor. For self perception poverty, 99% of the MHs are poor of which 70% are landless and 17% are marginal landowners. These households are economically vulnerable to *in situ* income activities during the wet season.

Seasonal migrants mainly comprise the uneducated, young male and capital-deficient wage labourers, marginal farmers and sharecroppers seeking work in other agricultural regions during the wet season. The empirical relationship between household poverty status and seasonal domestic migration has been found logical and effective for livelihood diversification in the *Haor* region.

## **6. DISCUSSION, CONCLUSION AND POLICY RECOMMENDATIONS**

### **6.1 Introduction**

This chapter discusses all the research questions in the context of the findings based upon the data analysis and interpretations. The theoretical support is provided to strengthen the reliability of the research findings and the four analytical approaches of this study. The discussion leads to conclusion of this study, policy recommendations and topical areas for further investigations.

### **6.2 Discussion**

#### **6.2.1 Socio-demographic characteristics of the *Haor* archipelago**

The socio-demographic characteristics of the survey population relate to individuals and households and cover age, sex, family size, marital status, education and occupation. In the sample population, 94.5% are male and 5.5% are female-headed households. Most male household heads (33.3%) fall in the age range of 31-40 years. For both sexes, 58.9% (26.4% for the 20-30 and 32.5% for the 31-40 age group) of household heads fall in the 20-40 age group bears upon family decision-making on borrowing, undertaking migration, managing marriage ceremonies, childrens' schooling, etc. The demographic evidence shows a diminishing trend in the number of household heads above 60 years and may be associated with family hierarchy, individual responsibilities for the family and the processes of an individual's capital entitlement. Most of the elderly people are given low preference in the wage labour market since they possess very low or no potential for employment or they become physically incapable. This inactive group of people are mostly poor as reported by World Bank (2001).

From the interview data, marital status, gender and age of household heads were extracted; 95.3% of the male and 25% of the female-headed households are married; 4.3% of the male and 6.3% of the female-headed households are unmarried and divorced, respectively, while 68.8% of the female-headed households are widows. A trend is discernible that teenage household heads are rare for both sexes as the villagers do not normally marry before 20. However, 55.8% of the men in the 20-40 age group do marry. Along with the widows, another vulnerable group of female-headed households are those who are divorced (6.3%). The widows are concentrated more in the middle age cohort although the data also shows that there are 12.5% women who are widows in the age group of 20-30 years.

The results of analyzing marital status with education and gender reveal that 47.5% of uneducated males and 25% of uneducated females are married. The ratio of unmarried men who have at least a primary level of education is higher than the unmarried uneducated men. The inference is that either educated men intend to be financially solvent before marriage or are incapable of entering the existing labour market to earn enough income to manage a married life. The data show a zero divorce rate among educated females: this means that education may protect them from becoming vulnerable and helps in retaining a good understanding of family livelihood in various ways.

Most of the respondents are uneducated as was expected. During the crop season (dry season), 59.6% and 25.3% are farmers and daily labourers, respectively. Unemployed household heads not engaged in income generating activities only constitute 1.4%. Across educational qualification, 45.4%, 33.9% and 17.2% of the farmers are uneducated, or have a primary and secondary level of education, respectively. For daily wage labour, 16.1% are

uneducated and 8.2% have primary education. Among the sample villages, 4.8% of all households report business as the main occupation during the crop season; among them, 2.1% and 1.4% have attained primary and secondary levels of education, respectively.

In the non-crop season (wet season), 25% and 22.9% of the sample households' main occupations are daily labouring and fishing, respectively. Seasonal migrants also reported working as daily labourers in agriculture farms at the destination for 2-3 months. Diversification of work is also reported as people change from being involved in farm activities to fishing and business.

Household heads involved in business increased to 15.4% during the wet season, and among them, 7.2% have primary education while generally they have a degree level education. Unemployed household heads constitute 27.1% which is an indication of the slackening wet season labour market. These unemployed household heads are mainly farmers who consume their crop season savings during the non-crop season thus affecting the process of capital formation.

### **6.2.2 The poor in the sample villages**

The poor in the sample villages depend mainly on dry season crop cultivation and related activities and wet season fishing. These limited income sources affect the household's poverty status which varies with gender, marital status, age, education and landownership; thus the poor are heterogeneous in character. Although the poverty profile has been delineated in Chapter 5, their general characteristics discussed below.

Females who are widows and divorced are extremely vulnerable; they are financially more deprived, often encounter gender discrimination that makes them

economically powerless, socially insecure and less productive. The old people suffer more poverty than the youth; they have low resource endowment and are accorded low preference for labour intensive work. The uneducated, who form the majority of the poor, are directly involved in crop cultivation and related activities.

The farmers and daily labourers are the poor who are involved in fishing, petty trading and share cropping activities. Together with the marginal farmers, some large landholders are also poor as they encounter increasing pressures from ecological vulnerabilities, annual monsoonal deluge, expensive or scarce credit, rising input prices and poor quality physical infrastructures. Many are thus forced to search for their livelihoods elsewhere.

Most of the landless villagers are extremely poor non-cultivators in the sample villages. They are mostly uneducated, married and having large families, they are mainly wage labourers facing the vulnerable seasonal labour market. They face more difficulties in accessing credit sources, natural resources, infrastructure and services in the study villages.

Overall, the poor are uneducated and primarily belong to landless, marginal farmer and female-headed households. The old household heads, landless, divorcees and widows are the extremely poor while the last two groups are the most vulnerable. The poor are involved in daily labour, share cropping, farming, fishing and migration. Not all the landless are poor while not all the large landowners are non-poor.

The above discussion confirms the findings of other studies (Singh & Hazell, 1993; Maloney 1986; Sen, 2003; A.U. Ahmed, 2004; Minot *et al.*, 2003; Kazal *et al.*, 2010; Khan & Islam, 2005; Rahman & Razzaque, 2000) reviewed in Chapter 3.

### **6.2.3 Sources of income in the sample villages**

The actual and potential sources of income for the dry (crop season) and wet (non-crop season) seasons are given in Table 6.1. Agriculture and mono-cropping is the main source of household income. Animal husbandry (cows, goats and poultry) is mainly for subsistence purposes and not as an additional cash income source; sometimes cows and goats are sold in emergencies to meet crises. Currently, duck farming is being undertaken and both ducks and eggs are sold to supplement household income.

Along with paddy cultivation, fishing also provides some extra income during the crop season, in the village river at ebb-tide and the wet season (non-crop season). Few people undertake market mediation (for example, petty trading) of rice. As the alternative income sources are virtually non-existent for the poor during the wet season, most undertake seasonal domestic migration.

During the dry season, the villagers do not cultivate green vegetables and other spring harvests as before. Vegetables were distributed to neighbors and relatives and were given to them as and when they asked for it. People used to share such resources in the past. However, nowadays, nothing is free; there is lack of a community feeling, and the traditional social ties have become weak. Villagers sell their produces for cash.



Table 6.1: Different income sources of the 5 sample villages, 2010

Current income sources		Potential income sources
Crop season	Non-crop season	
Rice cultivation	Boat renting	Cooperative fish culture
Livestock rearing	Livestock rearing	Individual in-net fish culture
Forestry	Forestry	Pearl culture
Fisheries	Fisheries	Poultry farm
Vegetable cultivation	Market mediation	Dairy farm
Homestead vegetable gardening	Homestead vegetable gardening	Handicraft or handloom
Agricultural labour	Boating	Large scale oil seeds and pulse cultivation
Wage labour	Wage labour	Duck rearing
Artisan activities	Artisan activities	Fish hatchlings
Hawking	Restaurant	Teaching
Construction	Business	Tailoring training
Transport	Religious activities	Tourism
Hotel & restaurant	Village doctor	Large scale livestock rearing
Business	Seasonal domestic migration	Community based credit scheme
Services	Services	Trading and market mediation
Religious activities	Midwife	Communication
Village doctor	Quack	Mechanical plowing system
Rent out land	--	Incubating duck eggs
Midwife	--	Handloom
Quack	---	Small scale fish processing enterprise

Source: Survey data, 2010

Technology also assists to diversify income in various ways; nowadays, the villagers earn income through providing digital videos and mobile telephones. Threshing machines are also a source of income for some people, together with tractors to plow the land, power pump engines for irrigation and rice milling services.

Villagers have migrated to other villages, towns and cities and, in the process, have observed, experienced and learned new ideas and been exposed to new products. Some individuals have become middlemen selling rice and dried fish. However, not everybody

has the capital or entrepreneurial skills or are willing to take the risks of being involved in business undertakings.

#### **6.2.4 Management of income in the study households**

The predominant part of the income generated from the sources mentioned above is used to meet household commitments. This allows little scope for savings and investment to raise productivity and escape the poverty trap in the study area.

Among the sample population, 59.6% are farmers having income only from dry season while 25% are daily labourers working in both dry and wet seasons. The income earned is used mainly for consumption of basic needs and schooling for children, house renovations, and homestead construction. Health costs consume a large part of this income together with dowry payments. Whatever savings are available are used for medical costs, to cover the mortgage of land and investments in livestock. Crop season earnings are used to cope with the monsoonal deluge when income opportunities for the majority of the population are marginalized.

Agriculture is the main source of income for the study villages and this is subject to ecological factors (Orr *et al.*, 2009; Nargis & Hossain, 2006; Ali, 1995). As higher returns can be obtained in the non-farm sector, to escape the spatial poverty traps (Minot & Baulch, 2005), occupational mobility is gradually increasing. Three decades ago, social networks were very strong in rural Bangladesh (Maloney, 1986) but these ties are almost absent now (Orr *et al.*, 2009). For social networking, education is a useful instrument as it enhances economic outcomes (Rabby *et al.*, 2011a). Rural people divest land to invest in education and migration (Orr *et al.*, 2009). To increase incomes, technology is required for which

education, training and skills are needed for its adoption (Rabby *et al.*, 2011a). Proper management of income contributes to savings and capital formation for which financial training for the rural household heads is needed (Rabby *et al.*, 2011a).

### 6.2.5 Major income determinants of the sample households

The strong correlation that exists between poverty and income has been empirically justified in different studies (Aikaile, 2010; Rahman, 2009; Chaudhry, 2003); its links have not been explored yet in the *Haor* region. In this study, the income determinants of the study households are investigated from two broad levels: the community as a whole and the individual households. These are displayed in Tables 6.2-6.8 below.

Table 6.2: Income determinants for the community, 2010

Serial no	Income determinant	Observed association
1	Accessibility to public credit	Positive
2	Seasonal domestic migration (remittances)	Positive
3	Household size	Negative
4	Dry season income	Positive
5	Age of household head	Negative
6	Household head works as a labour in crop cultivation	Negative

Table 6.3: Income determinants for the daily labour-headed households, 2010

Serial no	Income determinant	Observed association
1	Seasonal domestic migration (remittances)	Positive
2	Household size	Negative
3	Dry season income	Positive
4	Age of household head	Negative

Table 6.4: Income determinants for the landless households, 2010

Serial no	Income determinant	Observed association
1	Accessibility to public credit	Positive
2	Seasonal domestic migration (remittances)	Positive
3	Household size	Negative
4	Dry season income	Positive
5	Education of household head	Negative
6	Age of household head	Negative
7	Household head works as a labour in crop cultivation	Negative

Table 6.5: Income determinants for the non-poor households, 2010

Serial no	Income determinant	Observed association
1	Household size	Negative
2	Household head works as a labour in crop cultivation	Negative

Table 6.6: Income determinants for the aggregated poor households, 2010

Serial no	Income determinant	Observed association
1	Accessibility to public credit	Positive
2	Seasonal domestic migration (remittances)	Positive
3	Household size	Negative
4	Dry season income	Positive
5	Household head works as a labour in crop cultivation	Negative
6	Age of household head	Negative

Table 6.7: Income determinants for the moderately poor households, 2010

Serial no	Income determinant	Observed association
1	Seasonal domestic migration (remittances)	Positive
2	Dry season income	Positive
3	Household size	Negative
4	Amount of cultivable land	Negative

Table 6.8: Income determinants for the extremely poor households, 2010

Serial no	Income determinants	Observed association
1	Accessibility to public credit	Positive
2	Dry season income	Positive
3	Seasonal domestic migration (remittances)	Positive
4	Household size	Negative
5	Age of household head	Negative
6	Natural deluge ( <i>Borsha</i> )	Positive
7	Household head works as a labour in crop cultivation	Negative

Information in Tables 6.2-6.8 is not generalisable for all the 5 study districts as there are diverse determinants for low income for different households and the community. Accessibility to public credit facility is an important income determinant for the whole community and inaccessibility impacts strongly on the landless and extremely poor. The other two most important income determinants are remittances earned from SDM and dry season income for all types of households excluding the non-poor. The size of the household and the employment status of household head are the two most important income determinants for the non-poor household.

The results of econometric analysis reveal that, among the independent variables, accessibility to public credit, remittances, dry season income consistently maintain a positive association with household average income. The other variables in a negative relationship include household size, age of household head and the employment status of household head. Education of household head has a negative relationship with the average income of landless households. It implies that low level of education cannot uplift financial status of the poor live the geographically difficult ecologies (Singh and Hazell, 1993).

Cultivable land is a significant explanatory variable for the per capita income of the moderately poor households. Its negative relationship implies that the risks of crop

cultivation are very high in the study area- climatic factors like hailstorms, dry weather and ecological factor like flashfloods and its recurrent nature damage crops and contribute to the debt burden. Recovering from these losses and reaching a state of 'balance' requires 3-4 good and consecutive harvests which is a rare reality in the *Haor* ecosystem. This finding is not ambiguous since all the resource rich households are not non-poor (Singh & Hazell, 1993) and landownership often degrades household income in ecologically vulnerable and geographically remote areas (Minot *et al.*, 2003).

The environmentally-linked annual monsoonal deluge is significantly and positively associated with the average income of the extremely poor households. This result is not unexpected since fishing is the main source of wet season income for the study households (Rabby *et al.*, 2011b) and 49% fisherman are extremely poor (Alam, 2005). Having low capital endowments, the extremely poor households are usually involved in the *in situ* income opportunities available in the ecosystem (Mehta & Shah, 2003) as they are mostly uneducated and financially incapable to invest in small business and seasonal petty trading. However, almost all the sample villagers are engaged in fishing even though catches are insufficient for an average household or a significant income source for others.

#### **6.2.6 Interruptions to household livelihoods**

Livelihoods in the study area are onerous either because of demographic factors or the environmental and ecological attributes of the area or its geographical remoteness.

The mean size of the study household is 5.12 which is larger than the national average of 4.7; the average number of earners per household is 1.41 while the average inverse household dependency ratio is 0.308 which is low. The study informants attributed

this to the gradually declining land–man ratio which interrupts the livelihood efforts and requires other supplementary income sources.

Flashfloods are the single most significant natural calamity identified by the study respondents with both horizontal and vertical effects on the local livelihood and national economy. Data reveal that every 5 years, flashfloods affect the area at least once causing huge crop damage and interrupting poverty reduction efforts.

As an environmental factor, the annual monsoonal deluge (*borsha*) affects livelihoods by squeezing employment opportunities and enhancing vulnerabilities as the villagers cannot cultivate cereals, vegetables or other crops. High waves and storms often damage houses, erode homesteads, constrain fishing and other market mediation activities. Also, the villagers cannot move anytime anywhere they need to go as the boat service is the only means of transportation and not available throughout the day. Livestock food and fire wood cannot be collected. Children are at risk because of the water level and often are not sent to school.

Poverty eradication interventions to upgrade rural livelihoods have positive links to infrastructure (roads, irrigation facilities, electricity), accessibility to growth centers, educational institutions, health services, etc. (Kam *et al.*, 2005) and geographical location of the area (Rahman, 2009). The infrastructure facilities enhance household capabilities to earn incomes, reduce transportation costs and increase the price of farm produce (Wanmali & Islam, 1997). The link of family, family size and poverty reduction is embedded in social norms related primarily to investments in childrens' education and long term prospects (Maloney, 1986; Becker, 1988).

Flashfloods substantially exacerbate the challenges of development in the region. In 2004, 30,696 families (154,370 people) were affected by early flashfloods in two sub-districts (Mohangonj and Khaliajuri) of Netrokona district. 75% crops were damaged and to meet monetary needs of the affected villagers, 25% -40% of the livestock had to be sold at 60% -70% of the actual price; villagers also could not access credit, while the labour market was squeezed to the margin (DER Secretariat, 2004). Such natural disasters impede the collection of natural fodder which discourages livestock rearing (Orr *et al.*, 2009) in rural Bangladesh.

#### **6.2.7 Livelihood diversification strategies**

The *Haor* households initiate diverse livelihood strategies to cope with the vulnerabilities of the ecology and the environment of the region. These are subject to and constrained by household capabilities (asset endowment) and the transforming structures and processes which can assist or hinder the enhancement of the household poverty status (Mukherjee *et al.*, 2002). However, the ultimate goal of undertaking strategies is to escape poverty by increasing income and reducing risks.

Different types of households undertake diverse livelihood strategies associated with their individual characteristic and attributes; while some strategies are exclusive to specific groups of household, common strategies have also been observed. The female-headed households undertake strategies that reflect their vulnerabilities as they are endowed with the least resources. They prepare and sell firewood, work as servants, stop children for attending school and send their young sons to work as wage labour. Since all these strategies are related to dry season activities, they confront immense livelihood pressures during the wet season.



The extremely poor landless households also work as labourers and undertake short term seasonal domestic migration yearly to overcome wet season unemployment. To supplement incomes, they engage in fishing, stop children schooling and overlook health problems. They borrow to feed the household while some Hindu villagers specialize in making idols. The landless daily labourers who are also involved in share cropping also migrate seasonally during the wet season but work only in the agriculture sector for 2-3 months at the destination. They are reluctant to learn new work skills in order to diversify livelihoods into the non-farm labour market. They borrow at high interest rate, stop their children from attending school, consume inferior quality and in smaller amounts, and even resort to eating only once daily if flash floods ruin the dry season crop.

The extremely poor do not have any natural resources except a very small homestead plot. Seasonal domestic migration is an inevitable livelihood strategy for them and they also fish during the wet season. Dry season unemployment compels them to borrow from the *mohajon* (local money lender) at high interest rates to feed family members. They mortgage their homesteads if large loans are needed.

The uneducated marginal farmers who are also daily wage labourers are extremely poor but relatively better off than others in this cohort as they own capital like livestock, fishing gears and boats. Fishing is the main source of wet season income for them. As a livelihood strategy, they do *howlat* (interest free loan from relatives, friends and neighbors) before controlling quality and quantity of daily food consumption. They divest their movable assets and subsequently lease out and sell cultivable land but do not migrate seasonally.

The moderately poor marginal farmers who are daily labourers as well are much more homogeneous in owning than other groups. 80% of them undertake seasonal domestic migration for 4-5 months during the wet season, if flashfloods damage the dry season crop. They rear cows and sell milk, vegetables and seasonal fruits, and engage in fishing and seasonal fruit trading. Selling livestock is their first choice in divesting capital to meet emergencies.

The moderately poor medium farmers who are tenant migrate rarely during the wet season. Since they have the highest capital endowment compared to the groups above, they have the highest individual and household levels of diversifying livelihoods by sharing threshing machines and hand trolleys, petty business, renting out boats, homestead vegetable gardening, livestock and fowl rearing.

As the poor *Haor* households are heterogeneous in character, they experience different adversities and prospects. They differ in capital endowment or investment (education, land, accessibility to credit) and sources of income. Their livelihood strategies are shaped by the annual monsoonal deluge, flashfloods, natural resources (*beels* and other water bodies), credit facilities, social relations (kinship, gender), *in situ* economic opportunities, etc. During the wet season, the poor undertake seasonal domestic migration applying their labour skills but are reluctant to learn new work skills which is a major constraint in extending their sources of work and income.

#### **6.2.8 Asset accessibility and household poverty status**

The analysis of assets and livelihoods confirm that one type of capital is closely linked with another. Lack of one asset could be constrain the use of another while accumulation or

preservation of one asset (skills or natural forest resources) can alleviate burdens and open up new livelihood avenues. Therefore, assets should be nurtured and managed properly to achieve an optimal increment of other assets. The interdependency and consequent reciprocal association between assets has been conceptualized by the pentagon pyramid in the SLA.

#### **A. Relationship among assets**

From the asset linkage diagrams (Figures 5.19-5.21) the understanding is deduced that a single endowment can generate multiple benefits. Households that have secure access to land can also have well-endowed credit facilities. The land produces crops that alleviate food shortages and becomes the collateral that makes households eligible for public loans.

Human capital also facilitates the entry into and use of informal credit sources. Education, skills and a healthy physique represent considerable collateral to the money lender. Households possessing such capital are given priority in sharecropping and livestock rearing in the villages. Education and skills increase social prestige and extend social networks thus generating social capital.

#### **B. Relationship between access to assets and household poverty status**

The SLA reveals the significance and consequences of asset endowments in the villagers' livelihoods. Tables 5.38-5.40 reveal that asset ownership creates advantages and conversely its absence brings disadvantages to the livelihood searching. In this regard, three types of household (female-headed, male-headed moderately poor and extremely poor households) suffer disadvantages in magnitude and control over 5 different types of capital as elaborated below.

***(i) Human capital and poverty***

The extremely poor households reflect the lowest human capital followed by the female-headed and moderately poor households. Both the extremely poor and female-headed household reveal access deficiencies to education as the involved outlays are unaffordable (Figures 5.19-5.21). They are the most vulnerable households in the *Haor region* (Rabby *et al.*, 2011a). To improve human capital, the vulnerable households have to borrow from local informal sources which they do not have easy access compared to the moderately poor households. Since the latter have relatively better access to human capital (Figure 5.20), they benefit by being involved in market mediation (small scale buying and selling rice, paddy and fruits) and small businesses (tea stalls) while the female-headed households have the opportunity of being involved in tailoring and handicraft work. On the other hand, the extremely poor households lack these additional skills and are dependent on their physical labour which is vulnerable to health problems. Education extends the scope to search for livelihoods in the non-farm sector (Nargis & Hossain, 2006; Sen, 2003; Rabby *et al.*, 2011b). On average, the moderately poor have a higher level of educational attainment than the extremely poor; the educated migrants from the former group earn more income and send back higher remittances than the latter (Rabby *et al.*, 2011b) since human capital endowment increases labour productivity (Albert & Collado, 2004).

***(ii) Social capital and poverty***

The moderately poor households have the highest access to social capital followed by the female-headed and extremely poor households. The moderately poor households have the highest magnitude of social capital for which they get privileged access to the sharecropping market and local *shalish*. They can team together more easily than other

types of household heads and thus obtain membership in the Grameen *somiti*. Relatively higher human capital investments enable them to extend social networks outside villages enabling livelihood diversification elsewhere (Gardener & Ahmed, 2006). Female-headed households are socially barred from being involved in fishing together with facing discrimination in claiming rights, migration and direct labour participation in crop cultivation, etc.; these negative reinforces are both a cause and consequence of weak endowments of social capital (Maloney, 1986). Similarly, the extremely poor do not have reasonable access to different types of informal credit sources, government provided incentive programs and sharecropping negatively impacting their financial status and ability to break the vicious poverty circle (Rahman & Islam, 2003).

### ***(iii) Natural capital and poverty***

Although all three types of households differ in the magnitude of natural capital ownership, they endure similar access deficiencies. Cultivable land is the main natural capital for the moderately poor household whereas the others are mostly landless. The aggregate effects of human, social and natural capital produce additional advantages to the moderately poor households. Flashfloods affect all equally by damaging crops, constraining the labour market and squeezing credit sources (Rabby *et al.*, 2011 a, b; DER Secretariat, 2004). None of these households have free access to *beels*. In comparison, the moderately poor households can manage to finance their entry into a specific zone of the leased out *beels* for a specific time period. Though some of them rear livestock for extra income, the monsoonal deluge constrains fodder collection. Reed forests in the region are no more visible now as formerly thus affecting household incomes as there are no natural supplies of firewood, livestock fodder, materials for homestead protection walls, etc. Taken together, the

vulnerable households confront seasonal livelihood failure and the perpetuation of their poverty status.

Since the poorest peoples' livelihoods are predominantly dependent on natural resources, they exploit them the most (Jensen, 2003; Hanjra *et al.*, 2009), constraining livelihood diversification (Hossain, 2009) and reducing the quality and quantity of natural resources ultimately intensifying poverty (Asaduzzaman, 2002).

***(iv) Physical capital and poverty***

Overall, the *Haor* households suffer the disadvantages of poor or non-existent public infrastructure and services (such as public health services, roads, electricity, irrigation, transport and storage facilities), the dykes and embankments are left unprotected and the rivers in the region have become shallow. These all represent access deficiencies and lead to income erosion for all types of *Haor* households.

Specifically, the extremely poor households have the least physical capital (fishing gear, boat) followed by the female-headed and moderately poor households. Though fishing is the second most important income source for the villagers and the extremely poor households do catch fish, they lack fishing gears, boats and accessibility to fishing grounds as of financial incapability and public policy dysfunction. These vulnerable households own very small houses which are in poor condition and often require repairs.

The moderately poor households engage in fishing aided by their fishing gears and often form groups to buy high quality nets for fishing and often they hire small boats. Their daily catches tend to be higher and ensure relatively higher incomes and avenues for escaping extreme poverty.

Along with other capital deficiencies, the lack of storage facilities, year-round all weather roads linked to market centers, power supply and growth centers in the rural area directly affect the household financial status (Thornton, 2002; R. I. Rahman, 2002; Asaduzzaman, 2002; Kam *et al.*, 2005). When crop cultivation is not profitable because of agro-ecological conditions, good road networks can facilitate access to work opportunities for the poor (Holden & Sankhayan, 1998). Also, physical capital endowments increase female literacy, labour productivity, landholding and wages and thus contribute in poverty reduction (Mehta & Shah, 2003; Shah & Guru, 2003).

***(v) Financial capital and poverty***

The moderately poor households have the most financial capital, followed by the extremely poor and female-headed households. These three types of households have different levels of access to informal credit sources; the moderately poor households have the relatively best access to various financial sources. The local moneylender is the main source of credit for all household types and remittances are a common source of income for all but the female-headed households. While females cannot migrate alone elsewhere, the moderately poor can access *howlat* (interest free loans) from relatives during crises. The interplay of human, social and natural capital facilitates better credit accessibility for the moderately poor households. Sometimes, they even have access to public credit service such as public bank and government incentive programs because of strong social networks.

The extremely poor households can access more credit sources than the female-headed household. Being landless, by default they are ineligible to access public credit sources. Various government incentive programs such as the widow allowance and VGF (Vulnerable Group Feeding) card and emergency relief as for flashfloods were allocated for

a short period but did not significantly improve their financial status. Most of the vulnerable households have ceased their NGO memberships as the provided credit service was found to be too exploitative of their financial condition. Conversely, the local money lenders were found to be much more accommodating as they were flexible and always considered the problems/crises encountered by the all households.

Overall, among the households, the extremely poor households owned the least of all forms of capital excluding financial capital which the female-headed households has the lowest endowment. For ownership of all types of capital, the moderately poor households are followed by the female-headed household. The constraints of accessibility limit the household capacity to increase income and makes more challenging the escape from poverty.

Financial incapability is one of the main causes for rural poverty in Bangladesh (Orr *et al.*, 2009). Seasonal migration increases that capability (Khan & Islam, 2005; Rabby *et al.*, 2011b). Investments in education is a means to escape poverty (Malek & Usami, 2010) while high endowments of financial capital reduce vulnerabilities and extend long term opportunities to increase income (Albert & Collado, 2004).

The above discussion reveals that all the 5 types of capital together with culture, shocks and seasonality must be considered in poverty alleviation policy interventions in the region. These types of capital are required for cultivation, communication and business formation (Hossain & Nargis, 2010). The young and middle aged household heads tend to earn relatively more (Orr *et al.*, 2009) as they have higher productivity of labour. Education contributes to both social and economic development. The villagers' capabilities are influenced by the local culture which can enhance social capital and financial status (Rabby



*et al.*, 2011b; Ahmed *et al.*, 2010). Family size has a negative association while the number of household earners has a positive effect on the economic situation of household while at the same time both these factors positively affect occupational mobility (Albert & Collado, 2004; A. U. Ahmed, 2004). Seasonality and shocks cause vulnerability; thus the households consider different *ex-ante* and *ex-post* measures to sustain livelihoods in rural Bangladesh (Azam & Imai, 2009).

### **6.2.9 Migrants in the *Haor* villages**

The migrants in the *Haor* villages are not a homogenous group and can be differentiated according to their demographic and resource profile. Migrants are mostly poor and predominantly young males most of whom are involved in daily labour in the dry season agriculture sector in the villages. Female migration is very low (6%) because of socio-cultural barriers. Migrants come from poor households comprising the landless, marginal, small, medium and large landowners confirming the findings of Afsar (2000, 2005). They are mostly uneducated (51%) and belong primarily to households with uneducated heads (53.3%). Only 32% of the migrants are involved in agriculture sector at the destination while 68% pursue diverse livelihoods in such non-farm residual employment as hawking, wood cutter, stone quarrier, rikshaw puller, etc. Based on dry season income, 72% of the migrants are extremely poor while only 17% are moderately poor which indicates wet season survival difficulties in *Haor* villages. Most of the migrants are extremely poor because they originate from geographically remote and ecologically vulnerable area (Mosse *et al.*, 2002).

Overall, the inconclusive findings that observed in literature (sub-section 3.7.3; chapter 3) has been disclosed in this study by manifesting that the migrants are poor and

undertake short term seasonal domestic migration. They are mostly uneducated, landless, young, male, wage and agricultural labour and marginal farmer in the *Haor* area.

#### **6.2.10 Causes of migration**

These causes of migration were identified through interviews and focus group discussions – all, broadly, are closely associated with ecology, crop seasonality, labour and credit markets, resource endowments and coping strategies. Ecology plays a critical role by limiting agriculture to mono-cropping caused by the annual monsoonal deluge and flashfloods. However, unlike the DER Secretariat (2004), the annual monsoon rains are a major cause of seasonal migration. A second reason is the absence of an *in situ* labour markets during the wet season severely limiting causal employment while common water resources are not open to mass fishing as these resources are leased out by the government and the informal local authority of religious institutions (e.g., mosques, temples, etc.). Lack of knowledge, technology and finance hinders benefits that can be reaped from the monsoonal floodwater (such as fish culture in open net cages, cultivation of watercress and water lilies, floating vegetable production). Among others, inaccessibility to whatever emergency public support is provided and the corrupt, nepotistic and politically biased local systems impel seasonal domestic migration during the wet season in the *Haor* region.

#### **6.2.11 Impact of seasonal domestic migration**

Although the positive association of  $P_{hs}$  and  $M_h$  is empirically and statistically justified, the results in Tables 5.64 and 5.65 indicate that the migration contribution to the household financial status is not considerable.

The focus group discussions revealed that most migrants have no cultivable land. For those having some arable land, this, together with homesteads, can secure informal loans to sustain the seasonal crisis and migration costs. This coping strategy, however, often creates further livelihood risks. Migrants usually live in two places, increasing overall family expenditures while household members left behind borrow from local moneylenders at high interest rates and buy consumer goods on credit from the village shop at inflated prices. A related issue is the availability, duration, type of employment and wages earned during the migration period at the destination. In most cases, there are no job guarantees at the destination, migrants often work for low wages, suffer exploitation and health problems linked to occupational risks, hazards and capital deficiencies (e.g., low physical and human capital). Remittances merely supported a hand-to-mouth existence for the *Haor* households. Such predicaments in the villagers' livelihood diversification strategies do not significantly improve their poverty status and increase their debt burden for the migration period. The focus group participants raised significant and insuperable challenges: inevitability of seasonal migration, poor housing conditions, inferior food quality, inability to provide for children's education and cope with health crises, never having a rest day and homesteading on government land.

#### **6.2.12 Causes of poverty**

The poor are not homogenous groups and perceive of their poverty variably; nevertheless some of the common poverty determinants cited were landlessness, geographical remoteness, flashfloods, monsoonal deluge and the unprotected and poorly-maintained dikes. Such land-related attributes (Mehta & Shah, 2003; Kazal *et al.*, 2010), geographical difficulties (Orr *et al.*, 2009; Kam *et al.*, 2005) and flashfloods (DER Secretariat, 2004) are

at the root of extreme poverty. Along with the above reasons, the lack of physical infrastructure such as all-weather roads, hospitals and clinics, banks and credit institutions, and low price for paddy contribute to the prevalence and persistence of poverty in the region.

From the focus group information, the causes of poverty have been reduced into 6 broad categories as follows: (a) historical and ecological causes, (b) geographical causes, (c) demographic cause, (d) lack of assets, (e) behavioral and social causes and (f) government policies. A diagrammatic depiction of these causes for the female-headed, moderately and extremely poor households is given in Figures 6.1-6.3; each broad head consists of many dimensions of poverty some of which are linked and reflect the cumulative causation of poverty (Mukherjee *et al.*, 2002) in the region.

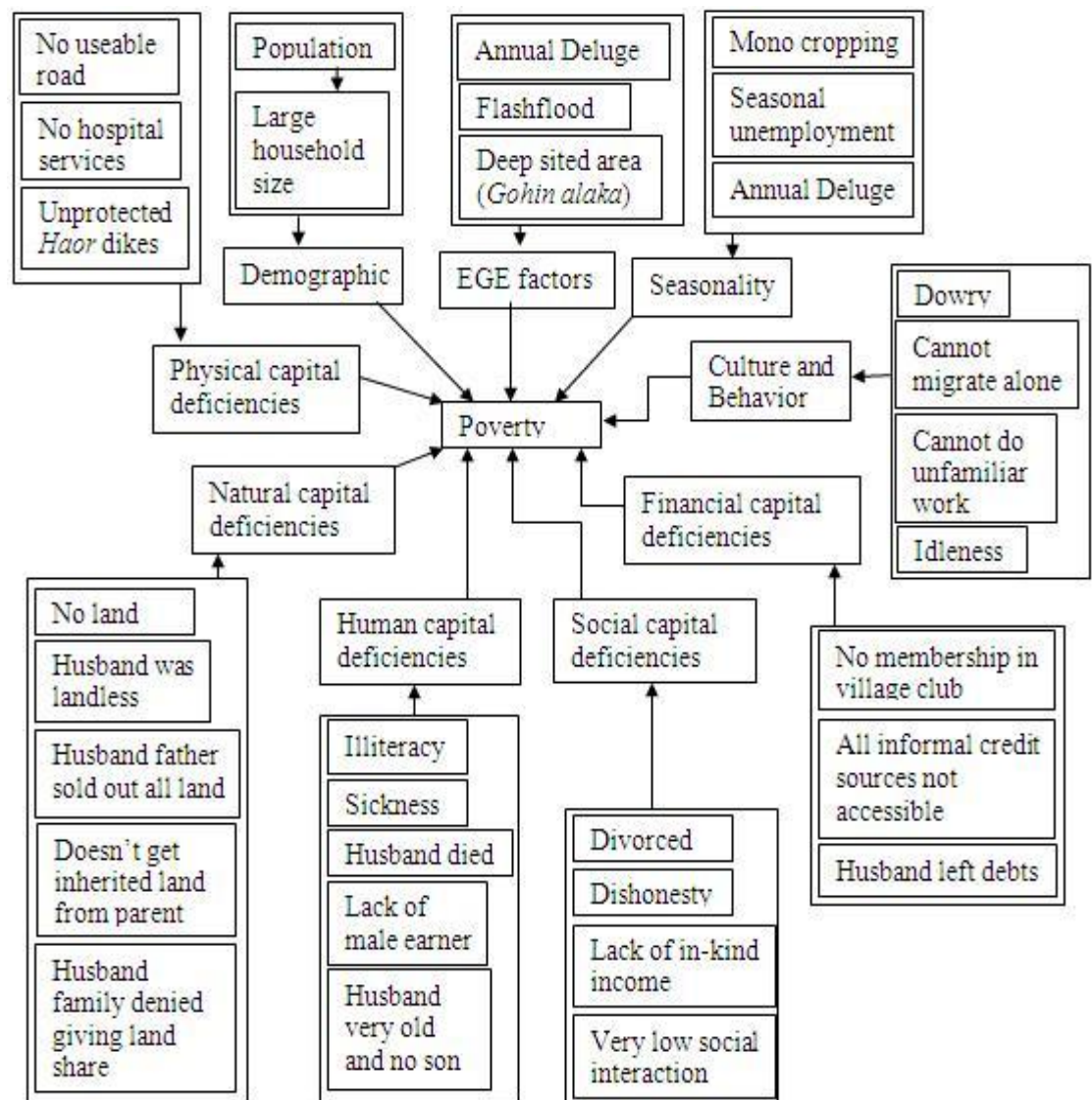


Figure 6.1: Schematic arrangement of causes of poverty for the female-headed household in the Haor area, 2010

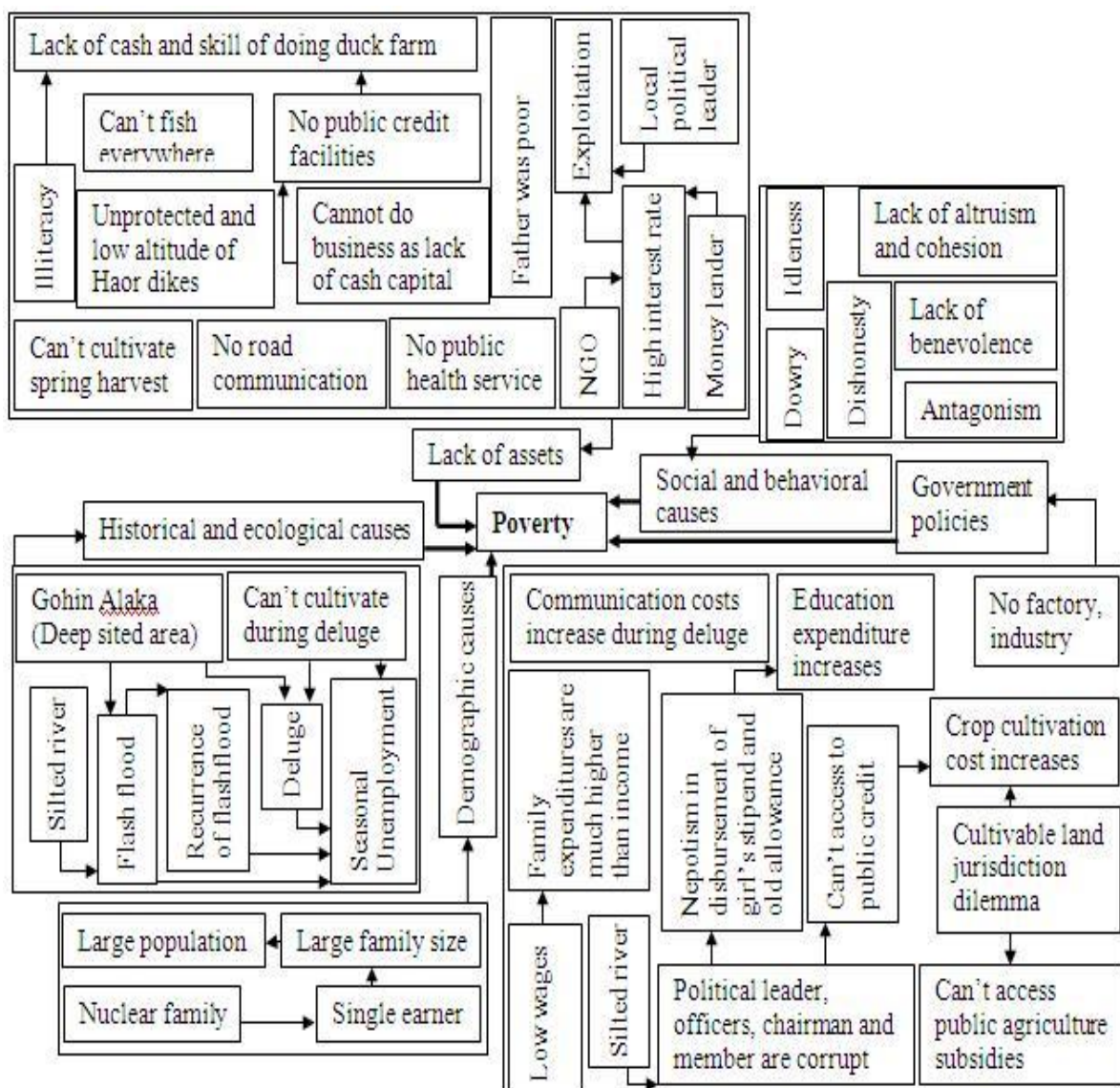


Figure 6.2: Schematic arrangement of causes of moderate poverty in the *Haor* area, 2010

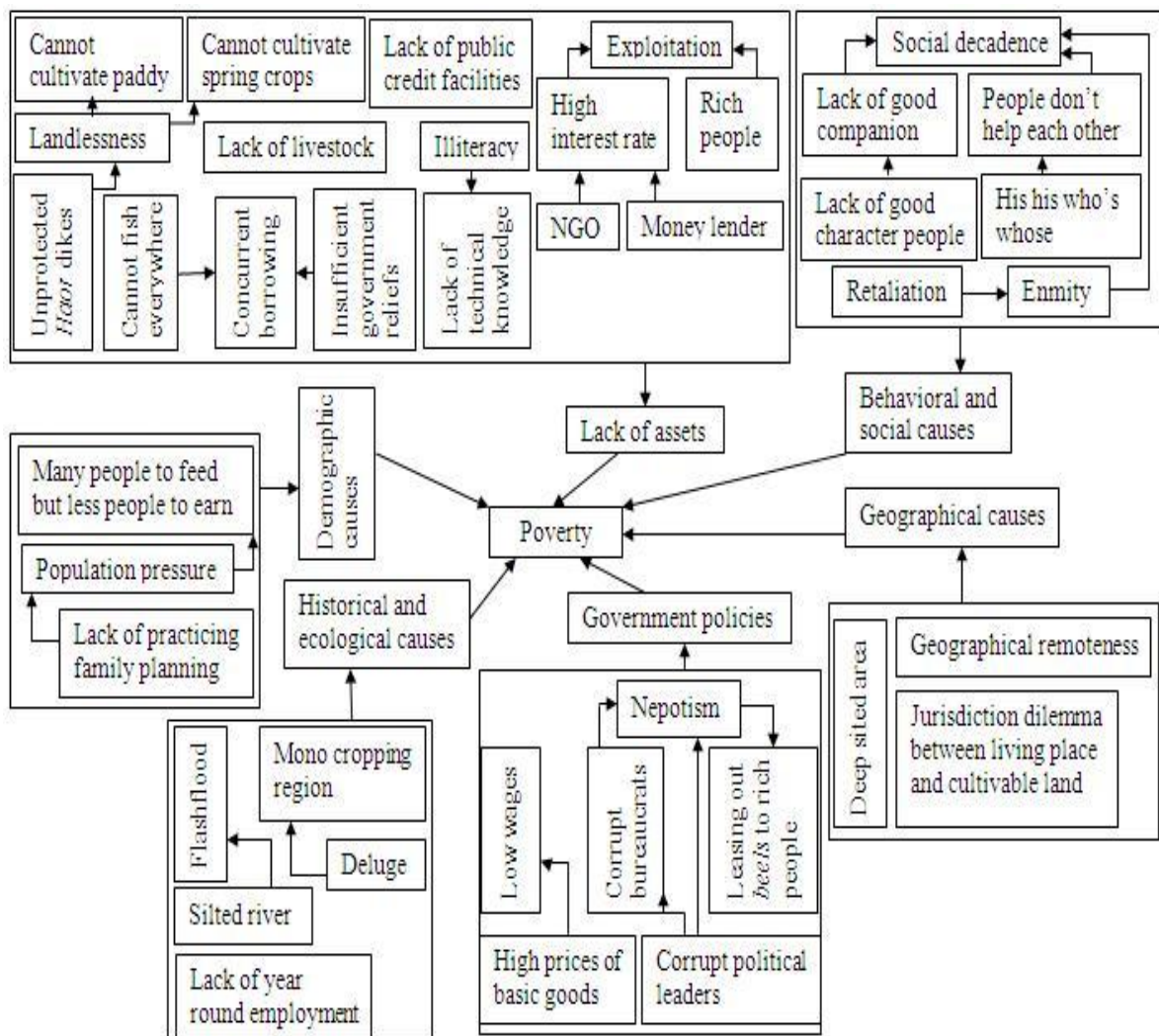


Figure 6.3: Schematic arrangement of causes of extreme poverty in the *Haor* area, 2010

### 6.2.13 Consequences of poverty

The consequences of poverty are very important to understand the incidence and severity of poverty and instrumental in anti-poverty policy development. The effect of poverty subverts the regular flow of livelihood. People cannot obtain their basic needs and rights. The *Haor* people are forced to adopt sub-optimal strategies of consuming inferior quality and very low quantity food. The poor are disallowed access to public services (Islam, 2004) specifically public credit and are compelled to borrow from informal credit sources.



Poverty has strong negative effects on a household's capital endowment. The children are taken away from school and join in labour activities, decreasing productivity in the long run; girls experience early marriage with aged males and often are divorced; household members often starve if household heads suffer ill health. The household's position in the community would deteriorate while social networking cannot extend but rather exacerbates the social isolation. The poor people live in poor housing conditions, houses often leak during the deluge as repairs are unaffordable. To settle previous debts, marketable physical assets would have already been divested impeding access to natural asset (e.g., land, *beels*). Thus, the cycle of poverty ends in socio-economic isolation and pushes the poor in the *Haor* area into chronic poverty.

#### **6.2.14 Coping with vulnerabilities**

The poor *Haor* villagers adopt various strategies to overcome the vulnerabilities that threaten their livelihoods as explored in Tables 5.43-5.49. The strategies consist of either a principal or a combination of activities to sustain the flow of household income.

The poor villagers are highly vulnerable to some major unexpected crises including seasonal unemployment, flashfloods, illnesses and health risks. They often adopt a combination of strategies which are less sustainable than survival tactics. The research findings reveal that the sequence of survival strategies (Figure 6.4) includes: (a) reduction of quantity and quality of food, daily frequency of food consumption and obtaining *hawlat* from friends; (b) selling poultry, firewood and livestock; (c) borrowing; (d) selling fishing nets; (e) undertaking seasonal migration; (f) mortgaging cultivable land; (g) selling cultivable land; (h) leasing out homesteads; (i) selling homesteads and (j) resorting to long term family migration.



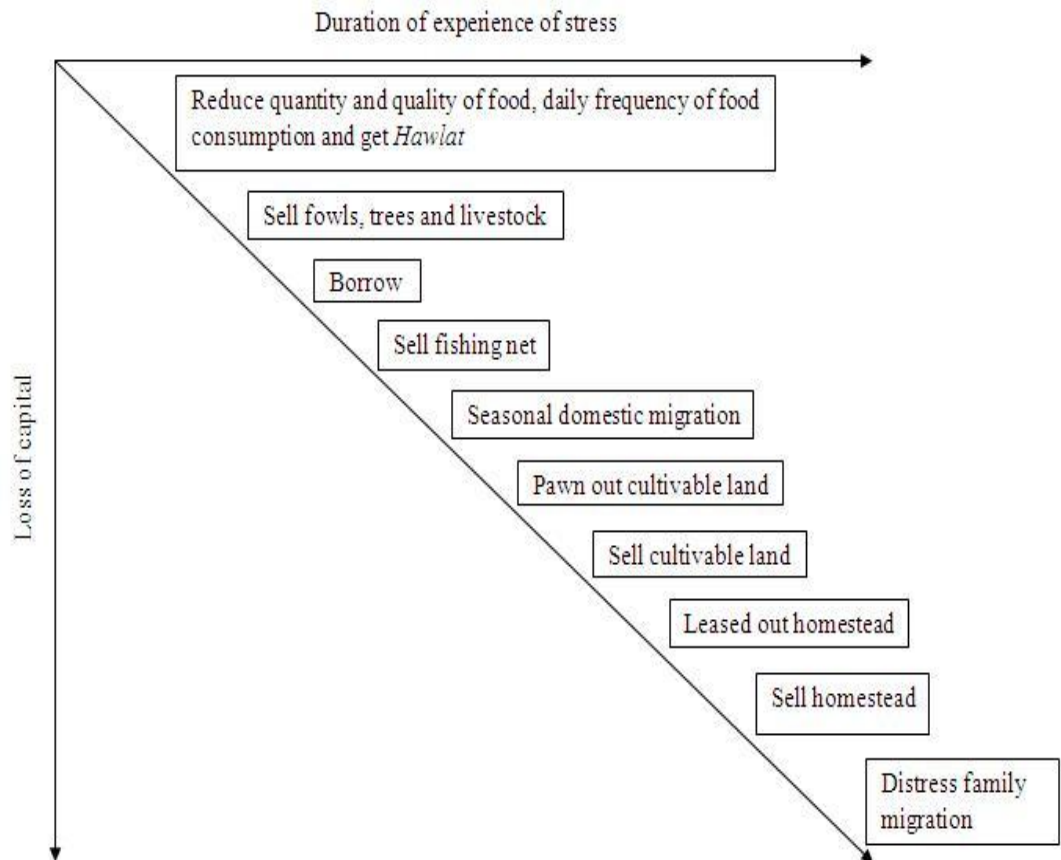


Figure 6.4: Sequence of coping strategies for the poor *Haor* households, 2010 (adapted from Ahmed *et al.*, 2010)

These strategies have strong implications on household asset endowment since some are irreversible. Consumption of low quality and quantity of food causes malnutrition which undermines human capital. Capital loss delays the daughter's marriage, increases the demand for dowry and force villagers to seek livelihoods in marginal and lowly paid activities. All these cause a long term negative impact on financial, social and natural capital of the poor *Haor* households who adopt a sequence of strategies to cope with livelihood shocks as observed in rural Bangladesh by Ahmed *et al.* (2010); Azam & Imai, (2009) and Rashid, Langworthy & Aradhyula (2008).

### **6.3 Conclusion**

The sources of income in the *Haor* region vary with the availability of seasonal activities. Most of the villagers switch occupations between seasons because of the long monsoonal wet season. Although a number of potential income sources are available, they are difficult to realize. Income obtained from available sources is used mainly to meet household commitments. As incomes are low, the poor face significant challenges in improving their capabilities. As the local resources alone cannot support livelihood in the *Haor* villages, the poor undertake seasonal domestic migration which is a survival technique that has little impact on poverty. Thus, the above discussion illuminates the five research questions covering all the four objectives and suggests the following policy interventions.

### **6.4 Policy recommendations**

The qualitative data gathered from the focus group discussions and the key informant interviews indicate that the respondents perceive poverty as being primarily an economic phenomenon for which the policy panacea would be productivity-enhancing interventions. However, the basic findings of this study is that the prevalence of poverty is also associated with the geographical, ecological, political and demographic attributes of the *Haor* region and that poverty cannot be studied as a aggregate and homogeneous phenomena as it affects diverse groups of households in various ways leading to multifarious livelihood strategies, including seasonal domestic migration. Hence, the policy prescriptions that are proposed below have to be differentiated to deal with the multi-dimensional attributes of poverty in the region. This approach implicitly pertains to the dynamics of the poverty process in the region as it traces the interactions and linkages among the economic, ecological, environmental, geographical and socio-cultural factors.

These policy interventions are discussed under two main sub-headings. The first is to take immediate initiatives to increase household income through capital accumulation to mitigate poverty and decrease the pressures that motivate seasonal domestic migration of the poorest households. The second considers the strategies focused on the attainment of long term livelihood sustainability of the different groups of households. Inevitably, both internal and external interventions are required to effectively manage the challenges of poverty in ecologically sensitive and geographically isolated villages as in the *Haor* study area.

#### **6.4.1 Increasing income**

A comprehensive manner approach to enhancing the income of the *Haor* households must underscore their involvement in both farm and non-farm activities with a focus on the households as the target group rather than the farm as the unit. To increase household income, a special development policy should be formulated that recognizes the inherent ecological and geographical characteristics of the *Haor* area concentrating on the following themes.

##### **A. Re-vitalizing *Haor* agriculture**

Livelihoods in the *Haor* villages are primarily founded on agriculture-oriented economic activities. Along with land and water, the size of the resident population also plays a role in and affects crop production. As man-land ratios decrease, effectively the management of agricultural pursuits will be limited to small and selective parcels of arable land in the region, inhibiting the adoption of new technology and agriculture intensification. As technology usually replaces labour, its adaptation demands contextual research. The whole

intensification process should be pursued parallel to the extension of the labour market for almost all poor who directly depend on daily labouring activities. Therefore, a pertinent and strong policy framework should be developed to adopt appropriate technologies that are appropriate for small and medium farmers.

## **B. Establishment of the non-farm sector**

Considering the geographical and ecological attributes of the *Haor* region, the sample respondents themselves have identified the following potential non-farm activities: handicrafts, aquatic fish cultivation, drying fish, fish processing, transportation, storage, woodworking (carpentry), workshops (support services) for farm equipment, post-production processing and marketing. Thus, the policy formulated should ensure improvements in household income while maintaining natural resource sustainability. Such a policy aims at diversifying *in situ* livelihoods to not only enhance incomes but limit its year-round fluctuations (Rabby *et al.*, 2011a; Mendola, 2008; Saha, 2002), improve risk management, smoothen consumption throughout the season (Azam & Imai, 2009; Taufique & Turton, 2002) and ultimately provide a viable avenue to escape the poverty trap.

## **C. Resolving seasonal domestic migration**

Although the poverty-seasonal domestic migration link has been established, the study shows that flood-induced seasonal domestic migration does not significantly alleviate poverty or constitute a sustainable livelihood diversification strategy for households directly dependent on dry season income. To mitigate the need for seasonal domestic migration, policy guidelines are required for investments in public infrastructure,

government food stamp programs, semi-government (for instance, Grameen Bank, PKSF<sup>73</sup>), NGOs and cooperative activities.

This study raises the need for substantial government or NGO inputs to resolve the seasonal domestic migration issue. *Haor* residents live under exacting poverty conditions and seasonal migration is a survival decision. Incentives to provide supplementary security for survival can alleviate the need to migrate seasonally. Considering the intrinsic value of the *Haor* ecosystem, food stamp support is an attractive policy followed by local cooperative activities in providing credit services and improving its accessibility, education, all-weather roads and *Haor* dike and embankment construction, renovation and maintenance, and related semi-government and non-government interventions. Thus, it follows that policymakers should concentrate their efforts on providing incentive financing directly or suitable support to encourage the *Haor* residents not to migrate seasonally and remain *in situ* during the flood season.

Agriculture intensification, development of the non-farm sector and alleviating the pressures to undertake seasonal domestic migration will be challenging tasks as the capital investments required extend beyond the capacity of the local villages. Thus, effective policies for capital formation should be given high priority in uplifting household income in the *Haor* region.

---

<sup>73</sup> Polli Kormo Sohayok Foundation.

#### **D. Capital accumulation**

Being uneducated and unskilled, the poor villagers are invariably drawn to low-wage and residual employment. Investments in human capital through the medium of education can extend the opportunities of earning higher wages, improve land productivity, diversify crop cultivation and encourage new technology adaptation. Thus, improving access to free quality education for the poor children and skills development and training in crop cultivation, livestock rearing, duck farming, tailoring, handicraft making and so on can upgrade household productivity and asset endowment.

Policies to improve the endowments of natural capital and their accessibility can contribute to shifting the capacity of the poor positively. Replacing traditional crop varieties with high yielding hybrids can increase land productivity although the intolerance of the new seeds to floods requires further research to be conducted. Extension services provide the crucial link between the relevant government departments and the farming community which appears almost non-existent in the study area. Also, the poor are not allowed to fish in almost all the *beels* leased out by government because of non-transparent allocations of these leases to community elites who are well connected to the bureaucratic decision-makers and local politicians. Thus, an important policy intervention in the area of enhancing the accessibility to the natural resource endowments in the *Haor* region is the formulation of a fisheries policy which should be transparently implemented, eliminates the over-exploitation of fishing grounds, and encourages fish breeding and conservation. These targeted policy interventions must be poverty mitigating in their impact and introduce different types of licensing systems based on the heterogeneous characteristics of the poor households in the villages.

Geographical isolation and remoteness, the small size of local markets (or physical inaccessibility to larger urban and semi-urban markets) and ecological factors may discourage business entrepreneurship which is an avenue for capital formation. Availability of and accessibility to public credit systems and infrastructural facilities can be an effective policy strategy as both labour and product markets will be extended. The disguised unemployed workers, whose marginal productivity is zero or negligible, can exploit these new work opportunities and improve their sources of capital formation.

Infrastructure facilities enhance household income earning capabilities, reduce transportation costs and increase the price of farm products (Wanmali & Islam, 1997). The government must give priority to the construction and maintenance of physical infrastructure in the region; the first priority should be accorded to the construction, renovation and maintenance of the *Haor* dikes and embankments to mitigate the effects of the recurrent flashfloods on the crucial dry season crop. In the process of planning and implementation, the local villagers must be involved to ensure effective outcomes. The study has confirmed that the lack of roads and public health and other services account for the prevalence of poverty in the region; additionally, the quality of life of the poor villagers can be improved by the supply of electricity, drinking water and toilets.

Although there are no public credit institutions in the study area, the public credit facilities in the *upazila* towns rarely meets the needs of the poor and landless for consumption credit and to meet emergencies and crises. The current micro-credit policy should be reviewed to give it a more poverty alleviation and friendly approach. Although NGOs can perform a positive role in this regard, the study reveals that they are bureaucratic, unsympathetic and even exploitative in their programs and practices which

appear to be in contrast to the behavior of the local informal moneylenders. Thus, the credit system in the area must be re-evaluated to ensure that the poor become their main target population.

#### **6.4.2 Attainment of sustainability**

Although all the policies above can contribute towards sustainable livelihoods in the region, some specific issues are noted below:

- the prevailing anti-poverty policies of the government minimally meet the needs of the poor villagers as the qualitative data indicate that the political leaders do not keep their promises when these policies working against their vested interests. As the poor villagers are knowledgeable of the means to reduce risk and increase income, their views must be given value by the policymakers in designing effective poverty mitigating policies.
- policy makers must possess the knowledge about the livelihood systems and processes in the *Haor* ecosystem to complement their theoretical knowledge of the economic dimensions of poverty to identifying and diagnosing the causes, livelihood situations and required policy interventions (Mukherjee *et al.*, 2002).
- the fishermen and the poor should be provided licenses to fish; regulation must be imposed on the allowable mesh size of fishing gears; a seasonal ban should be imposed for fish breeding and during that time, food stamps should be given to the license holders; only specific *beels* can be leased out along with strict controls on their duration and boundaries;



- in the design, construction, renovation and maintenance of the *Haor* dikes and embankments, timeliness, transparency and local accountability can be effective to save the *boro* crop from flashfloods;
- as the potential for animal husbandry and livestock rearing is very high in the region, policies should be designed to supply credit facilities, available and accessible pasture land, commercial cultivation of grass, veterinary services and marketing facilities together with the required training and skills upgrading curriculum.
- the public credit policy and agriculture subsidy system should be reviewed to allow the poor, share croppers and tenants to access the relevant services; the *Union porisads* (the lowest tier of administrative and local government unit in rural Bangladesh) can work with the poor to ensure transparency and accountability.
- the road network should be improved and quality public health services must be available, accessible and affordable to the poor villagers.
- above all, to ensure the sustainable livelihood of the poor villagers, the challenges of good governance must be recognized and overcome.

## **6.5 Contribution**

This study has contributed to three fields of knowledge as follows:

### **6.5.1 Methodological implications**

In this study, the household's sources of income, inter-seasonal income variation, occupational mobility between seasons, and the major income-generating activities are

analyzed using a qualitative ‘income flow approach’. This analysis provides an understanding of how the poor *Haor* households struggle to increase income and attempt to sustain their livelihoods. From an economic perspective, the analysis helps in the examination of what factors contribute to enhancing household income and what can lead to its deterioration. The model applied is instrumental in explaining that it is the household’s capability attributes that are associated with its income-generating outcomes or its productivity in aggregate. This implies that the impacts of the diverse income determinants are crucial in designing the anti-poverty policies for specific categories of village households.

The limitation of cross-sectional data in understanding the dynamics of poverty has been overcome by adopting the SLA (Sustainable livelihood Approach) in the analysis of the livelihood strategies of the sample villagers. The impact of different categories of assets on poverty, the relationship between TSP (Transforming Structure and Processes) and poor villagers’ livelihoods, risks and pertinent coping strategies are investigated in-depth and outline the dynamics of poverty in the region. Such a research orientation and analytical approach can be extended to other regions where panel data are not available.

The poverty and seasonal domestic migration (SDM) linkage has been established by using the simultaneous equation modeling technique. It explains the impact of SDM on the financial status of the village households. The resolution of the endogeneity problems can be applied to improve and make contextual the validity of the study of the poverty-migration nexus in Bangladesh and similar countries.

The mixed method approach adopted in this study comprising four different techniques represents an innovative orientation in exploring the poverty phenomena

particularly in ecologically vulnerable and geographically remote areas. It draws attention to the challenges of investigating spatial poverty as a phenomenon not only in Bangladesh but also other countries and regions. The findings underscore the fact that prevailing poverty amelioration programs conducted by the government are not appropriate to the *Haor* area and necessitate the consideration of policy interventions that are targeted not to the region in aggregate but to specific types of poor households.

### **6.5.2 Theoretical implications**

This study has reviewed the major theories and literature on poverty and livelihoods to explore the dynamics of the poverty phenomenon as it relates to its causes, consequences, and avenues of escaping the poverty trap and attaining sustainable livelihoods. Poverty particularly in ecologically, economically, environmentally and geographically isolated regions must be investigated from several theoretical perspectives balanced by a mixed methodological approach.

It underscores the fact that ecological, environmental, geographical and economic factors must be weighed in order to obtain a comprehensive understanding of spatial poverty. Although a variety of ecological factors such as droughts, floods, topographical attributes, natural resources, etc., have been highlighted in other spatial poverty studies (Sinn, 1988; Minot & Baulch, 2005; Jensen, 2003; Hanjra *et al.*, 2009; Mehta & Shah, 2003), the impact of flashfloods and its recurrent nature has not been identified as it has been done in this study. The assessment of its impact is a contribution to the poverty literature as it has been felt not only by the poor and landless households but even by some relatively large farmers who suffer extreme poverty in the *Haor* villages.

The study contributes in the research on the dynamics of poverty by establishing the SLA instrument as a link between cross-sectional data and the non-existence of panel data. There are systems in the *Haor* villages that voluntarily assist the vulnerable household to survive.

Importantly, the study examines the links between the resources of individual, household and the *Haor* community for different types of individuals and households. Thus, this relationship explores individual and household capacity over time and the role resources play in the livelihood sustainability of the *Haor* people.

Empirically, the association between landownership, poverty and seasonal domestic migration (SDM) has been found logical and SDM is a rational strategy adopted by the *Haor* households as a livelihood diversification strategy. The study discloses poverty-migration nexus as an *ex-post* coping strategy as living costs are incurred *in situ* and the migrant's destination; incomes earned during the crops season are insufficient to meet household needs in the flood season when households depend on exploitative moneylenders and shopkeepers, while the migrant suffers various challenges at the point of destination affecting the size of remittances sent home (Rabby *et al.*, 2011b).

### **6.5.3 Policy implications**

The importance of steady economic growth has been well recognized in a poor country like Bangladesh. Nevertheless, it must be recognized that the country has not reduced its incidence and prevalence of poverty to the levels meeting the Millennium Development Goals (MDGs). There is wide disparity in the regional distribution of the incidence of poverty in rural Bangladesh requiring a review and re-thinking of the policies and interventions to mitigate it.

While promoting economic growth nationally, the government should stress on diverse regional strategies as there is a significant regional variation in poverty, food security and land productivity in Bangladesh. For poverty alleviation and improvement of livelihoods in the *Haor* region, the government should consider policies and interventions oriented to the modernization and intensification of the agricultural sector, blending education with new technology and agricultural research. Since the area is highly vulnerable to flashfloods, high priority should be accorded to the construction, renovation and maintenance of the *Haor* dike and embankment network to protect the dry season crop from its depredations. Although the long monsoonal deluge climatically limits the area to a monocropping regime, it also extends the potential for developing fishing and related activities as a significant *in situ* development strategy to mitigate poverty and attain sustainable livelihoods. However, structural and socio-cultural adjustments are also needed impacting on local social and governance systems.

To mitigate the necessity of seasonal domestic migration by the poorest and landless households in the region, capital development initiatives and extension of the non-farm sector in the region would be crucial. For this purpose, to create a favorable investment environment, the government should offer such incentives as tax exemptions (e.g., direct tax), special investment loans, health, transport, road, and law-and-order infrastructure to support local investment. Policy interventions are required to increase the capabilities and capital bases of the *Haor* villagers to engage in non-farm activities and encourage animal husbandry and livestock rearing.

In rural Bangladesh, the policy recommendations given above cannot be effective without instituting a de-centralized government system and good governance balanced by a needs-based strategy drawing upon the participation and involvement of the *Haor* villagers.

## **6.6 Limitations of the study**

This study has several limitations as follows:

The intrinsic characteristics of the *Haor* area have affected the quality of the primary data used in the analysis. Thus, for example, accessibility to road and public health services cannot be considered in the regression analysis since these facilities are unavailable in the sample villages and negatively affect all types of household livelihoods.

The study also faced the methodological constraint of dis-aggregating and analyzing the impact of the flashfloods on the community. Although, flashfloods affect, directly or indirectly, the whole *Haor* community, the magnitude of income erosion differs among the sample households. For example, the landless wage labourers suffer an immediate unemployment problem when flashfloods occur increasing their huge debt burden and affecting their future consumption, savings and investments. Thus, this ecological vulnerability has both short and long term impacts on households and their poverty status. To explore such impacts, data should be collected just after the flashflood (immediate impact), at the end of the non-crop season (seasonal impact) and just before the start of harvesting the following year's *boro* crop (annual impact). This could well be an avenue for future research with vital policy implications.

The study did not consider the cross-sectional variations in the age ranges of household heads that limit the depth of the explanation of the determinants of poverty

among the youth and the elderly cohorts. Besides, other variables such as the price of basic goods, previous year savings and skills of the household head that could potentially affect household income and poverty status could not be taken into account in this research. Some other household level characteristics like dependency ratios, number of daughters, number of school going children, quality of land and accessibility to irrigation facilities were also not considered to elucidate the income determinants for different types of households.

For an in-depth understanding of the female-headed household's vulnerabilities, research is required on social exclusion and gender relationships. This study, however, did not delve insightfully into this topic as it predominantly focuses on the economic perspectives of poverty.

Although the study underscores the vital role of informal credit sources in the *Haor* livelihoods, no attempt was initiated to quantify the differential impact of such sources on the sample households and their poverty status. This type of analysis will be helpful in the development of a micro-credit framework for the poor *Haor* villages.

This study also faced the challenge of quantifying and assessing the impact of the fluctuations in the poverty status of different households. For example, divorce and low wages increase dependency forcing such people to depend on others; this implies the necessity of a dynamic approach based on the gathering of longitudinal data.

In exploring the dynamics of poverty, the research approach of this study did not involve estimating the implicit incomes that women accrue from childbearing, housekeeping, nursing and other voluntary family work. Household's income has been affected negatively due to woman's child bearing function and responsibility which can

severely constrain their earning capacity. Studying the role of gender division in the *Haor* area and social exclusion will provide meaningful insights into these issues and their influence on the dynamics of poverty.

## **6.7 Future research**

Although the above mentioned limitations are subject to further research, some suggestions are indicated for future studies in the *Haor* area.

The empirical analysis undertaken in this study indicates that access to public credit facilities has a strong positive influence on the villagers' livelihoods in general and the extremely poor in particular. As the mixed method approach has not explored this relationship in any depth, cost-benefit analysis is required to investigate the feasibility of introducing public micro-finance institutions in the region.

The research considers cross-sectional data to understand the impact of seasonal domestic migration (SDM) on poverty which may not be appropriate for long term assessment output. Availability of panel data would be invaluable in providing a more insightful perspective of the correlation between seasonal domestic migration (SDM) and poverty in the region.

The establishment of a non-farm employment sectors has been suggested to increase labour productivity. It thus is necessary to assess the long and short term effects of non-farm activities in increasing household income and attaining livelihood sustainability in the region. Although income accruing from non-farm activities would reduce pressure on the region's natural resources, its conservation and management must be conducted within a long term sustainable development framework.



For the assessment of the long term impact of flashfloods and the annual monsoonal deluge, a one-off data collection method cannot yield accurate outcomes. Thus, research can be conducted into the methodological approaches to analyze panel data and the effectiveness of government emergency programs to formulate policy guidelines for coping with the formulation of poverty ameliorating and sustainable livelihood strategies that can meet the formidable ecological, environmental and geographical challenges on the *Haor* region of Bangladesh.

The findings of this study are limited to 5 *Haor* villages only. Practically, the *Haor* area comprises of 5 districts that constitute 48 *upazilas* (sub-districts), 436 *unions* (sub-sub-districts) and 10,804 *grams* (villages). Within the context of geographical remoteness, highly diverse ecological systems and vulnerabilities can be observed between *upazilas*, *unions* and *grams*. Because of this, the incidence of income poverty and villagers' understanding and experiences of poverty may well differ. This would be a further area of research to explore similar research objectives in other areas in the *Haor* region and examine whether the findings of this study are similar or dissimilar.

## INSTRUMENTATION

### 1<sup>st</sup> ROUND DATA COLLECTION: CENSUS SURVEY

#### LETTER OF INTRODUCTION

Department of Development Studies  
Faculty of Economics and administration  
University of Malaya  
Kuala Lumpur, Malaysia.

Dear Sir/Madam,

I am doing a doctorate degree thesis on “**Poverty and Sustainable livelihoods in the Seasonally Submerged *Haor* Area of Netrokona District, Bangladesh**” under supervision of the professors named below in the University of Malaya. To write up the doctoral thesis, some essential information is required to collect from the field hence conducting this primary survey. Please try to give your practical experiences and expert opinion as accurate as possible which will enable me to accomplish the thesis on the above subject matter.

Please note that these opinions are required for research purposes only and be guaranteed that the information given here will be given off the record treatment.

Thank you

Talukder Golam Rabby  
EHA 080020  
Ph.D. Student  
Department of Development Studies  
Email: [rabby829@hotmail.com](mailto:rabby829@hotmail.com)

### **QUESTIONNAIRE: 1<sup>ST</sup> ROUND**

1. Household No. \_\_\_\_\_
2. Name of Household Head \_\_\_\_\_
3. Household Size \_\_\_\_\_
4. Occupation of Household Head \_\_\_\_\_
5. Do you earn? \_\_\_\_\_
6. How many persons are earning in your family?

a. 

Male	
------	--

b. 

Female	
--------	--

c. 

Not applicable	
----------------	--

7. **Cash income** of your household from the sources below. (Recall period last one year).

Sl.No.	Dry Season Income (DSI) Heads	Total Amount (Taka)	Wet Season Income (WSI) Heads	Total Amount (Taka)
1	Rice Cultivation		Boat Renting	
2	Livestock Rearing		Livestock Rearing	
3	Forestry		Forestry	
4	Fisheries		Fisheries	
5	Vegetable Cultivation		Market Mediating	
6	Homestead Vegetable Gardening		Homestead Vegetable Gardening	
7	Agricultural Labour		Boating	
8	Wage Labour		Wage Labour	
9	Artisan Activities		Artisan Activities	
10	Hawking		Hawking	
11	Construction		Construction	
12	Transport		Transport	
13	Hotel & Restaurant		Hotel & Restaurant	
14	Business		Business	
15	Services (e.g. Teaching)		Services (e.g. Teaching)	
16	Religious Activities		Religious Activities	
17	Village Doctor		Village Doctor	
18	Cash Received from Rent Out Land			
19	Remittance		Remittance	
20	Others Activities		Others Activities	
	Sub-Total (DSI)		Sub-Total (WSI)	

8. **Kind income** of your household from the sources below. (Recall period last one year).

Sl.No.	Dry Season Kind Income (DSKI) Heads	Total Amount (Taka)	Wet Season Kind Income (WSKI) Heads	Total Amount (Taka)
1	Paddy		Paddy	
2	Rice		Rice	
3	Cash Money		Cash Money	
4	Vegetable		Vegetable	
5	Livestock		Livestock	
6	Fish		Fish	
7	Labour		Labour	
8	Clothes		Clothes	
9	Medicine		Medicine	
10	Others		Others	
	Sub-Total (DSI)		Sub-Total (WSI)	

9. **Consumption from self produces** of your household from the items below. (Recall period last one year).

Sl.No.	During Dry Season	Total Amount (Taka)	During Wet Season	Total Amount (Taka)
1	Rice		Rice	
2	Livestock		Livestock	
3	Vegetable		Vegetable	
4	Forestry		Forestry	
5	Fisheries		Fisheries	
6	Fruits		Fruits	
7	Others		Others	
	Sub-total		Sub-total	

10. **Cost of crop production** of your household in items below. (Recall period last one year).

Sl.No.	Production Elements	Cost (Taka)
1	Seeds	
2	Fertilizer	
3	Pesticides	
4	Irrigation	
5	Hired Labour	
6	Rental Cost of Oxen Plow	
7	Payment of Rented in Land	
8	Rental Cost of Threshing Machine	
9	Cost of Rice Husking	
10	Rental Cost of Boat	
11	Interest paid out in owing loan	
12	Imputed Cost of Family Labour	
13	Others	
Total		

**11. Household expenditure** in the items below. (Recall period last one year).

Sl.No.	Heads of Expenditures at Dry Season	Total Amount (Taka)	Heads of Expenditures at Wet Season	Total Amount (Taka)
1	Rice (purchase)		Rice (purchase)	
2	Flour etc		Flour etc	
3	Livestock		Livestock	
4	Vegetable		Vegetable	
5	Fish		Fish	
6	Health (Medicine, Doctor's Visits etc)		Health (Medicine, Doctor's Visits etc)	
7	Clothes		Clothes	
8	House Renovation		House Renovation	
9	Homestead Construction		Homestead Construction	
10	Education		Education	
11	Fuel		Fuel	
12	Stationary		Stationary	
13	Dowry		Dowry	
14	Gift		Gift	
15	Others		Others	
	Sub-total		Sub-total	

Date of Interview:

Place of Interview:

Those are all the questions I have. Thank you very much for taking the time to participate in this study. If you have any questions about this survey, please contact:

Talukder Golam Rabby, Saheb Bari, Chawrapara.

**2<sup>nd</sup> ROUND DATA COLLECTION: INTERVIEW**

**QUESTIONNAIRE: 2<sup>ND</sup> ROUND**

1. Name of Household Head \_\_\_\_\_
2. Status of Household Head  
a. Male                      b. Female
3. Age of Household Head \_\_\_\_\_
4. Marital Status of Household Head  
a. Married      b. Unmarried      c. Divorced      d. Widow
5. Educational Qualification of Household Head  
a. Primary Level  
b. Secondary Level  
d. Higher Secondary Level/College  
f. Bachelor/Degree  
g. Masters  
h. Uneducated
6. Household Size \_\_\_\_\_
7. How many children are going school now? \_\_\_\_\_
8. Why are the children (if any) not going school?  
a. Cannot afford the expenditure (Financially incapable)  
b. Opportunity cost very high (can earn and earning)  
c. Do not want to study  
d. For marriage  
e. Others  
f. Not applicable
9. Who does own this homestead?  
a. Self      b. Relatives/Neighbor      c. Government
10. What is the size of the homestead land?  
Size: \_\_\_\_\_ decimal/ hector.
11. If you have any land for vegetable cultivation, what is the size?  
Size: \_\_\_\_\_ decimal/hector
12. If you have any land for rice cultivation, what is the size (in total)?  
Size: \_\_\_\_\_ decimal/hector.
13. Where your cultivated lands are located?  
*Haor/s* Name \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
14. Did you harvest well in last five years?  
a. Yes      b. No.
- 14.1 If 'yes', does it help to increase your financial capabilities?  
a. Yes      b. No.
- 14.2 If yes, how does it?  
\_\_\_\_\_  
\_\_\_\_\_
- 14.3 If 'no', what are the reasons impeded in harvesting well?  
\_\_\_\_\_  
\_\_\_\_\_

15. Is there any flashflood last year which affects your household income?

a. Yes b. No.

16. How your income was affected?

---

17. Does this year flashflood affect you?

a. Yes b. No.

17.1 If yes, how does it?

---

17.2 If 'no', why you are not affected?

---

18. To replenish damages caused by flashflood, what types of help do you need?

---

19. Do you think that long monsoonal deluge (*Borsha*) disparage your household income?

a. Yes b. No.

20. What types of advantages and disadvantages are you having during monsoonal deluge?

---

21. If the answer of question -15 is 'yes', then how do you maintain your family?

---

22. When household income decreases as because of vulnerability then what types of problems do you face?

---

23. What types of steps do you assign to cope with such sorts of vulnerabilities?

---

24. Are there any types of public credit facilities which are accessible to you?

a. Yes b. No.

24.1 If 'no', from where you do borrow if necessary?

---

25. Do you think that your income will be increased if you have accessibility to public credit facilities?

a. Yes b. No.

26. Do you know that public bank in *upazila* are providing credit facilities?

a. Yes b. No.

26.1 If 'yes', do you have any problem to get that credit?

a. Yes b. No.

26.2 If 'yes'. What are those problems?

---

27. Do you think, now a day, fishing is an important source of household income?

a. Yes b. No.

28. Do you have accessibility to all *Haor* and/or *beel* to fish?

a. Yes b. No.

28.1 If 'no', why?

---

29. Do you think accessibility to all fishing ground can help to increase your household income and decrease financial constrain or poverty?

a. Yes b. No.

30. Do you think that well constructed and connected roads can help to increase your household income?

a. Yes b. No.

30.1 If 'yes', How?

---

31. Do you have accessibility to infrastructure of roads to go *upazila*?

a. Yes b. No.

32. Is there any public or private hospital around this area?

a. Yes b. No.

33. Can the accessibility to public hospital decrease your household expenditure?

a. Yes b. No.

33.1 If 'yes', how?

---

34. To fulfill your household needs, is your present financial situation-

a. Insufficient

b. Barely sufficient

c. Sufficient

d. More than sufficient.

35. What are those guidelines which may seem to influence your household income?

---

36. What are the policies required for the effective development of *Haor* area (*Bhati Anchal*)?

---

37. Is there any party politics prevailing in the village?

a. Yes b. No

38. Are the political activities visible around the year?

a. Yes b. No

39. Do you vote?

a. Yes b. No

40. Do you pay any form of tax or taxes to government?

a. Yes b. No

40.1 If 'yes', what form (type) of tax are you paying?

---

41. What contributions the *Haor* area has in the development of Bangladesh as a whole?



A) Huge B) Enough C) Little D) Nothing

42. Who are responsible for overseeing of *Haor* area development? (Please marks descendingly)

- a. Politician
  - b. Government Officials
  - c. The rich people of the area
  - d. The poor people of the area
  - e. Others (please specify)
- 

43. To solve the problems which are identified in the preceding question (Q-42), what are the policies you suggest?

---

---

---

44. Do you think the governments will development this area? Why?

---

45. Are you or any member/s of your household receiving aids or other help from government provided welfare programs?

- a. VGF (vulnerable group formation)
- b. Food for work
- c. Food for education
- d. Others (please specify)

Date of Interview:

Place of Interview:

Those are all the questions I have. Thank you very much for taking the time to participate in this study. If you have any questions about this survey, please contact:  
Talukder Golam Rabby, Saheb Bari, Chawrapara.

## APPENDICES

### Appendix: A

Table A-1: National income share of the 5 *Haor* villages, 2010

A <sup>a</sup>	N <sup>b</sup>	O <sup>b</sup>	P (LCU CP) <sup>c</sup>	Q (LCU)	R (LCU)	S (LCU)	T(%) <sup>d</sup>
156,118,464	N-971,197	636(V1) <sup>E</sup>	43,433.80	9,474	6,149,708	41,835	0.000180
	S-977,060	774(V2) <sup>E</sup>		12,816	9,897,671	64,271	0.000290
	H-864,645	2,200(V3 and V4) <sup>E</sup>		10,289	23,668,976	52,598	0.000694
	K-1,274,837			10,072 (V4)	3,340,530	51,393	0.000009
	M-791,688	1,884(V5) <sup>E</sup>		9,643	20,147,073	44,871	0.000591

Note: A- Population of Bangladesh; N- Population in all *Haor* districts; O- Population in study villages under Netrokona district; P- National per capita income; Q- Village per capita income (average); R- Total income of villages; S- HH average income of villages; T- Share of average income with national GDP and E -Village name [V1-Chawrapara, V2-Chandpur, V3-Gaglajur, V4-Mohabbotnagar and V5-Manderbari village]. Abbreviation: HH- Household; N- Netrokona; S- Sunamgonj; H- Hobigoj; K- Kisorgonj; M-Moullovibazaar; LCU-Local Currency Unit and CP-Current Price.

Sources: a) US Census Bureau, 2010. b) BBS, 2001.c) World Economic Outlook Database, 2010.d) The World Bank Data Base, 2010 (considered GDP- constant LCU of 2009).

## Appendix: B

Table B-1: Key safety net programs in Bangladesh

Name of the program	Purpose	Targeting criteria	Financed by and implementing Ministry	Nature of benefit /planned coverage /delivery mechanism
Vulnerable Group Feeding (VGF)	To provide food and other emergency assistance to disaster victims	Disaster victims	GOB DPs/MFDM	10KGs rice for 8 months/cardholder
Gratuitous Relief (GR)	To provide food and other short term emergency assistance to disaster victims	Disaster victims	GOB DPs/MFDM	10KGs rice variable period/cardholder
Test Relief (Rural Infrastructure Maintenance Program) (TR)	(a) Employment generation for the poverty stricken people in rainy season (b) Developing and maintaining rural infrastructure	Geographic targeting	GOB DPs/MFDM	5-6KGs of wheat per day for a month during rainy season
Vulnerable Group Development (VGD)	(a) Developing life skills for women through training, motivating saving and providing scope for availing credit (b) Monthly in-kind income transfer	(a) Households with not more than 15 acres of land (b) Households with income less than TK 300 dependent upon seasonal wage employment (c) Adult women below 50 (d) Day labour /temporary worker (e) Households with little or no productive assets	GOP, WFP, EC, CIDA/MWCA	30KGs wheat and training

Source: World Bank, 2008

Table B-1, continued (Appendix B)

Allowance to the Widowed, Deserted and Destitute Women	Income support for a vulnerable group	(a) Women either widowed, deserted and destitute (b) The number of beneficiaries identified on the basis of the category of union	GOB/MWCA	TK 220 per month
Honorarium Program for the Insolvent Freedom Fighters	Honorarium Program for the Insolvent Freedom Fighters	(a) Freedom fighter's identity verifiable in cross section of references (b) Freedom fighters with income <Tk. 6000 per year (c) Disabled or partially disabled or landless or unemployed or none in the family to depend upon (d) Landless (e) Not beneficiary of other programs	GOB/MFFA	TK. 600 per month
Old Age Allowances	Livelihood support to the elderly poor	(a) At least 65 years of age (b) Income equal to Tk. 2000 (c) Must have worked in formal sector (d) Number of beneficiaries is determined on the basis of category union 5.50% of beneficiaries women	GOB/MSW	TK. 220 per month
Food For Work (FFW) (and Cash for Work)	(a) Employment generation for the poor in slack season (b) Developing and maintaining rural infrastructure	(a) People who are functionally landless (b) People who lack productive resources (c) Women headed household where women are widowed, deserted, and destitute (d) Day labour or temporary workers (e) People with income less than Tk. 360 per month	GOB,ADB,WFP MLGD,MSW MWR	Quantity of Work Done/man/month (Wheat)

Source: World Bank, 2008

Table B-1, continued (Appendix B)

Primary Education Stipend Project (PESP)	(a) Increasing number of primary school enrolments' from poor family (b) Increasing school attendance and reducing dropouts (c) Increasing primary school completion rate (d) Reducing child labour and poverty	(a) Children from female headed households where head of the household is widowed, deserted and destitute (b) Children from households where head of the households are day labours (c) Family of low income professionals (like: fishing, pottery, blacksmith, weaving, and cobbling) (d) Landless or households that own <.5 acres of land	GOB/MPME	TK. 100-125 /student
Female Secondary School Assistance Program (FSSAP)	(a) Increasing student enrolments at secondary schools (b) Reducing frequency of underage marriage	All unmarried girl students studying in recognized institutions at secondary level	GOB DFID /DSHE MOE	TK. 300-720 and other cash benefits/student

Source: World Bank, 2008

## Appendix: C

Table C-1: Total number and area of *Jolmohal* in Netrokona district and Bangladesh

	Size of <i>Jolmohal</i>				Total amount of <i>Jolmohal</i>	Total area of <i>Jolmohal</i> (acre)
	Not large than 20 acres		Large than 20 acre			
	Amount	Total area (acres)	Amount	Total area (acres)		
Bangladesh	23162	134066.1445	3113	440290.05303	26275	574356.19753
Netrokona district	343	1709.14	161	12404.28	504	14113.42

Source: <http://www.minland.gov.bd/download/Jalmohal-Information.pdf>

## REFERENCES

- Adato, M., & Meinzen-Dick, R. (2002). Assessing the impact of agricultural research on poverty using the sustainable livelihoods framework. *FCND (Food Consumption Nutrition Division) Discussion Paper 128*, EPTD (Environment and Production Technology Division) Discussion Paper 89.
- Afsar, R. (2000). *Rural-Urban Migration in Bangladesh: Causes, Consequences and Challenges*. Dhaka, Bangladesh: The University Press Ltd.
- Afsar, R. (2002). Migration and rural livelihoods. In Toufique, K. A. & C. Turton (Eds.), *Hands Not Land: How Livelihoods are Changing in Rural Bangladesh* (pp. 89-96). Dhaka: Bangladesh Institute of Development Studies (BIDS).
- Afsar, R. (2005). *Bangladesh: Internal Migration and Pro-poor Policy*. Paper presented at the Regional conference on migration and development in Asia, 14-16 March, Lanzhou, China.
- Ahmed, A. I. M. U. (2004). Socio-demographic correlates of rural poverty in Bangladesh: a case study of Gaibandha Sadar and Tanore Upazilas. *Bangladesh e-journal of Sociology*, 1(2), 17.
- Ahmed, A. U., Hill, R. V., Smith, L. C., Wiesmann, D. M., & Frankenberger, T. (2007). The world's most deprived: Characteristics and causes of extreme poverty and hunger. *IFPRI, Washington*.
- Ahmed, F. (2004). Practices of poverty Measurement and Poverty Profile of Bangladesh. Asian Development Bank, *ERD (Economic and Research Department) Working Paper* (54).
- Ahmed, N. (2009). The sustainable livelihoods approach to the development of fish farming in rural Bangladesh. *Journal of International Farm Management*, 4(4), 1-18.
- Ahmed, N., Troell, M., Allison, E. H., & Muir, J. F. (2010). Prawn postlarvae fishing in coastal Bangladesh: Challenges for sustainable livelihoods. *Marine Policy*, 34(2), 218-227.
- Ahmed, S. (2010). *A Reassessment of Agriculture's Role on the Rural Poverty Reduction Process in Bangladesh*. Paper presented at the 54<sup>th</sup> Australian Agricultural and Resource Economics Society (AARES) Conference- 2010, Adelaide, Australia.
- Aikaeli, J. (2010). *Determinants of Rural Income in Tanzania: An Empirical Approach* (Research Report No. 10/4). Dar es Salam: Research on Poverty Alleviation (REPOA).

- Alam, M. J. (2004). Income and expenditure distribution pattern of sunamgonj *Haor* area: implications for poverty alleviation. BRAC University, Bangladesh. ESS (Economics and Social Science) Working paper (01).
- Alam, M. J. (2005). Socio-economic conditions of *Haor* fishermen a field level study. *BRAC University Journal*, 2(1), 57-63.
- Albert, J. R. G., & Collado, P. M. (2004). *Profile and Determinants of Poverty in the Philippines*. Paper presented at the 9th National Convention on Statistics (NCS), Mandaluyong City, Philippines, EDSA Shangri-La Hotel, October 4-5.
- Ali, A. A. G., & Thorbecke, E. (2000). The state and path of poverty in Sub-Saharan Africa: some preliminary results. *Journal of African Economies*, 9(Supplement 1), 9-40.
- Ali, A. M. S. (1995). Population pressure, environmental constraints and agricultural change in Bangladesh: examples from three agroecosystems. *Agriculture, Ecosystems & Environment*, 55(2), 95-109.
- Amin, R., & Pierre, M. S. (2002). *Giving Voice to the Poor: Poverty Alleviation in West Bengal and Bangladesh*. Dhaka, Bangladesh: The University Press Ltd.
- Asaduzzaman, M. (2002). Frontiers of change in rural Bangladesh: natural resources and sustainable livelihoods. In Toufique, K. A. & C. Turton (Eds.), *Hands Not Land: How Livelihoods are Changing in Rural Bangladesh* (pp. 65-70). Dhaka: BIDS.
- Ashley, S., Kar, K., Hossain, A., & Nandi, S. (2000). The Chars Livelihood Assistance Scoping Study. In *Development Ltd, DFID*.
- Azam, M. S., & Imai, K. S. (2009). Vulnerability and poverty in Bangladesh. *Economics Discussion Paper* (EDP 0905).
- Banerjee, L. (2007). Effect of flood on agricultural wages in Bangladesh: An empirical analysis. *World Development*, 35(11), 1989-2009.
- Barrett, C. B., Reardon, T., & Webb, P. (2001). Nonfarm income diversification and household livelihood strategies in rural Africa: Concepts, dynamics, and policy implications. *Food Policy*, 26(4), 315-331.
- Basu, S. R. (2003). *The Determinants of Economic Well-being: An Application in the Indian States*. Paper presented at the VIII<sup>th</sup> (8<sup>th</sup>) Spring Meeting of Young Economists, Leuven, April 3-5, Belgium.
- BBS. (2001). *Population Census-2001*: Bangladesh Bureau of Statistics (Ministry of Planning, Government of the People's Republic of Bangladesh).
- BBS. (2002). *Statistical Year Book of Bangladesh*. Dhaka: Bangladesh Bureau of Statistics (Ministry of Planning, Government of the People's Republic of Bangladesh).



- BBS. (2004). *Statistical Year Book of Bangladesh*. Dhaka: Bangladesh Bureau of Statistics. (Ministry of Planning, Government of the People's Republic of Bangladesh)
- BBS. (2005). *Preliminary Report on Agriculture Sample Survey*. Dhaka: Bangladesh Bureau of Statistics. (Ministry of Planning, Government of the People's Republic of Bangladesh)
- BBS. (2006). *Statistical Year Book of Bangladesh*. Dhaka: Bangladesh Bureau of Statistics. (Ministry of Planning, Government of the People's Republic of Bangladesh)
- Becker, G. S. (1988). Family economics and macro behavior. *American Economic Review*, 78(1), 1-13.
- Bhuyan, A. R., Harun-ar-Rashid, K., & Ahmad, S. U. (2001). *Rural Urban Migration and Poverty: The Case for Reverse Migration in Bangladesh* (MAP Focus Study Serial No. 10): Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP).
- Bird, K., & Shepherd, A. (2003). Livelihoods and chronic poverty in semi-arid Zimbabwe. *World Development*, 31(3), 591-610.
- Birdsall, N. (1993). Social development is economic development. *Policy Research, The World Bank, Working Paper* (WPS 1123).
- Bland, J. M., & Altman, D. G. (1996). Statistics notes: the use of transformation when comparing two means. *Bmj*, 312 (4 May 1996), 1153.
- Bradshaw, J. (2000). Child poverty in comparative perspective. In D. Gordon & P. Townsend (Eds.), *Breadline Europe: The Measurement of Poverty* (pp. 223-250). Bristol: The Policy Press.
- Bradshaw, T. K. (2006). Theories of Poverty and Anti-Poverty Programs in Community Development. *RPRC (Rural Poverty Research Center) Working paper* (06-05).
- Bradshaw, T. K. (2007). Theories of poverty and anti-poverty programs in community development. *Community Development*, 38(1), 7-25.
- Brammer, H. (1990). Floods in Bangladesh: II. Flood mitigation and environmental aspects. *The Geographical Journal*, 156(2 July 1990), 158-165.
- Brocklesby, M. A., & Fisher, E. (2003). Community development in sustainable livelihoods approaches - an introduction. *Community Development Journal*, 38(3), 185-198.
- BWDB. (2005). *Haors in Bangladesh*. Bangladesh Water Development Board (Ministry of Water Resources, Government of the People's Republic of Bangladesh).  
[http://www.bwdb.gov.bd/index.php?option=com\\_content&view=article&id=105&Itemid=95](http://www.bwdb.gov.bd/index.php?option=com_content&view=article&id=105&Itemid=95)

- Cahn, M. (2002). *Sustainable livelihood approach*. Paper presented at the 3rd Biennial Conference of the International Development Studies Network of Aotearoa, Newzeland.
- Carney, D. (2003). Sustainable Livelihoods Approaches: Progress and Possibilities for Change. *Department for International Development(DFID) , London, UK*.
- .Carney, D., Drinkwater, M., Rusinow, T., Neefjes, K., Wanmali, S., & Singh, N. (1999). Livelihoods Approaches Compared. *Department for International Development (DFID), London, UK*.
- Castella, J. C., Manh, P. H., Kam, S. P., Villano, L., & Tronche, N. R. (2005). Analysis of village accessibility and its impact on land use dynamics in a mountainous province of northern Vietnam. *Applied Geography*, 25(4), 308-326.
- Chambers, R. (1995). Poverty and livelihoods: Whose reality counts? *Environment and Urbanization*, 7(1), 173-204.
- Chambers, R. (1997). Responsible well-being-a personal agenda for development. *World Development*, 25(11), 1743-1754.
- Chambers, R. (2006). Vulnerability, coping and policy (Editorial introduction). *IDS Bulletin*, 37(4), 1-8.
- Chambers, R., & Conway, G. (1991). *Sustainable rural livelihoods: Practical concepts for the 21st century* (No. 296): IDS Discussion paper.
- Chaudhry, I. S. (2003). *An Empirical Analysis of The Determinants of Rural Poverty in Pakistan: A Case Study of Bahawalpur District With Special Reference to Cholistan*. Unpublished PhD thesis, The Islamia University Bahawalpur, Bahawalpur, Pakistan.
- Choudhury, G. A., & Nishat, A. (2005). *Hydro-meteorological characteristics of Hakaluki Haor*. The International Union for Conservation of Nature (IUCN), Dhaka, Bangladesh.
- Chowdhury, M. H. (Ed.) (2006) Floodplain. *Banglapedia* (National Encyclopedia of Bangladesh).
- Corcoran, M., Duncan, G., Gurin, G., & Gurin, P. (1985). Myth and reality: The causes and persistence of poverty. *Journal of Policy Analysis and Management*, 4(4), 516-536.
- Craig, J. F., Halls, A. S., Barr, J. J. F., & Bean, C. W. (2004). The Bangladesh floodplain fisheries. *Fisheries Research*, 66(2-3), 271-286.
- Crockett, J. (1964). Income and Asset Effects on Consumption: Aggregate and Cross Section. In National Bureau of Economic Research (NBER) (Ed.), *Models of Income Determination* (Vol. 28, pp. 97-136). Princeton: Princeton University Press.

- Davis, P. (2007). Discussions among the poor: Exploring poverty dynamics with focus groups in Bangladesh. *Chronic Poverty Research Centre (CPRC) Manchester, Working Paper* (84).
- Dayton, J., Khan, A., Ribe, H., & Schneider, M. (1993). Country Policies for Poverty Reduction: A Review of poverty Assessments. *ESP (Education and Social Policy) Department, The World Bank, Discussion Paper Series* (15).
- De Brauw, A., & Harigaya, T. (2007). Seasonal migration and improving living standards in Vietnam. *American Journal of Agricultural Economics*, 89(2), 430-447.
- De Haan, A., Brock, K., Carswell, G., Coulibaly, N., Seba, H., & Toufique, K. A. (2000). Migration and livelihoods: Case studies in Bangladesh, Ethiopia and Mali. *IDS Research Reports* (46).
- De Haan, A., & Yaqub, S. (2008). *Migration and poverty: linkages, knowledge gaps and policy implications*: United Nations Research Institute for Social Development.
- DeClerck, F., Ingram, J. C., & Rio, C. M. R. D. (2006). The role of ecological theory and practice in poverty alleviation and environmental conservation. *Frontiers in Ecology and the Environment*, 4(10), 533-540.
- DER Secretariat. (2004). Ready to Respond in Times of Need: Assessment of the Impact of the Early Flooding in the Haor Districts. Disaster Emergency Response (DER) Secretariat (Ministry of Food and Disaster Management, Government of the People's Republic of Bangladesh). Draft Summary Report (20-24 June, 2004).
- Deshingkar, P., & Grimm, S. (2004). Voluntary internal migration: An update. Paper commissioned by the Urban and Rural Change Team and the Migration Team, Policy Division, DFID. ODI. September 2004.
- Deshingkar, P., & Start, D. (2003). Seasonal Migration for Livelihoods in India: Coping Accumulation and Exclusion. *Overseas Development Institute (ODI), Working Paper* (220).
- DFID.(1999). Sustainable livelihoods guidance sheets. *Department for International Development (DFID), London, UK*.
- Elbers, C., Lanjouw, J. O., & Lanjouw, P. (2003). Micro-level Estimation of Poverty and Inequality. *Econometrica*, 71(1), 355-364.
- Ellis, F. (1999). Rural livelihood diversity in developing countries: evidence and policy implications. *Overseas Development Institute (ODI)*.
- Ellis, F. (2000). The determinants of rural livelihood diversification in developing countries. *Journal of Agricultural Economics*, 51(2), 289-302.

- Ellis, F. (2003). A livelihoods approach to migration and poverty reduction. *A paper commissioned by the Department for International Development (DFID), CNTR 03 4890*.
- Ellis, F. (2004). Occupational diversification in developing countries and implications for agricultural policy. *Hot topic paper-Programme of Advisory and Support Services to DFID (PASS) Project No. WB0207*.
- Ellis, F., & Allison, E. (2004). Livelihood diversification and natural resource access. *Food and agriculture Organization (FAO), LSP (Livelihood Support Programme) Working Paper (9)*.
- Ellis, F., & Freeman, H. A. (2004). Rural livelihoods and poverty reduction strategies in four African countries. *Journal of Development Studies*, 40(4), 1-30.
- Enfors, E. I., & Gordon, L. J. (2008). Dealing with drought: The challenge of using water system technologies to break dryland poverty traps. *Global Environmental Change*, 18(4), 607-616.
- Epprecht, M., Müller, D., & Minot, N. (2011). How remote are Vietnam's ethnic minorities? An analysis of spatial patterns of poverty and inequality. *The Annals of Regional Science*, 46(2), 349-368.
- EvIEWS 6. (2007). Basic Regression. *EvIEWS 6 User Guide II*, (Chapter 24, pp. 21-22). Irvine CA, USA. URL <http://www.evIEWS.com>.
- Farrington, J., Carney, D., Ashley, C., & Turton, C. (1999). Sustainable livelihoods in practice: Early applications of concepts in rural areas. *ODI, Natural Resource Perspectives, Number 42, June 1999*.
- FAO. (2001). Developing farming systems and best practices for flood-prone areas, *Annex - XV. In report of the: FAO Asia-Pacific Conference on Early Warning, Prevention, Preparedness and Management of Disasters in Food and Agriculture*. (Report No. APDC/01/11).
- Gardner, K., & Ahmed, Z. (2006). Place, social protection and migration in Bangladesh: A Londoni village in Biswanath. *Migration DRC Working Paper (T18)*.
- Glatting, G., Kletting, P., Reske, S. N., Hohl, K., & Ring, C. (2007). Choosing the optimal fit function: Comparison of the Akaike information criterion and the F-test. *Medical Physics*, 34(11), 4285-4292.
- Green, M., & Hulme, D. (2005). From correlates and characteristics to causes: Thinking about poverty from a chronic poverty perspective. *World Development*, 33(6), 867-879.

- Guba, E. G., & Lincoln, Y. S. (2000). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 163-194): Sage Publications, Inc.
- Gujarati, D. N. (2003). *Basic Econometrics* (4<sup>th</sup> ed.). NY: McGraw-Hill, Inc.
- Gujarati, D. N., & Porter, C. D. (2009). *Basic Econometrics* (5<sup>th</sup> ed.). NY: McGraw-Hill, Inc.
- Hagenaars, A., & De Vos, K. (1988). The definition and measurement of poverty. *Journal of Human Resources*, 23(2 Spring), 211-221.
- Hallman, K., Lewis, D., & Begum, S. (2003). An integrated economic and social analysis to assess the impact of vegetable and fish pond technologies on poverty in rural Bangladesh. *FCND Discussion Paper 163, EPTD Discussion Paper 112*.
- Handley, G., Higgins, K., Sharma, B., Bird, K., & Cammack, D. (2009). Poverty and poverty reduction in sub-Saharan Africa: An overview of the issues. *Overseas Development Institute (ODI) Working Paper 299*.
- Hanjra, M. A., Ferde, T., & Gutta, D. G. (2009). Reducing poverty in sub-Saharan Africa through investments in water and other priorities. *Agricultural Water Management*, 96(7), 1062-1070.
- Hay, M. J. (1980). A structural equations model of migration in Tunisia. *Economic Development and Cultural Change*, 28(2), 345-358.
- Hocking, R. R. (1976). The analysis and selection of variables in linear regression. *Biometrics*, 32(1), 1-49.
- Holden, S. T., & Sankhayan, P. L. (1998). Population pressure, agricultural change and environmental degradation in the western Himalayan region of India. *Forum for Development Studies*, 25(2), 271-300.
- Hossain, M. (1996). Rural Income and Poverty Trends. In Rahman, H. Z., M. Hossain & B. Sen (Eds.), *Analysis of Poverty Trend Project 1987-1994: Dynamics of Rural Poverty in Bangladesh*. Dhaka: Bangladesh Institute of Development Studies (BIDS).
- Hossain, M. (2009). *Dynamics of Poverty in Rural Bangladesh, 1988-2007: An Analysis of Household Level Panel Data*. Paper presented at the Employment, Growth and Poverty Reduction in Developing Countries. The Political Economy Research Institute, University of Massachusetts.
- Hossain, M., & Nargis, N. (2010). Dynamics of Poverty in Rural Bangladesh, 1988-2007: An Analysis of Household Level Panel Data. In Banerje, L., A. Dasgupta & R. Islam (Eds.), *Development, equity and poverty: Essays in honour of Azizur Rahman Khan* (pp. 213-232). Delhi: Macmillan Publishers India Ltd.

- Hossain, N. (2005). *Elite Perceptions of Poverty in Bangladesh*. Dhaka, Bangladesh: The University Press Ltd.
- Islam, A., Chowdhury, N. K., & Haque, M. R. (2005). Socio-Economic Baseline Survey of Pangar and Sunar-Dakuar *Haors*. The International Union for Conservation of Nature (IUCN). *Dhaka: Bangladesh*, viii+23pp.
- Islam, S. A. (2004). Overcoming poverty in Bangladesh: Search for a new paradigm. *Bangladesh e-journal of Sociology*, 1(2), 29-49.
- Jalan, J., & Ravallion, M. (1998a). Are there dynamic gains from a poor-area development program? *Journal of Public Economics*, 67(1), 65-85.
- Jalan, J., & Ravallion, M. (1998b). Transient poverty in postreform rural China. *Journal of Comparative Economics*, 26(2), 338-357.
- Jalan, J., & Ravallion, M. (2000). Is transient poverty different? Evidence for rural China. *The Journal of Development Studies*, 36(6), 82-99.
- Jalan, J., & Ravallion, M. (2002). Geographic poverty traps? A micro model of consumption growth in rural China. *Journal of Applied Econometrics*, 17(4), 329-346.
- Jarque, C. M., & Bera, A. K. (1987). A Test for Normality of Observations and Regression Residuals. *International Statistical Review*, 55(2), 163-172.
- Jamilah Ariffin. (1994). Poverty: Conceptual Underpinnings, Trends and Patterns in Malaysia and a Literature Review. In Jamilah Ariffin (Ed.), *Poverty Amidst Plenty*. Selangor, Malaysia: Pelanduk Publications.
- Jenkins, S. P. (2000). Modelling household income dynamics. *Journal of Population Economics*, 13(4), 529-567.
- Jensen, C. (2003). Development assistance to upland communities in The Philippines. *World Agroforestry Centre (ICRAF), Southeast Asia Regional Office. PO Box, 161*.
- Jolliffe, D. (2002). Whose Education Matters in the Determination of Household Income? Evidence from a developing country. *Economic Development and Cultural Change*, 50(2), 287-312.
- Kabeer, N. (2004). Snakes, ladders and traps: changing lives and livelihoods in rural Bangladesh (1994-2001). *Institute of Development Studies, CPRC Working Paper* (50).
- Kabir, M. A., Lipi, N. N., Afrin, S., & Seeley, J. (2008). Social protection by and for temporary work migrants and their households in Northwest Bangladesh. *A Final Report, Development Research Centre on Migration, Globalization and Poverty*. University of Sussex.

- Kakwani, N. (2003). *Issues in setting absolute poverty lines*. Asian Development Bank, Regional and Sustainable Development Department.
- Kam, S. P., Hossain, M., Bose, M. L., & Villano, L. S. (2005). Spatial patterns of rural poverty and their relationship with welfare-influencing factors in Bangladesh. *Food Policy*, 30(5-6), 551-567.
- Kazal, M. M. H., Villinueva, C. C., Hossain, M. Z., & Das, T. K. (2010). *Food Security Strategies of the People Living in Haor Areas: Status and Prospects* (Final Report PR #3/08)
- Khan, M. I., & Islam, M. A. (2005). Poverty Status of a Critical Wetland Area: Hakaluki Haor. In Nishat, A., S.M.M.H. Khan & R. Ahmed (Eds.), *An IUCN Report*: Dhaka, Bangladesh.
- Khandaker, N. I. (1992). Natural Calamities Due To Flooding and Cyclonic Storms: Bangladesh. In Majumdar, S. K., G. S. Forbes, E. W. Miller & R. F. Schmalz (Eds.), *'Natural and Technological Disaster: Causes, Effects and Preventive Measures'* (pp. 164-175): The Pennsylvania Academy of Science.
- Kletting, P., & Glatting, G. (2009). Model selection for time-activity curves: the corrected Akaike information criterion and the F-test. *Zeitschrift für Medizinische Physik*, 19(3), 200-206.
- Kletting, P., Kull, T., Reske, S. N., & Glatting, G. (2009). Comparing time activity curves using the Akaike information criterion. *Physics in Medicine and Biology*, 54(21), 501-507.
- Konseiga, A. (2005). Household Migration Decisions as Survival Strategy: The Case of Burkina Faso. *IZA (Institute for the Study of Labor) Discussion Paper* (1819).
- Kothari, U. (2002). Migration and chronic poverty. *Chronic Poverty Research Centre, Working Paper* (16).
- Krantz, L. (2001). The sustainable livelihood approach to poverty reduction: An Introduction. *Swedish International Development Cooperation Agency (SIDA)*.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational Psychological Measurement*, 30(2), 607-610.
- Laderchi, C. R., Saith, R., & Stewart, F. (2003). Does it matter that we do not agree on the definition of poverty? A comparison of four approaches. *Oxford Development Studies*, 31(3), 243-274.
- Levin, E. (2005). From Poverty and War to Prosperity and Peace. *Sustainable Livelihoods and Innovation in Governance of Artisanal Diamond Mining in Kono District, Sierra Leone. Master's thesis, University of British Columbia*.

- Lim Hin Fui. (1990). *Poverty Among Chinese in Malaysia (with special reference to three new villages in Perak)*. Unpublished Ph.D. Thesis, University of Malaya, Kuala Lumpur.
- Mahmood, R. A. (1996). Migration and Poverty. In H. Z. Rahman, M. Hossain & B. Sen (Eds.), *Analysis of Poverty Trend Project 1987-1994: Dynamics of Rural Poverty in Bangladesh*. Dhaka: Bangladesh Institute of Development Studies (BIDS).
- Malek, M. A., & Usami, K. (2010). Do non-farm incomes really matter for poverty among small households in rural Bangladesh? A case of advanced villages. *Journal of Development and Agricultural Economics*, 2(7), 250-267.
- Maloney, C. (1986). *Behaviour and Poverty in Bangladesh*. Dhaka, Bangladesh: The University Press Ltd.
- Marusteri, M., & Bacarea, V. (2010). Comparing groups for statistical differences: How to choose the right statistical test? *Biochemia Medica*, 20(1), 15-32.
- Maxwell, S. (1999). The Meaning and Measurement of Poverty. *ODI Poverty Briefing 3: February 1999*.
- McCaston, M. K., Rewald, M., & CARE's Integration Team. (2005). A Conceptual Overview of Underlying Causes of Poverty. *CARE*.
- Mehta, A. K., & Shah, A. (2001). Chronic poverty in India: Overview study. *CPRC Working Paper* (7).
- Mehta, A. K., & Shah, A. (2003). Chronic poverty in India: Incidence, causes and policies. *World Development*, 31(3), 491-511.
- Mendola, M. (2008). Migration and technological change in rural households: Complements or substitutes? *Journal of Development Economics*, 85(1-2), 150-175.
- Minot, N., & Baulch, B. (2005). Spatial patterns of poverty in Vietnam and their implications for policy. *Food Policy*, 30(5-6), 461-475.
- Minot, N., Baulch, B., & Epprecht, M. (2003). *Poverty and inequality in Vietnam: Spatial patterns and geographic determinants* (Research Report). (International Food Policy Research Institute).
- Minot, N., & Yamamura, S. (2003). *Income Diversification and Poverty in the Northern Uplands of Vietnam*. Washington DC USA: International Food Policy Research Institute. (Prepared for Japan Bank for International Cooperation).
- Mishra, S. (2007). Household Livelihood and Coping Mechanism During Drought among Oraon Tribe of Sundargarh District of Orissa, India. *Journal of Social Science*, 15(2), 181-186.



- Monsur, M. H. (Ed.) (2006) Pleistocene Terrace. *Banglapedia* (National Encyclopedia of Bangladesh).
- Moore, M., Choudhary, M., & Singh, N. (1998). *How Can We Know What They Want? Understanding Local Perceptions of Poverty and Ill-being in Asia*. Institute of Development Studies, University of Sussex.
- Mortimore, M., Ariyo, J., Bila, M., Faye, A., Faye, A., Herrmann, S., et al. (2008). *Links between ecosystem services and poverty reduction: Situation analysis for arid and semi-arid lands in the Sahel* (Final Report: Sahel Synthesis 3).
- Mosse, D., Gupta, S., Mehta, M., Shah, V., fnms Rees, J., & Kribp Project Team. (2002). Brokered livelihoods: Debt, labour migration and development in tribal western India. *Journal of Development Studies*, 38(5), 59-88.
- Muijs, D. (2004). *Doing quantitative research in education with SPSS*. London: Sage Publications Ltd.
- Mukherjee, N., Hardjono, J., & Carriere, E. (2002). People, poverty and livelihoods: Links for sustainable poverty reduction in Indonesia. *The World Bank*.
- Nargis, N., & Hossain, M. (2006). Income dynamics and pathways out of rural poverty in Bangladesh, 1988-2004. *Agricultural Economics*, 35, 425-435.
- Neely, C., Sutherland, K., & Johnson, J. (2004). Do sustainable livelihoods approaches have a positive impact on the rural poor? A look at twelve case studies. *FAO LSP (Livelihoods Support Programme) Working Paper* (LSP WP16).
- Obermeyer, C. M. (1997). Qualitative methods: a key to a better understanding of demographic behavior? *Population and Development Review*, 23(4), 813-818.
- Omideyi, A. K. (2008). Poverty and development in Nigeria: trailing the MDGs? *African Journal of Infectious Diseases*, 1(1), 3-17.
- Orr, A., Adolph, B., Islam, M. R., Rahman, H., Banua, B., & Roy, M. K. (2009). *Pathways from Poverty: The Process of Graduation in Rural Bangladesh*. Dhaka: The University Press Ltd.
- Otsuka, K., & Estudillo, J. (2007). *Changing sources of household income and poverty reduction in rural Asia, 1985-2004*. Paper presented at the Agricultural and Rural Development for Reducing Poverty and Hunger in Asia: In Pursuit of Inclusive and Sustainable Growth, ADB Headquarters, Manila, Philippines, August 9–10, 2007.
- Oxaal, Z. (1997). *Education and Poverty: A Gender Analysis* (Report No. 53): Swedish International Development Cooperation Agency (SIDA) and (Institute of Development Studies (IDS).

- Palivos, T. (2001). Social norms, fertility and economic development. *Journal of Economic Dynamics and Control*, 25(12), 1919-1934.
- Parikh, H. H., Li, W. C., & Ramanathan, M. (1999). Evaluation of an alternative to the Kolmogorov-Smirnov test for flow cytometric histogram comparisons. *Journal of Immunological Methods*, 229(1), 97-105.
- Parker, B., & Kozel, V. (2007). Understanding Poverty and Vulnerability in India's Uttar Pradesh and Bihar: A Q-squared Approach. *World Development*, 35(2), 296-311.
- Parkin, F. (1979). *Marxism and class theory: A bourgeois critique*. London: Tavistock
- Pettigrew, T. F., Christ, O., Wagner, U., Meertens, R. W., Van Dick, R., & Zick, A. (2008). Relative deprivation and intergroup prejudice. *Journal of Social Issues*, 64(2), 385-401.
- Place, F., Adato, M., & Hebinck, P. (2007). Understanding rural poverty and investment in Agriculture: An assessment of integrated quantitative and qualitative research in western Kenya. *World Development*, 35(2), 312-325.
- Quigley, W. P. (2003). *Ending poverty as we know it: Guaranteeing a right to a job at a living wage*. Philadelphia: Temple University Press.
- Rabby, T. G., Alam, G. M., Fredericks, L. J., Nair, S., Nurul Azam, M., Al-Amin, A. Q., Kamluddin, S. M., Khan, I. (2011b). What offers solution to the poverty reduction of the *Haor* people in Bangladesh? Seasonal migration or a new inshore economic livelihood policy. *African Journal of Business Management*, 5(23), 9979-9991.
- Rabby, T. G., Alam, G. M., Mishra, P. K., Hoque, K. E., Fredericks, L. J., & Nair, S. (2011a). Different economic and policy perspectives in micro population for sustainable development: A study of the *Haor* livelihood in Bangladesh. *African Journal of Business Management*, 5(6), 2475-2492.
- Rabby, T. G., Azam, M. N., Yeasmin, M., & Hoque, M. Z. (2010). Decision Making Method in Seasonal-Domestic-Migration: A Critical Appraisal. *International Review of Business Research Papers*, 6(6), 276-285.
- Rafique, A., Massey, D., & Rogaly, B. (2006). Migration for Hard Work: A Reluctant Livelihood Strategy for Poor Households in West Bengal, India. *Development Research Center (DRC) Working Paper Series WP-T17, University of Sussex*.
- Rafique, A., & Rogaly, B. (2003). *Internal seasonal migration, livelihoods and vulnerability in India: A case study*. Paper presented at the Regional Conference on Migration, Development and Pro-Poor Policy Choices in Asia, Dhaka, Bangladesh, 22-24 June.
- Rahman, A., & Razzaque, A. (2000). On reaching the hardcore poor: Some evidence on social exclusion in NGO programmes. *The Bangladesh Development Studies*, XXVI(1), 1-35.

- Rahman, H. Z. (1996a). Bangladesh-Dynamics of Rural Poverty: A 1987-1994 overview. In Rahman, H. Z., M. Hossain & B. Sen (Eds.), *1987-94: Dynamics of rural poverty in Bangladesh*. Dhaka: University Press Limited.
- Rahman, H. Z. (1996b). Crisis, Income Erosion and Coping. In Rahman, H. Z., M. Hossain & B. Sen (Eds.), *1987-1994: Dynamics of Rural Poverty in Bangladesh, (mimeo.)*, Dhaka, Bangladesh: BIDS.
- Rahman, H. Z. (2002). Re-thinking local governance: Towards a livelihoods focus. In Toufique, K. A. & C. Turton (Eds.), *Hands Not Land: How Livelihoods are Changing in Rural Bangladesh* (pp. 113-119). Dhaka: BIDS.
- Rahman, R. I. (2002). Rural poverty: patterns, processes and policies. In Toufique, K. A. & C. Turton (Eds.), *Hands Not Land: How Livelihoods are changing in Rural Bangladesh* (pp. 79-88). Dhaka: Bangladesh Institute of Development Studies (BIDS).
- Rahman, R. I., & Islam, K. M. N. (2003). Employment poverty linkages: Bangladesh. *ILO, Issues in Employment and Poverty Discussion Paper, 10*.
- Rahman, S. (2009). Microdeterminants of poverty among the farming population in Bangladesh. *Outlook on Agriculture*, 38(4), 349-355.
- Rahman, S., & Davis, J. (2005). A survey of rural livelihood and enterprise development opportunities in the Chars, Bangladesh. *DFID Poverty Oriented Research Programme R8369 (NRI: C1731)*.
- Rana, M. P., Chowdhury, M. S. H., Sohel, M. S. I., Akhter, S., & Koike, M. (2009). Status and socio-economic significance of wetland in the tropics: A study from Bangladesh. *iForest-Biogeosciences and Forestry*, 2(1), 172-177.
- Rashid, D. A., Langworthy, M., & Aradhyula, S. V. (2006). *Livelihood shocks and coping strategies: an empirical study of Bangladesh households*. Paper presented at the American Agricultural Economics Association Annual Meeting, July 23-26, Long Beach, California.
- Rashid, T., Monsur, M. H., & Suzuki, S. (2006). A Review on the Quaternary Characteristics of Pleistocene Tracts of Bangladesh. *Earth Science Reports*, 13(1), 1-13.
- Ravallion, M. (1996). Issues in measuring and modeling poverty. World Bank, Policy Research Working Paper (WPS 1615).
- Ravallion, M., & Bidani, B. (1994). How robust is a poverty profile? *The World Bank Economic Review*, 8(1), 75-102.
- Ravallion, M., & Sen, B. (1996). When method matters: Monitoring poverty in Bangladesh. *Economic Development and Cultural Change*, 44(4), 761-792.

- Rayhan, I., & Grote, U. (2007). Coping with Floods: Does Rural-Urban Migration Play any Role for Survival in rural Bangladesh? *Journal of Identity and Migration Studies*, 1(2), 82.
- Razali, N. M., & Wah, Y. B. (2011). Power comparisons of shapiro-wilk, kolmogorov-smirnov, lilliefors and anderson-darling tests. *Journal of Statistical Modeling and Analytics*, 2(1), 21-33.
- Reardon, T., Berdegue, J., Barrett, C. B., & Stamoulis, K. (2006). Household income diversification into rural nonfarm activities. In S. Haggblade, P. Hazell & T. Reardon (Eds.), *Transforming the Rural Nonfarm Economy. Opportunities and Threats in the Developing World*. Baltimore: Johns Hopkins University Press.
- Reardon, T., & Vosti, S. A. (1995). Links between rural poverty and the environment in developing countries: Asset categories and investment poverty. *World Development*, 23(9), 1495-1506.
- Sabates-Wheeler, R., Sabates, R., & Castaldo, A. (2008). Tackling poverty-migration linkages: evidence from Ghana and Egypt. *Social Indicators Research*, 87(2), 307-328.
- Sachs, J. D. (2005). *The end of poverty: How can we make it happen in our life time*. New York: Penguin Group.
- Saha, B. K. (2002). Rural development trends: What the statistics say. In Toufique, K. A. & C. Turton (Eds.), *Hands Not Land: How Livelihoods are Changing in Rural Bangladesh* (pp. 47-55). Dhaka: BIDS.
- Saleth, R. M. (1997). Occupational Diversification among Rural Groups: A Case Study of Rural Transformation in Tamil Nadu. *Economic and Political Weekly*, 32(30 (Jul.26-Aug.1, 1997)), 1908-1917.
- Sanderson, D. (2000). Cities, disasters and livelihoods. *Environment and Urbanization*, 12(2), 93-102.
- Scoones, I. (1998). Sustainable rural livelihoods: A framework for analysis. *IDS Working paper* (72).
- Sen, A. (1983). Development: Which way now? *The Economic Journal*, 93(372), 745-762.
- Sen, A. (1993). Capability and well-being. In Nussbaum, M. & A. Sen (Eds.), *The quality of life*. Oxford: Clarendon Press.
- Sen, A. K. (1987). Gender and cooperative conflicts. *World Institute for Development Economics Research (WIDER), Working Paper* (WP 18).
- Sen, A. K. (1999). *Development as freedom*. Oxford: Oxford University Press.

- Sen, B. (2003). Drivers of escape and descent: changing household fortunes in rural Bangladesh. *World Development*, 31(3), 513-534.
- Sen, B., & Ali, Z. (2005). Spatial Inequality in Social Progress in Bangladesh. *Programme for Research on Chronic Poverty in Bangladesh (PRCPB) Working Paper* (7).
- Sen, B., & Islam, Q. T. (1993). Monitoring Adjustment and Urban Poverty in Bangladesh: Issues, Dimensions, Tendencies. *Monitoring Adjustment and Poverty in Bangladesh* (5), 2,100-102,200.
- Serrat, O. (2008). The Sustainable Livelihoods Approach. *ADB, Knowledge Solutions*, November, 15, 2008.
- Shaffer, P. (2008). New Thinking on Poverty: Implications for Globalization and Poverty Reduction Strategies. *DESA (Department of Economic and Social Affairs) Working Paper* (65).
- Shah, A., & Guru, B. (2003). Poverty in remote rural areas in India: A review of evidence and issues. *Gujarat Institute of Development Research, Working paper* (139).
- Shahabuddin, Q. (2004). Unfavourable Environment and Chronic Poverty: Some Preliminary Findings. *Programme for Research on Chronic Poverty in Bangladesh (PRCPB) Working Paper* (5).
- Shahriar, A. Z. M., Zeba, S., Shonchoy, A. S. M. P., & Parveen, S. (2006). Seasonal Migration of Labor in the Autumn Lean Period: Evidence from Kurigram District, Bangladesh. *BRAC University, Bangladesh. ESS Working Paper Series* (007).
- Shamsuddin, S. D. (1981). Aspects of Migration from Rural Areas to Industrial Urban Centres of Bangladesh: A Case Study. In Mandal, R.B. (Ed.), *FRONTIERS IN MIGRATION ANALYSIS* (pp. 205-216). New Delhi: Concept Publishing Company.
- Shivakoti, G., & Shrestha, S. (2005a). Analysis of Livelihood Asset Pentagon to Assess the Performance of Irrigation Systems Part 1 – Analytical Framework. *Water International*, 30(3), 356-362.
- Shivakoti, G., & Shrestha, S. (2005b). Analysis of Livelihood Asset Pentagon to Assess the Performance of Irrigation Systems: Part-2 Application of Analytical Framework. *Water international*, 30(3), 363-371.
- Shonchoy, A. (2008). *Seasonal Migration and the Effectiveness of Micro-credit in the Lean period: Evidence from Bangladesh*. Paper presented at the 21st century conference Harvard University, Boston.
- Silber, J., & Verme, P. (2012). Relative deprivation, reference groups and the assessment of standard of living. *Policy Research (The World Bank) Working Paper* (WPS 5930).

- Singh, R. P., & Hazell, P. B. R. (1993). Rural Poverty in the Semi-Arid Tropics of India: Identification, Determinants and Policy Interventions. *Economic and Political Weekly*, 28(12/13), A9-A15.
- Sinn, H. W. (1988). The Sahel Problem. *Kyklos*, 41(2), 187-213.
- Sjaastad, L. A. (1962). The Costs and Return of Human Migration. *Journal of Political Economy*, 70(5, part 2: Investment in Human Beings), 80-93.
- Skeldon, R. (2003). *Migration and Poverty*. Paper presented at the African Migration and Urbanization in Comparative Perspective, June 4 – 7, Johannesburg, South Africa.
- Soeftestad, L. T. (2000). *Riparian Right and Colonial Might in the Haors Basin Bangladesh*. Paper presented at the International Association for the Study of Common Property (IASCP) (8th), 31 May – 4<sup>th</sup> June, Bloomington, Indiana, United States.
- Solesbury, W. (2003). *Sustainable livelihoods: A case study of the evolution of DFID policy*: Overseas Development Institute.
- Somers, H. M. (1950). A Theory of Income Determination. *The Journal of Political Economy*, 58(6), 523-541.
- Stark, O., Micevska, M., & Mycielski, J. (2009). Relative poverty as a determinant of migration: Evidence from Poland. *Economics Letters*, 103(3), 119-122.
- Stark, O., & Yitzhaki, S. (1988). Labour migration as a response to relative deprivation. *Journal of Population Economics*, 1(1), 57-70.
- Stephens, M. A. (1974). EDF statistics for goodness of fit and some comparisons. *Journal of the American Statistical Association*, 69(347), 730-737.
- Strauss, A. L., & Corbin, J. (1990). *Basic of qualitative research*. Newbury Park, CA: SAGE.
- Studenmund, A. H., & Cassidy, J. H. (1992). *Using econometrics: A practical guide* (2nd ed.): HarperCollins.
- Swain, R. B., Van Sanh, N., & Van Tuan, V. (2008). Microfinance and poverty reduction in the Mekong Delta in Vietnam. *African and Asian Studies*, 7, 2(3), 191-215.
- Thornton, P. (2002). The formal institutional framework of rural livelihoods in Bangladesh. In Toufique, K. A. & C. Turton (Eds.), *Hands Not Land: How Livelihoods are Changing in Rural Bangladesh* (pp. 105-111). Dhaka: BIDS.
- Toufique, K. A. (2002). Agricultural and non-agricultural livelihoods in rural Bangladesh: a relationship in flux. In Toufique, K. A. & C. Turton (Eds.), *Hands Not Land: How Livelihoods are Changing in Rural Bangladesh* (pp. 57-63). Dhaka: BIDS.

- Toufique, K. A., & Turton, C. (2002). Poverty in a Changing rural landscape. In Toufique, K. A. & C. Turton (Eds.), *Hands Not Land: How Livelihoods are Changing in Rural Bangladesh*. Dhaka, Bangladesh: BIDS.
- Turner, S. D. (2005). The underlying causes of poverty in Lesotho. *Maseru: CARE Lesotho-South Africa*.
- Van de Walle, D., & Gunewardena, D. (2001). Sources of ethnic inequality in Viet Nam. *Journal of Development Economics*, 65(1), 177-207.
- Varma, S., & Kumar, P. (1996). Rural Non-farm Employment in Bangladesh. *Bangladesh Development Studies*, 24(3&4), 75-102.
- Vassalos, M., Dillon, C. R., & Childs, P. D. (2012). Empirically testing for the location - scale condition: A review of the economic literature. *Journal of Risk Model Validation*, 6(3, Fall 2012), 51-66.
- Waddington, H., & Sabates-Wheeler, R. (2003). How does poverty affect migration choice? A review of literature. *Development Research Centre (DRC) on Migration, Globalisation and Poverty (Working Paper T3)*, University of Sussex.
- Wanmali, S., & Islam, Y. (1997). Rural Infrastructure and Agricultural Development in Southern Africa: A centre-periphery perspective. *The Geographical Journal*, 163(3 November), 259-269.
- Werner, C., & Schermelleh-Engel, K. (2009). Structural equation modeling: advantages, challenges, and problems. *Introduction to Structural Equation Modeling with LISREL*, Goethe University, Frankfurt.
- White, H. (2002). Combining quantitative and qualitative approaches in poverty analysis. *World Development*, 30(3), 511-522.
- Wodon, Q. T. (1997). Food energy intake and cost of basic needs: Measuring poverty in Bangladesh. *The Journal of Development Studies*, 34(2), 66-101.
- Wodon, Q. T. (1999a). *Micro determinants of consumption, poverty, growth, and inequality in Bangladesh* (Vol. 2076): World Bank, South Asia Region, Poverty Reduction and Economic Management Sector Unit.
- Wodon, Q. T. (1999b). *Growth, poverty, and inequality: A regional panel for Bangladesh* (Vol. 2072): World Bank Publications.
- Wodon, Q. T. (2000). Microdeterminants of consumption, poverty, growth, and inequality in Bangladesh. *Applied Economics*, 32(10), 1337-1352.
- Wood, G. (2003). Staying secure, staying poor: The ‘Faustian Bargain’. *World Development*, 31(3), 455-471.

- World Bank.(2001). *Kingdom of Morocco Poverty Update (In Two Volumes) Volume ii: Annexes* (Report No. 21506-MOR): Middle East and North Africa Human Development Sector (MNSHD).
- World Bank. (2005). *Introduction to Poverty Analysis: Poverty Manual, All, JH Revision of August 8, 2005*: The World Bank Institute.
- World Bank. (2008). *Bangladesh: Poverty Assessment for Bangladesh-Creating Opportunities and Bridging the East-West Divide* (No. 44321-BD). Washington, DC: World Bank.
- Yazici, B., & Yolacan, S. (2007). A comparison of various tests of normality. *Journal of Statistical Computation and Simulation*, 77(2), 175-183.
- Yitzhaki, S. (1982). Relative deprivation and economic welfare. *European Economic Review*, 17(1), 99-113.
- Zug, S. (2006). Monga-Seasonal Food Insecurity in Bangladesh: Bringing the Information Together. *Journal of Social Studies*, 111(Jul-Sept 2006), 21-35.